

# **ARKANSAS TEACHER RETIREMENT SYSTEM**

**February 3, 2020**

1400 West Third Street

**BOARD ROOM**

Little Rock, AR 72201

## **Board of Trustees Meeting**

**11:00 a.m.**

### **Trustees**

Danny Knight, Chair

Dr. Richard Abernathy, Vice Chair

Anita Bell

Lloyd Black

Kathy Clayton

Kelly Davis

Shawn Higginbotham

Bobby G. Lester

Chip Martin

Robin Nichols

Janet Watson

### **Ex Officio Trustees**

Candace A. Franks, State Bank Commissioner

Johnny Key, Education Commissioner

Honorable Andrea Lea, State Auditor

Honorable Dennis Milligan, State Treasurer

**AGENDA**  
**ARKANSAS TEACHER RETIREMENT SYSTEM**  
**BOARD OF TRUSTEES**

**February 3, 2020**  
**11:00 a.m.**  
**1400 West Third Street**  
**Little Rock, AR 72201**

- I. **\*Call to Order/Roll Call.** page 1.
- II. **\*Adoption of Agenda.** page 2.
- III. Executive Summary. (Attachment No. 1) page 6.
- IV. **\*Approval of December 2, 2019 Minutes.** (Attachment No. 2) page 16.
- V. **\*Proposed Change to 2020 Board of Trustees Meeting Schedule.** *Clint Rhoden, Executive Director* (Attachment No. 3) page 26.
- VI. **\*Staff Empowerment.**
  - A. **\*Authority to Transact Business.**
    - 1. **\*Resolution 2020-01.** (Attachment No. 4) page 27.
  - B. **\*Specific Power of Executive Director.**
    - 1. **\*Resolution 2020-02.** (Attachment No. 5) page 28.
  - C. **\*Appointment of ATRS as Manager of LLCs.**
    - 1. **\*Resolution 2020-03.** (Attachment No. 6) page 29.
- VII. **\*Authority to Reimburse Trustee Expenses for 2020.**
  - A. **\*Resolution 2020-04.** (Attachment No. 7) page 30.
- VIII. **\*Authorization for Board Travel and Expenses for 2020.**
  - A. **\*Resolution 2020-05.** (Attachment No. 8) page 31.
- IX. **\*Adoption of Employer Contribution Rate.**

\* Action Item

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- A. **\*Resolution 2020-06.** (Attachment No. 9) page 36.
  
- X. **\*Adoption of Member Contribution Rate.**
  - A. **\*Resolution 2020-07.** (Attachment No. 10) page 37.
  
- XI. **\*Adoption of Contribution Rate applied to Outsourced Positions.**
  - A. **\*Resolution 2020-08.** (Attachment No. 11) page 38.
  
- XII. **\*Actuarial Valuations: June 30, 2019.**
  - A. Active and Inactive Members. (Attachment No. 12) page 39.
  - B. Retirees and Beneficiaries. (Attachment No. 13) page 113.
  
- XIII. Report of Member Interest Amount Waived Under A.C.A. Sec. 24-7-205. A total of Two (2) Member Interest amounts were waived for this reporting period in the amount of \$1,240.35. (Attachment No. 14) page 153.
  
- XIV. Report of Employer Penalties and Interest Waived Under A.C.A. Sec. 24-7-411. A total of Seven (7) Employer Penalties and Interest amounts were waived for this reporting period in the amount of \$6,481.40. (Attachment No. 15) page 154.
  
- XV. Manifest Injustice Report. *Martha Miller, General Counsel* (Attachment No. 16) page 155.
  
- XVI. **\*Forfeiture Recommendations pursuant to A.C.A. 24-7-734(6).** *Martha Miller, General Counsel* (Attachment No. 17) page 156.
  
- XVII. Audit Committee Report. *Kelly Davis, Audit Committee Chair*
  - A. Internal Audit Report: ATRS Option Benefits. (Attachment No. 18) page 158.
  
- XVIII. Investment Committee Report. *Robin Nichols, Investment Committee Chair*
  - A. Arkansas Related and Investment Update.
    - 1. List of Fund Closings.
      - a. Clearlake Capital Partners VI, L.P. a Private Equity Fund that Makes Opportunistic Debt and Equity Investments in Middle Market Companies Undergoing Change and/or are in Underserved Industries or Markets in North America, the Board Authorized Commitment of up to \$30 Million Dollars on October 7, 2019 was Accepted and Closed on December 10, 2019.

\* Action Item



XX. **\*Staff Reports.**

- A. **\*Medical Committee Report. A total of Fifteen (15) Disability Retirement Applications were approved.** *Willie Kincade, Director of Operations*  
(Attachment No. 27) page 454.

XXI. Other Business.

XXII. **\*Adjourn.**

## EXECUTIVE SUMMARY

TO: Board of Trustees  
FROM: ATRS Staff  
RE: Executive Summary  
DATE: February 3, 2020

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**V. Proposed Change to 2020 Board of Trustees Meeting Schedule.**

**VI. Staff Empowerment.**

Each year the ATRS Board authorizes ATRS staff to transact certain business to set the specific powers of the executive director and to appoint the executive director to manage and delegate operational duties to the limited liability companies that ATRS uses to manage its investments and Arkansas related property. The three resolutions regarding such actions are attached to this agenda as action items. The resolutions are worded the same as last year.

**A. Authority to Transact Business.**

This is the standard Board resolution to authorize staff to take action and limit authority of staff with the same authority and restrictions as in previous years. The changes this year from previous years is that the year has changed to 2020, and removing G. Wayne Greathouse Director of Investment due to his retirement.

**1. Resolution 2020-01.**

**B. Specific Powers of Executive Director.**

This is the standard Board resolution to authorize specific powers of the Executive Director and to also limit those powers as in previous years. Other than to change the year, this is unchanged from last year.

**1. Resolution 2020-02.**

**C. Appointment of ATRS as Manager of LLC's.**

This is the standard Board resolution to authorize staff to transact business as manager of LLCs. Other than to change the year, this is unchanged from last year.

**1. Resolution 2020-03**

**VII. Authority to Reimburse Trustee Expenses for 2020.**

This is an action item for the Board to adopt a resolution authorizing reimbursement to Trustees for their expenses and costs for serving as Trustees. The resolution is the same as last year. Other than to change the year, this is unchanged from last year.

**A. Resolution 2020-04.**

**VIII. Authorization for Board Travel and Expense Reimbursement for 2020.**

This is a standard Resolution for Board reimbursement. The standard rate for cities not identified or located in listed cities had a small increase (\$2 per day for lodging.) and Little Rock's lodging rate increased by \$2 per day. You should note that all travel reimbursement requests for both in-state and out-of-state travel can be found on the Federal General Services Administration website at:

<http://www.gsa.gov/portal/category/100120>

GSA rates are set by fiscal year, effective October 1 each year. For cities not identified or located on the website, the standard lodging rate is \$96 per day and \$55 per day for meals.

**A. Resolution 2020-05.**

**IX. 2020-2021 Employer Contribution Rate.** This is a standard resolution that has been adopted over the years to establish the employer contribution rate for the upcoming fiscal year. The ATRS Board, on November 13, 2017, adopted an employer contribution rate schedule that established the employee contribution rate for FY2021 should be 14.50%. This resolution sets the employer contribution rate at 14.50%.

**A. Resolution 2020-06.**

**X. 2020-2021 Member Contribution Rate.** This is a standard resolution that has been adopted over the years to establish the member contribution rate for the upcoming fiscal year. The ATRS Board, on November 13, 2017, adopted a member contribution rate schedule that established the member contribution rate for FY2021 should be 6.50%. This resolution sets the member contribution rate at 6.50%.

**A. Resolution 2019-07.**

**XI. Adoption of Contribution Rate applied to Outsourced Positions.** From the 2017 Legislative session, a contribution rate now applies to outsourced salaries that are embedded positions as defined by that law. The law provides a "phased in" rate over several years. In order to process this rate like the employer and member contribution rate, it is also placed on the agenda for the Board to officially set the rate by Resolution. After the full phased in period, the Board has the authority to adjust the rate to a maximum rate 4%. The authorized rate by law for fiscal year 2021 is 3%.

**A. Resolution 2020-08.**

**XII. Actuarial Valuations, June 30, 2019.** These are the annual reports prepared by the actuaries concerning the valuation of liabilities to active and inactive members along with the valuation of liabilities for annuities being paid to current retirees and current beneficiaries. These reports reflect the future liabilities of ATRS to these two groups. The two groups are: (1) Active and Inactive Members; and (2) Members and Beneficiaries of Members currently receiving a monthly annuity. **This is an action item to approve the reports.** The ATRS Board has already had a presentation by the actuaries on these reports that are now in final form.

**A. Active & Inactive Members.**

This report reflects the liabilities owed by ATRS to active and inactive members. Active members include all those who are currently employed with an ATRS employer and continue to accrue service credit. Inactive members include those who are vested but no longer active and would be entitled to a benefit at a point in the future when they reach an appropriate age.

**B. Retirees & Beneficiaries.**

This explanation is set forth above. These liabilities reflect the liabilities to ATRS retirees, beneficiaries, survivors, and incapacitated children.

- XIII. Report of Member Interest Amount Waived Under A.C.A. Sec. 24-7-205.** ATRS waives interest for members when there is a dispute between ATRS and the member as to whether ATRS made a mistake or otherwise did not do all that was required on the member's account. Since ATRS has implemented the actuarial cost method for the purchase of service credit, interest waived is slowly disappearing, as well as the number of members who purchase service credit. No member interest was waived for this reporting period. Two (2) member interest amounts were waived for this reporting period in the amount of \$1,240.35. This is a standard report for information and is not an action item
- XIV. Report of Employer Penalties and Interest Waived Under A.C.A. Sec. 24-7-411.** ATRS may also waive employer interest and penalties when reports or payments are late or have issues due to a new bookkeeper, inclement weather, sickness and other situations that justify a waiver. Four (4) employer penalties and interest amounts were waived for this reporting period in the amount of \$6,481.40. This is a standard report for information and is not an action item.
- XV. Manifest Injustice Report.** In December the ATRS Board found that a manifest injustice occurred in the matter of the Little Rock School District's error in not reporting six (6) years (1995 through 2000) of non-contributory service for an ATRS member. The Board voted to hold the member harmless for the error; waived most of the accrued interest; and directed staff to invoice the school district for employer contributions of \$19,437.47 and interest of \$16,938.86, with no additional accrual of interest if remitted before June 30, 2020.

On January 8, ATRS received payment in full from the LRSD of the \$36,376.33 invoice.

- XVI. Forfeiture Recommendations Pursuant to A.C.A. 24-7-734(6).** A.C.A. §24-7-734(b) provides that benefits that are not paid within five (5) years of the date they are due may be forfeited if (1) ATRS is unable to contact the person entitled to the benefit by mail addressed to the last known address on record; or (2) if the person entitled to the benefit fails to submit the required paperwork to ATRS to claim the benefit. The forfeiture of benefits is a question for the Board.

***A.C.A. §24-7-734. Lost payees. (b) (1) If the board is unable within five (5) years after payment of a benefit is due to a member or beneficiary to make the payment because it cannot ascertain the whereabouts of the member or the identity and whereabouts of the beneficiary or personal representative by mailing to the last known address shown on the board's records and neither the member, the beneficiary, or personal representative has submitted the paperwork and forms required by the system before the expiration of the five (5) years, then, and in each case, the board shall direct***

*that the amount shall be forfeited to the trust assets of the system.  
(emphasis added)*

Staff has begun reviewing a list of four hundred twenty-three (423) member accounts where the member died more than five (5) years ago and where benefits have not been distributed to determine why the benefits have not been paid. In each instance, staff confirmed that ATRS had attempted to contact a family member or beneficiary, in most cases multiple times. Most often, there was simply no response at all. In one instance, a family member notified ATRS that they would not be claiming the benefits because it was so small it wasn't worth the hassle of claiming it; in another instance, the family member said that the member's debts were greater than the estate assets. In a few instances, a family member responded to ATRS correspondence and then failed to follow through with the claims process.

Staff reviewed twenty-nine (29) member accounts in this initial round of reviews and, of those reviewed, identified benefits in 13 accounts totaling in the aggregate \$181,119.33 that fall within the provisions of this Code section. Staff recommends that the Board find these benefits should be forfeited according to A.C.A. §24-7-734(b) and direct the staff to transfer these benefits to the trust assets of ATRS. **This is an action item.**

## **XVII. Audit Committee Report.**

A. Internal Audit Report: ATRS Option Benefits.

## **XVIII. Investment Committee Report.**

### **A. Arkansas Related and Investment Update**

#### **1. List of Fund Closings**

- a. Clearlake Capital Partners VI, L.P. a Private Equity Fund that Makes Opportunistic Debt and Equity Investments in Middle Market Companies Undergoing Change and/or are in Underserved Industries or Markets in North America, the Board Authorized Commitment of up to \$30 Million Dollars on October 7, 2019 was Accepted and Closed on December 10, 2019.** The ATRS full commitment of \$30 million dollars was negotiated, accepted, and closed on December 10, 2019.

**b. Rebalancing of ATRS Timber Holdings Managed by BTG Pactual by Exchanging Certain ATRS Timber Holdings for Shares of the BTG Pactual Open Ended Core US Timberland Fund, LP, a Timber Fund Focused on Long-Term Commercial Timber Properties.** The ATRS rebalancing was negotiated, accepted, and closed on December 30, 2019.

**2. Investment Manager Guideline Update.** ATRS has established guidelines for some accounts managed by third party investment managers. These guidelines include information about the investment manager's strategy, benchmark, and type of securities the investment manager is allowed to trade on behalf of ATRS. The guidelines also include types of investments that the investment manager is not allowed to trade for ATRS. ATRS has monitored direct trading in Indian currency for a period of time and noted very limited trading activity in Indian currency. There are some administrative costs and additional accounting functions associated with ATRS trades in Indian currency and staff believes these costs could be eliminated by restricting trades in Indian currency. Global investment manager guidelines do not specifically restrict trading in Indian currency.

As discussed at the December 2, 2019 meeting, ATRS staff and Aon Hewitt Investment Consulting have been working with global account managers to make the adjustments to the guidelines for global separate accounts to prohibit direct trades in Indian currency. ATRS investment managers may continue to invest in Indian companies as long as the investment is U.S. dollar denominated. The restriction simplifies accounting for investments in India and reduces administrative costs associated with direct trades in Indian currency. The guideline change only applies to separate account managers and does not change ATRS investments in commingled funds or partnerships. The guideline changes have been finalized and are effective as of January 21, 2020.

**3. Investment Policies Update.** ATRS has established policies for real assets, private equity, and the total ATRS investment portfolio. Staff is requesting changes to these investment related policies to

align the format of these policies with other established Board policies and to amend these policies to Board policies. The majority of the changes involve cosmetic changes such as the numbering scheme. Proposed changes also include incorporating existing ATRS investment rules into the policies for efficiency and other minor updates. The redline versions included in the Investment Committee and Board materials do not reflect the requested cosmetic changes. The redline changes in the materials only show requested additions or updates to previously approved policies.

**B. General Investment Consultant**

- 1. Preliminary Performance Report for the Quarter Ending December 31, 2019.** PJ Kelly and Tim Pflugradt of Aon Hewitt Investment Consulting will provide the Board with a preliminary portfolio update for the quarter ending December 31, 2019.
- 2. York Credit Opportunities Fund an Opportunistic Credit Fund Approved by the Board in 2011.** The Board initially approved a \$50 million dollar commitment to the York Credit Opportunities Fund in April 2011. Aon Hewitt Investment Consulting (AHIC) recently notified ATRS staff the fund's manager, York Capital Management (York), has decided to liquidate the fund. Investors have two options: (1) redeem in full or (2) roll over their redemption proceeds into another fund managed by York. Both AHIC and ATRS staff recommend proceeding with the full redemption.

**C Real Assets**

- 1. Performance Report for the Quarter Ending September 30, 2019.** Chae Hong of Aon Hewitt Investment Consulting will provide the Board with a portfolio update for the quarter ending September 30, 2019.

**D. Private Equity**

- 1. Private Equity Portfolio Review for the Quarter Ending September 30, 2019.** Michael Bacine of Franklin Park will provide the Board with a portfolio update for the quarter ending September 30, 2019.
- 2. Recommendation to Commit up to \$30 Million Dollars in BVIP Fund X, L.P., a Private Equity Buyout Fund Investing in Middle Market Companies in the Tech-Enabled Business Services and Information Technology Services Sectors.** BV Investment

Partners was founded in 1983 as Boston Ventures but was rebranded in 2010 following a leadership succession plan that started in 2004. Today the firm is led by Vik Raina and Justin Harrison along with five additional partners who are supported by eight investment professionals, financial and operating officers, and an operating advisory board. The operating advisory board is made up of former industry executives that have experience in one of the general partner's target sectors. The BV team is highly knowledgeable about the forces shaping its target segments, industry cycles and valuations, value drivers, best operating practices and performance improvement. ATRS has invested in the firm's previous three funds as well as a co-investment that have an average net return in excess of 20% IRR. Due to the departures of some principals from the team in recent years, the current team's track record is considered to be about thirteen years, starting with the 2006 fund.

The fund will primarily make middle-market control buyout and growth capital investments in the tech enabled business services sector as well as the information technology services sector in the U.S., frequently targeting family-owned businesses. The general partner seeks to drive portfolio company growth through operational improvements and earnings growth and is targeting a net return of 20+% in the current fund. Both Franklin Park and ATRS staff recommend an investment of up to \$30 million dollars in BVIP Fund X, L.P.

3. **ATRS Staff Requests Authority to Modify the Fund Agreement for the ATRS/FP Private Equity Fund to Allow Franklin Park to Allocate Smaller Co-Investments to Each of their Clients on a Rotating Basis.** Franklin Park also makes co-investments for other clients. Until now, ATRS has required Franklin Park to make all co-investments across its client base on a pro-rata basis. Occasionally, the allocation available for a particular co-investment is too small to spread among all clients. Going forward, Franklin Park requests the ability to allocate these smaller co-investments to their clients on a rotating basis.

ATRS staff requests authority to modify the fund agreements to allow Franklin Park to allocate smaller co-investments to each of their clients on a rotating basis.

This request was approved by the Investment Committee at the December 2, 2019 meeting but the motion was not considered by the Board at the December 2, 2019 meeting.

**XIX. Operations Committee Report.**

**A. Open Forum for Potential Rule or Law Changes by Committee Member and Board Members present.**

**1. Open Forum.**

**B. Revision to Current Board Policy.**

**1. Board Policy 2: Board Governance.** Staff is requesting a few changes to Board Policy 2 covering Board Governance. The first change is to add some new goals for actuarial soundness. It should be stated that ATRS has a goal to be 100% funded and to target the amortization period to less than 18 years. Also, this policy refers to a couple of awards that may no longer be relevant. There are a few minor wording changes as well. The red line changes in the materials show requested additions or updates to the previously approved policy.

**C. Update on Rules.** The current batch of changes are in the promulgation process. The majority of the rule changes were consolidations and include many cosmetic changes to the rules such as a standard numbering scheme and improved section titles. Along with the consolidation process, rules are modified to include substantive changes due to recent legislative changes and Board actions. The following rules being considered are: Rule 6 - Membership Rules, Rule 7 - Reporting and Eligibility, Rule 8 - Purchases and Refunds, Rule 9 - Retirement and Benefits, Rule 10 - T-DROP and Return to Service, and Rule 11 - Survivors and Domestic Relations Orders.

**D. ATRS 2021 Legislative Package.** A quick update on the status 2021 legislative efforts will be provided. Some of the proposed changes include:

reciprocity laws  
definition of normal age of retirement  
definition of employers opting out of ATRS participation  
160 days of service in last year and normal retirement age  
technical changes

**XX. Staff Reports.**

**A. Medical Committee Reports. A Total of 15 Disability Retirement Applications Approved.**

The Medical Committee Report is a standard report made by staff on behalf of the Medical Committee approving disability cases. A total of 21 disability applications were received, 15 were approved, 5 were denied, and 1 needed more information. **This is an action item.**

**XXI. Other Business.**

**XXII. Adjourn.**

**XXII. Adjourn.**

**MINUTES  
ARKANSAS TEACHER RETIREMENT SYSTEM  
BOARD OF TRUSTEES**

**Monday, December 2, 2019  
12:30 p.m.  
1400 West Third Street  
Little Rock, AR 72201**

**ATTENDEES**

**Board Members Present**

Danny Knight, Chair  
Dr. Richard Abernathy, Vice Chair  
Anita Bell  
Lloyd Black  
Kathy Clayton  
Kelly Davis  
Shawn Higginbotham  
Bobby G. Lester  
Chip Martin  
Robin Nichols  
Janet Watson  
Hon. Andrea Lea, State Auditor

**Board Members Absent**

Candace Franks, Bank Commissioner  
Johnny Key, Education Commissioner  
Dennis Milligan, State Treasurer

**Guest Present**

Emily Tucker, Div. of Legislative Audit  
Wayne Greathouse  
Duncan Baird, APERS  
Bill Stovall  
Austin Grinder  
Bill Paschal

\* *via teleconference*

**ATRS Staff Present**

Clint Rhoden, Executive Director  
Rod Graves, Deputy Director  
Tammy Porter, Ex. Assistant/Board Secretary  
Curtis Carter, Chief Fiscal Officer  
Dena Dixson, Internal Audit/Risk Mgmt.  
Vicky Fowler, Director, Human Resources  
Willie Kincade, Dir. Of Operations  
Manju, Director, Information Systems  
Jerry Meyer, Manager, Real Assets  
Martha Miller, General Counsel  
Kevin Odum, Attorney Specialist  
Joseph Sithong, Software Support Analyst  
Leslie Ward, Manager, Private Equity  
Brenda West, Internal Audit/Risk Mgmt.

**Consultants Present**

PJ Kelly, Aon Investment Consulting  
Tim Pflugrad, Aon Investment Consulting  
Chae Hong, Aon Investment Consulting  
Judy Kermans, GRS Consulting  
Brian Murphy, GRS Consulting  
Heidi Barry, GRS Consulting  
Michael Bacine, Franklin Park  
Karl Hartmann, Franklin Park

**Reporters Present**

Mike Wickline, AR DemGaz

- I. **Call to Order/Roll Call.** Mr. Danny Knight, Chair, called the Board of Trustee meeting to order at 12:30 p.m. Voice roll call was taken. Ms. Franks, Mr. Key and Hon. Milligan were absent. Auditor Andrea Lea arrived at 12:32 p.m.

**II. Motion for Excused Absences.**

**Ms. Nichols moved to excuse Ms. Franks, Mr. Key and Hon. Dennis Milligan from the December 2, 2019, Board of Trustees meeting. Mr. Lester seconded the motion, and the Board unanimously approved the motion.**

**III. Adoption of Agenda**

**Dr. Abernathy moved for adoption of the Agenda. Ms. Davis seconded the motion, and the Board unanimously approved the motion.**

**IV. Executive Summary.** The Executive Summary was provided for reference with no questions or expansions on the written summary.

**V. Approval Prior Minutes.**

**A. October 7, 2019 Minutes.**

**Mr. Higginbotham moved for approval of the Minutes of the Board of Trustees meeting of October 7, 2019. Ms. Bell seconded the motion, and the Board unanimously approved the motion.**

**B. June 3, 2019 Minutes – Scrivener’s error.**

**Ms. Bell moved for approval of the Minutes of the Board of Trustees meeting of June 3, 2019. Mr. Lester seconded the motion, and the Board unanimously approved the motion.**

**C. September 11, 2019 Minutes – Scrivener’s error.**

**Ms. Bell moved for approval of the Minutes of the Board of Trustees meetings of September 11, 2019. Mr. Lester seconded the motion, and the Board unanimously approved the motion.**

**VI. Authority to Transact Business**

**A. Resolution 2019-45**

**Dr. Abernathy moved for adoption of Resolution 2019-45, Authority to Transact Business. Ms. Nichols seconded the motion, and the Board unanimously approved the motion.**

- VII. Preliminary Active Actuarial Valuation.** Judy Kermans and Brian Murphy of Grabriel, Roeder, Smith & Co., gave a presentation of the preliminary active actuarial valuation for the 2018-2019 fiscal year.
- VIII. Statement of Financial Interest.** Mr. Rhoden, Executive Director, reminded the Board members that their Statement of Financial Interest filings are to be filed with the Secretary of State's office by Friday, January 31, 2019, for financial information for calendar year 2019.
- IX. Proposed 2020 Board of Trustees Schedule.** The Board reviewed the proposed schedule.

**Mr. Lester moved to approve the 2020 Board of Trustee Schedule. Ms. Bell seconded the motion, and the Board unanimously approved the motion.**

- X. Report of Member Interest Waived Under A. C. A. Section 24-7-205.** Mr. Rhoden presented the member interest amount waived report. ATRS waives interest for members when there is a dispute between ATRS and the member as to whether ATRS made a mistake or otherwise did not do all that was required on the member's account. Since ATRS has implemented the actuarial cost method for the purchase of service credit, interest waived is slowly disappearing, as well as the number of members who purchase service credit. No member interest was waived for this reporting period. This is a standard report for information and is not an action item.
- XI. Report of Employer Interest and Penalties Waived Under A. C. A. Sec. 24-7-411.** Mr. Rhoden presented the employer interest and penalties waived report. ATRS may also waive employer interest and penalties when reports or payments are late or have issues due to a new bookkeeper, inclement weather, sickness and other situations that justify a waiver. Three (3) employer penalties and interest were waived for this reporting period in the amount of \$168.96. This is a standard report for information and is not an action item.
- XII. Manifest Injustice Report.** The Manifest Injustice Committee reviewed no claims during this reporting period. A copy of the report is included in the Board packet. The rule on Manifest Injustice requires reports to the Board at least two times per year. This is the second report of 2019. This Manifest Injustice report is for information and is not an action item.

**XIII. Manifest Injustice Report For Board Approval.**

**Dr. Abernathy moved to take off the table the Manifest Injustice Claim MI-2018-006. Mr. Higginbotham seconded the motion, and the Board unanimously approved the motion.**

Ms. Miller presented the questions to be decided by the Board.

**Dr. Abernathy moved that the Board find that a manifest injustice existed and to hold the member harmless. Ms. Nichols seconded the motion, and the Board unanimously approved the motion.**

**Mr. Lester moved to waive the look-back period. Ms. Watson seconded the motion, and the Board unanimously approved the motion.**

**Dr. Abernathy moved to direct the ATRS staff to bill the Little Rock School District (LRSD) for \$19,437.47 in employer contributions. Ms. Watson seconded the motion, and the Board unanimously approved the motion.**

**Dr. Abernathy moved to follow the staff recommendation to waive interest from FY 2015 to FY 2020 in the amount of \$25,989.67. Ms. Bell seconded the motion, and the Board unanimously approved the motion.**

**Ms. Watson moved to follow the staff recommendation to waive all but \$16,938.83 in interest for the period from FY 1997 to FY 2014. Ms. Bell seconded the motion, and the Board unanimously approved the motion.**

**Mr. Lester moved to forgo the assessment of future interest if LRSD paid the employer contributions of \$19,437.47 and interest of \$16,938.83 on or before June 30, 2020. Ms. Davis seconded the motion, and the Board unanimously approved the motion.**

**XIV. Member Appeal.** Ms. Miller and Mr. Odum presented the appeal of Benny Tunstall (MA-2019-001), along with the Administrative Hearing Officer's Proposed Order denying the appeal.

**Ms. Nichols moved to accept the Hearing Officer’s Order. Mr. Lester seconded the motion, and the Board unanimously approved the motion.**

**XV. Audit Committee.** Kelly Davis, Chair, gave a report on the Audit Committee meeting.

- A. Internal Audit Follow-up Report: Implementation of Legislation Enacted by the 91st General Assembly for the Period December 24, 2017 – April 30, 2019.** Report presented by Dena Dixson.
- B. Internal Audit Report: Board Resolutions Effective July 1, 2018/July 1, 2019.** Report presented by Dena Dixson.
- C. Internal Audit Department Updates.** Report presented by Brenda West.

**XVI. Investment Committee.** Robin Nichols, Chair, gave a report on the Investment Committee meeting.

- A. Arkansas Related and Investment Update.** Rod Graves, Deputy Director, gave the Committee a report on Arkansas Related and Investment Update including Listing of Fund Closings and Investment Manager Guidelines update.
- B. General Investment Consultant Report.**
  - 1. Preliminary Performance Report for the Month Ending October 31, 2019.** PJ Kelly and Tim Pflugradt of Aon Hewitt Investment Consulting provided the Committee with a preliminary portfolio update for the month ending October 31, 2019.
- C. Real Asset Consultant Report. Aon Hewitt Investment Consulting.**
  - 1. Performance Report for the Quarter Ending June 30, 2019.** Chae Hong of Aon Hewitt Investment Consulting provided the portfolio update for the quarter ending June 30, 2019.
  - 2. 2020 Real Assets Commitment Pacing (Total Pacing \$330 Million Dollars).** Chae Hong provided the recommendation for the 2020 Real Assets Commitment Pacing totally \$330 Million Dollars.

**Ms. Nichols moved to approve the 2020 Real Assets Commitment Pacing (Total Pacing \$330 Million Dollars). The Board unanimously approved the Motion.**

3. **Recommendation to Commit up to \$50 Million Dollars In Long Wharf Real Estate Partners Fund VI, L.P., a Value Added Real Estate Fund Focused on Acquiring a Diversified Portfolio of Assets at Significant Discounts to Values.** Chae Hong provided the recommendation to Commit up to \$50 Million Dollars in Long Wharf Real Estate Partners Fund VI, L.P., a Value Added Real Estate Fund Focused on Acquiring a Diversified Portfolio of Assets at Significant Discounts to Values. Both ATRS staff and Aon Hewitt Investment Consulting recommend committing up to \$50 Million Dollars in Long Wharf Real Estate Partners Fund VI, L.P.

**Ms. Nichols moved to adopt Resolution 2019-42, Recommendation to Commit up to \$50 Million Dollars In Long Wharf Real Estate Partners Fund VI, L.P., a Value Added Real Estate Fund Focused on Acquiring a Diversified Portfolio of Assets at Significant Discounts to Values. The Board unanimously adopted the Resolution.**

**D. Private Equity Consultant Report. *Franklin Park***

- A. **2020 Private Equity Pacing Schedule (Total Pacing \$300 Million Dollars).** Michael Bacine and Karl Hartmann of Franklin Park provided the 2020 pacing schedule for private equity. Both Franklin Park and ATRS staff recommend the 2020 Private Equity Pacing Schedule (Total Pacing \$300 Million Dollars).

**Ms. Nichols moved to approve the 2020 Private Equity Pacing Schedule (Total Pacing \$300 Million Dollars). The Board unanimously approved the Motion.**

- B. **Recommendation to Commit up to \$30 Million Dollars in Franklin Park Venture Fund XIII, L.P., (formerly Franklin Park Venture Fund Series 2019) a Fund of Funds Managed by Franklin Park Investing in Venture Capital Private Equity**

**Funds.** Michael Bacine provided the recommendation to Commit up to \$30 Million Dollars in Franklin Park Venture Fund XIII, L.P., (formerly Franklin Park Venture Fund Series 2019) a Fund of Funds Managed by Franklin Park Investing in Venture Capital Private Equity Funds. Both ATRS staff and Franklin Park recommend committing \$30 Million Dollars in Franklin Park Venture Fund XIII, L.P., (formerly Franklin Park Venture Fund Series 2019).

**Ms. Nichols moved to adopt Resolution 2019-43, to Commit up to \$50 Million Dollars In Long Wharf Real Estate Partners Fund VI, L.P., a Value Added Real Estate Fund Focused on Acquiring a Diversified Portfolio of Assets at Significant Discounts to Values. The Board unanimously adopted the Resolution.**

- C. Recommendation to Commit up to \$30 Million Dollars in Franklin Park International Fund X, L.P. (formerly Franklin Park International Fund 2019), a Fund of Funds Managed by Franklin Park Investing in International Private Equity Funds.** Michael Bacine provided the recommendation to Commit up to \$30 Million Dollars in Franklin Park International Fund X, L.P. (formerly Franklin Park International Fund 2019). Both ATRS staff and Franklin Park recommend committing \$30 Million Dollars in Franklin Park Venture Fund XIII, L.P., (formerly Franklin Park Venture Fund Series 2019).

**Ms. Nichols moved to adopt Resolution 2019-44, to Commit up to \$30 Million Dollars in Franklin Park International Fund X, L.P. (formerly Franklin Park International Fund 2019), a Fund of Funds Managed by Franklin Park Investing in International Private Equity Funds. The Board unanimously adopted the Resolution.**

- D. ATRS/FP Private Equity Fund, L. P., a Multi-Strategy Fund Focused on Co-Investments and Other Strategies That Will Use Accumulated Recallable Distributions to Fund New Investments in the Near Term.** Michael Bacine provided the recommendation ATRS/FP Private Equity Fund, L. P., a Multi-Strategy Fund Focused on Co-Investments and Other Strategies That Will Use Accumulated Recallable Distributions to Fund New Investments in the Near Term.

ATRS staff requested authority to provide ATRS consent to Franklin Park to recall up to \$30 million dollars for future investments in this fund. ATRS staff also requests authority to modify the fund agreements to allow Franklin Park to allocate smaller co-investments to each of their clients on a rotating basis.

**Ms. Nichols *moved to approve* Authorization of ATRS staff to give consent to Franklin Park to recall up to \$30 million dollars for future investments in this fund. And to give authority to modify the fund agreements to allow Franklin Park to allocate smaller co-investments to each of their clients on a rotating basis. The Board *unanimously approved the Motion.***

- E. Recommendation to Commit up to \$20 Million Dollars in Thoma Bravo Explorer Fund, L.P., a Private Equity Buyout Fund Focused on U.S. Investments in Small and Lower Middle Market Software Companies, with Imminent Need.** Michael Bacine provided the recommendation to Commit up to \$20 Million Dollars in Thoma Bravo Explorer Fund, L.P.

Both ATRS staff and Franklin Park recommend committing up to \$20 Million Dollars in Thoma Bravo Explorer Fund, L.P., a Private Equity Buyout Fund Focused on U.S. Investments in Small and Lower Middle Market Software Companies, with Imminent Need.

**Ms. Nichols *moved to adopt* Resolution 2019-47, to Commit up to \$20 Million Dollars in Thoma Bravo Explorer Fund, L.P., a Private Equity Buyout Fund Focused on U.S. Investments in Small and Lower Middle Market Software Companies, with Imminent Need. The Board *unanimously adopted the Resolution.***

- F. Other Business.** Rod Graves, Deputy Director gave a report on property in Jonesboro formerly owned by ATRS.

**Ms. Nichols *moved to approve* the recommendation from ATRS staff to sell the land. The Board *unanimously approved the Motion.***

**XVII. Operations Committee.** Bobby Lester, Chair, gave a report on the Operations Committee meeting.

**A. Open Forum for Potential Rule and Law Changes by Committee Members and Board Members Presents.**

1. **Open Forum.** Director Rhoden gave an update on the Statewide meetings and the process ATRS would be taking for the 2021 Legislative Session.

**B. 2. Update on Current Rule Promulgation.** Director Rhoden gave a status update on the rules. They are currently at the Governor's office and we are waiting approval to proceed.

**XVIII. Staff Reports.**

**A. Medical Committee Reports. A Total of 13 Disability Retirement Applications Approved.** The Medical Committee Report is a standard report made by staff on behalf of the Medical Committee approving disability cases. A total of 19 disability applications were received, 13 were approved for disability benefits, 3 were denied, and 3 needed more information.

***Ms. Nichols moved to approve the Medical Committee Report. Dr. Abernathy seconded the motion and the Board unanimously approved the motion.***

**B. Financial Reports.**

1. **Financial Statement Report.** Curtis Carter, Chief Fiscal Officer, presented the Board summary information for the financial reports for the year ending June 30, 2019. Plan net assets were \$17.7 billion dollars in fiscal year 2019. No action was needed.

2. **Travel Report.** Curtis Carter presented the standard travel report showing the expenses for staff and Trustees for fiscal year ending June 30, 2019. Board travel expenses increased in 2019 as compared to fiscal year 2018. Staff travel decreased in fiscal year 2019 as compared to fiscal year 2018. No action was needed.

- C. Contract Review.** Rod Graves, Deputy Director, reported that six firms were selected through the OPM Request for Qualifications process to recommend to the Board to provide securities monitoring services.

**Mr. Lester moved to approve the selection of the six firms listed in the Board material. Dr. Abernathy seconded the motion, and the Board approved the motion, with Auditor Lea abstaining.**

- D. Personnel Report.** Vicky Fowler, HR Manager, presented the personnel report for information. For the Fiscal Year 2020, ATRS has 87 appropriated positions with a cap of 81. Currently, 12 are vacant, and 12 are advertised. No action was needed.

**XVI. Other Business.** G. Wayne Greathouse, former ATRS Associate Director of Investments, Senior Investment Officer, and Interim Executive Director (now retired), was present and the Board recognized him for his 32 years of dedicated service.

**Ms. Nichols moved to adopt Resolution No. 2019-46 commending Mr. Greathouse for his service to ATRS. Ms. Clayton seconded the motion, and the Board unanimously approved the motion.**

**XVII. Adjourn.**

**Dr. Abernathy moved to adjourn the Board Meeting. Ms. Nichols seconded the motion and the Board unanimously approved the motion.**

**Meeting adjourned at 2:24 p.m.**

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Clint Rhoden  
Executive Director

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Mr. Danny Knight, Chair  
Board of Trustees

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Tammy Porter  
Recorder

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Date Approved

# 2020 Board of Trustees Meeting Schedule

**Arkansas Teacher Retirement System  
1400 West Third Street  
Little Rock, AR 72201**

Meeting Date*	Audit Committee	Investment Committee	Operations Committee	Board of Trustees
<b>February 3, 2020</b>	<b>8:30 a.m.*</b>	<b>9:00 a.m.*</b>	<b>10:30 a.m.*</b>	<b>11:00 a.m.*</b>
<b>April 6, 2020</b>	<b>8:30 a.m.*</b>	<b>9:00 a.m.*</b>	<b>10:30 a.m.*</b>	<b>11:00 a.m.*</b>
<b>June 1, 2020</b>	<b>8:30 a.m.*</b>	<b>9:00 a.m.*</b>	<b>10:30 a.m.*</b>	<b>11:00 a.m.*</b>
<b>September 28, 2020</b>	<b>8:30 a.m.*</b>	<b>9:00 a.m.*</b>	<b>10:30 a.m.*</b>	<b>11:00 a.m.*</b>
<b>December 7, 2020</b>	<b>8:30 a.m.*</b>	<b>9:00 a.m.*</b>	<b>10:30 a.m.*</b>	<b>11:00 a.m.*</b>

**NCTR Trustee Workshop: July 19-22, 2020, Berkeley, CA**

**NCTR 98<sup>th</sup> Annual Conference: October 10-13, 2020, La Jolla, California**

**\*Dates and times are subject to change. Meeting times may be adjusted earlier or later than scheduled, depending upon time needed for the previous meeting.**

**All meetings will be held on the Third Floor, Room 300, of the Arkansas Teacher Retirement System Building unless noted otherwise.**

**800-666-2877 toll free  
501-682-1517 local  
501-682-2359 fax**

**ARKANSAS TEACHER RETIREMENT SYSTEM  
1400 West Third Street  
Little Rock, Arkansas 72201**

**RESOLUTION  
No. 2020-01**

**Authority to Transact Business**

***BE IT RESOLVED***, That effective this 3<sup>rd</sup> day of February, 2020, **CLINT RHODEN**, Executive Director, **ROD GRAVES**, Deputy Director, and **WILLIE KINCADE**, Associate Director of Operations, each are authorized to execute, acknowledge and deliver such agreements, documents, and instruments as might be necessary or appropriate in connection with the purchase, sale, pledge, transfer, or other transaction of any kind whatsoever involving any investment approved by the Arkansas Teacher Retirement System Board of Trustees or approved by the Investment Committee of said Board; and

***WHEREAS***, This authority shall continue until after the first regular scheduled Board meeting in 2021; and

***FURTHER RESOLVED***, That the execution, acknowledgment and/or delivery of such agreement, document, or instrument by any one of the three (3) named persons shall constitute the valid, binding and enforceable act of the Arkansas Teacher Retirement System by its Board of Trustees.

**Adopted this 3<sup>rd</sup> day of February 2020.**

---

**Mr. Danny Knight, *Chair***  
***Arkansas Teacher Retirement System***

**ARKANSAS TEACHER RETIREMENT SYSTEM  
1400 West Third Street  
Little Rock, Arkansas 72201**

**RESOLUTION  
No. 2020-02**

**Specific Powers of Executive Director**

**WHEREAS**, The Board of Trustees has determined the policy concerning the specific powers of the Executive Director is not explicitly set forth in policy, and

**WHEREAS**, The Executive Director should be authorized and empowered to perform the usual and customary acts of the Executive Director of the Arkansas Teacher Retirement System as the Executive Director's usual and customary authority has been developed through a course of performance of Executive Directors over the years. However, the Executive Director should notify the Board Chair about any material decision that has usually and customarily been performed by the Executive Director to ensure the Board of Trustees is involved in all material decisions;

**IT IS THEREFORE RESOLVED**, The Executive Director shall be and hereby is authorized and empowered to perform the usual and customary acts of the Executive Director of the Arkansas Teacher Retirement System as the Executive Director's usual and customary authority has been developed through a course of performance of Executive Directors over the years. Provided however, the Executive Director shall notify the Board Chair about any material decision that has usually and customarily been performed by the Executive Director to ensure the Board of Trustees is involved in all material decisions before a final decision is made.

**Adopted this 3<sup>rd</sup> day of February 2020.**

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**Mr. Danny Knight, *Chair***  
***Arkansas Teacher Retirement System***

**ARKANSAS TEACHER RETIREMENT SYSTEM**  
**1400 West Third Street**  
**Little Rock, Arkansas 72201**

**RESOLUTION**  
**No. 2020-03**

**Appointment of ATRS as Manager of LLC's**

**WHEREAS**, The Arkansas Teacher Retirement System (“ATRS”) is the sole member and manager of several LLC's, including: Pinnacle Mountain Holding Company, LLC, Pinnacle Mountain Holding Company II, LLC, Pinnacle Mountain Holding Company III, LLC, Pinnacle Mountain Holding Company IV, LLC, Pinnacle Mountain Holding Company V, LLC, Pinnacle Mountain Holding Company VI, LLC, all Arkansas limited liability companies; and American Timberland, LLC, a Delaware company (collectively, the “Companies”); and

**WHEREAS**, The ATRS Board of Trustees, acting as a prudent investor for the benefit of all ATRS members, and in recognizing ATRS as sole member and manager of the Companies, adopts the following actions and resolution for, and on behalf of the Companies;

**NOW, THEREFORE, BE IT RESOLVED**, That

1. As managing member of the Companies and pursuant to its authority in A.C.A § 24-2-619, ATRS hereby delegates the authority to the ATRS Executive Director to perform all duties related to the respective Companies consistent with the amended Articles of Organization, Operating Agreements, and other applicable laws and policies of ATRS and further the Executive Director may delegate authority to a Deputy Director or to an investment staff member, when proper, to perform needed actions and executions in his absence.

2. That the Executive Director or his delegate will provide regular reports to the ATRS Board on the Companies.

**Adopted this 3<sup>rd</sup> day of February 2020.**

---

**Mr. Danny Knight, *Chair***  
***Arkansas Teacher Retirement System***

**ARKANSAS TEACHER RETIREMENT SYSTEM**  
**1400 West Third Street**  
**Little Rock, Arkansas 72201**

**RESOLUTION**  
**No. 2020-04**

**Authority to Reimburse Trustee Expenses for 2020**

**WHEREAS**, The Board of Trustees may reimburse expenses of the Trustees for performing official Board duties under A.C.A. § 24-7-303 (b) and other laws and policies of the State of Arkansas that may apply; and

**WHEREAS**, The Board must pre-approve any expenses incurred for the calendar year at its first meeting under ATRS Board Policy 1 section VII.A.

**THEREFORE, BE IT RESOLVED**, That the ATRS Board of Trustees hereby authorizes ATRS to reimburse Trustees for losses in salary resulting from attendance of a Board meeting that would otherwise be paid by the employer, including but not limited to, a Trustee's out of pocket cost associated with employing substitute personnel or losses in salary or compensation and any costs of communication, including long distance, postage, internet access, and other communication charges consistent with ATRS Board Policy 1 section VII.A. upon presentation of a written request by a Trustee, with adequate documentation enclosed.

**Adopted this 3<sup>rd</sup> day of February 2020.**

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**Mr. Danny Knight, Chair**  
**Arkansas Teacher Retirement System**

**ARKANSAS TEACHER RETIREMENT SYSTEM**  
**1400 West Third Street**  
**Little Rock, Arkansas 72201**

**RESOLUTION**  
**No. 2020-05**

**Authorization for Board Travel and Expenses for 2020**

**WHEREAS**, Act 1211 of 1995 (A.C.A. § 25-16-901 *et seq.*) provides that every state board may, by a majority vote of the total membership of the board cast during its first regularly scheduled meeting of each calendar year, authorize expense reimbursement for each board member for performing official board duties. Such reimbursement cannot exceed the rate established for state employees by state travel regulations; and

**WHEREAS**, Act 975 of 2011 provides for expense reimbursement for members of the Board of Trustees of the Arkansas Teacher Retirement System; and

**NOW, THEREFORE, BE IT RESOLVED**, That the Board of Trustees of the Arkansas Teacher Retirement System, by a majority vote of its total membership, authorizes expense reimbursement for each Board member for performing official Board duties during the calendar year 2020; and

**FURTHER RESOLVED**, That the expense reimbursement shall not exceed the rate established for state employees by state travel regulations and shall be in compliance with the attached Addendum A to this Resolution, adopted by this Board to reflect changes in state travel regulations; and

**FURTHER RESOLVED**, That Board members who live in the Little Rock area (excluding ex officio trustees) may be reimbursed for mileage and meal expenses incurred while performing official board duties in Little Rock at a rate not exceeding the rate established for state employees; and

**FURTHER RESOLVED**, That the adoption of this resolution authorizes reimbursement for any such expenses including those incurred in 2020 prior to the adoption of this resolution; and

**FURTHER RESOLVED**, That in years in which a Board retreat is held, each Board member shall be reimbursed for up to two (2) out-of-state conferences for the purpose of education; and

**FURTHER RESOLVED**, That in years in which the Board does not have a retreat each Board member shall be reimbursed for up to two (2) out-of-state

conferences for the purpose of education, with one (1) additional out-of-state conference with the approval of the Board Chair.

**Adopted this 3<sup>rd</sup> day of February 2020.**

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**Mr. Danny Knight, *Chair***  
***Arkansas Teacher Retirement System***

*Addendum A*

Resolution 2020-05

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The following regulations have been adopted to provide guidance to board members and employees of the Arkansas Teacher Retirement System (ATRS).

For purposes of these rules, the following definitions shall apply:

1. "Official Station" shall be:
  - (a) For board members, the city or town in which a board member has a permanent address.
  - (b) For employees, the city or town of the employee's actual location of work.
2. Travel expenses will be reimbursed when board members or employees are required to travel away from their official station on ATRS business. Minimization of expenses while traveling should be the same, as a prudent person would exercise if traveling on personal business.
3. A Travel Reimbursement Form (TR-1) must be verified and signed by the traveler, accompanied by the proper receipts, and duly signed by the Executive Director, or designee, before reimbursement may be processed.
4. All travel reimbursement requests, whether for in-state or out-of-state travel, must adhere to the reimbursement rates listed in the Federal Travel Directory unless a waiver is granted. Current rates as of the filing of this Resolution for cities not identified or located in listed cities have a Standard rate of \$96 per day for lodging and \$55 per day for meals. All current rates can be found on the Federal General Services Administration Website:  
  
<http://www.gsa.gov/portal/category/100120>
5. Reimbursement may be claimed for actual expenses only, and must not exceed the Federal Directory maximums. In-state meals will not be reimbursed without overnight lodging. There are no exceptions to the maximum meal rates. The tip reimbursement amount shall not exceed fifteen percent (15%) of the meal amount expended. The total reimbursement for meals and tips shall not exceed the maximum rates prescribed by the Financial Management Guide published by the Office of Accounting of the Department of Finance and Administration.
6. Exceptions to lodging maximums may be allowed only with good justification, i.e., when conference hotel rates exceed area maximums, and staying elsewhere would incur transportation charges. The Executive Director, or designee, must approve all requests for exceptions prior to incurring the expense.

*Addendum A*  
Resolution 2020-05

7. Private vehicle mileage is reimbursable at the current rate per mile authorized by the Arkansas Department of Finance and Administration, currently 42 cents per mile. If a traveler's personal vehicle is used for transportation to and from the airport, a mileage reimbursement may be requested.
8. Reimbursable travel expenses are limited to those expenses authorized and essential to conducting official ATRS business. Telephone, Internet access, and facsimile expenses shall be allowed only when necessary for the completion of official business. Incidental amounts not directly related to travel (such as postage, small emergency supplies, etc.) may be allowed, when necessary, if incurred during the performance of official business while traveling. These necessary incidental expenses shall be itemized on the TR-1 form with receipts attached.
9. If one-way travel exceeds 400 miles from the traveler's official station, reimbursement may be requested for no more than one day prior to, and/or after, the official start/end of an approved conference/convention.
10. Travelers shall not be reimbursed for the purchase of alcoholic beverages, entertainment, flowers, valet service, laundry, cleaning, printing items, or other discretionary purchases.
11. Travel expenses shall not be billed to ATRS by a third-party except for lodging, meals, registration fees, and air transportation, duly approved in advance by the Executive Director.
12. Travel may be achieved by plane, train, bus, private or system-owned vehicle, rented vehicle, or taxi, whichever method serves the requirements of ATRS most economically and advantageously. The maximum allowable mileage will be computed by the shortest major highway route. Flights resulting in the lowest available airfare for ATRS should be used for all business trips, unless there are extenuating circumstances, such as unreasonable arrival/departure times or unusually long layovers.
13. When common carriers (airplane, train, or bus) are needed to transport persons on ATRS business, ATRS will make the travel arrangements, if possible, in order for the system to be billed direct. If this is not possible, the traveler may make and pay for arrangements and request reimbursement. Items that are properly purchased by, and invoiced directly to ATRS, are not reimbursable to the traveler.

*Addendum A*

Resolution 2020-05

14. For out-of-state travel, reimbursement shall be the lesser of coach class air, or the current rate per mile authorized by the Arkansas Department of Finance and Administration.
15. If more than one traveler is transported in the same vehicle, only the owner can claim a mileage reimbursement.
16. When attending out-of-state conferences, travelers should choose the most economical mode of transportation between airports and hotels, i.e., rental car, shuttle, or taxi. Consideration must be given to mileage, fuel, and parking fees when selecting a rental. Vehicle rentals are under a mandatory state contract; therefore, board members must contact the ATRS Executive Assistant for assistance with making any rental reservations under the terms of the contract. Employees requiring a vehicle rental must contact the ATRS fiscal department for assistance. If a rental car is obtained, and two (2) or more board members or employees travel to the same location, rentals should be shared, if possible.
17. Board members and employees of ATRS shall be reimbursed for their own travel expenses only. Board members and employees shall not be reimbursed for expenses incurred by their spouse or guest.

**ARKANSAS TEACHER RETIREMENT SYSTEM**  
**1400 West Third Street**  
**Little Rock, Arkansas 72201**

**RESOLUTION**  
**No. 2020-06**

**2020-2021 Employer Contribution Rate**

**WHEREAS**, A.C.A. § 24-7-401(c) authorize the Board of Trustees of the Teacher Retirement System to establish the employer contribution rate paid into the System prospectively for each year; and

**WHEREAS**, A.C.A. § 24-7-401(c) dictates that the rate shall be set by the Board following consultation with its actuary based on the annual actuarial valuation and that the rate shall be based on the actuary's determination of the rate required to fund the plan in accordance with the financial objectives set forth in A.C.A. § 24-7-401(a); and

**WHEREAS**, Arkansas Teacher Retirement System is 80% funded, with an amortization period to pay off unfunded liabilities of 28 years, which shows that ATRS is in a strong financial position as of the last actuarial valuation at the end of the last fiscal year; and

**WHEREAS**, The ATRS Board, on November 13, 2017, adopted an employer contribution rate schedule that established the employee contribution rate for FY2021 should be 14.5%.

**NOW, THEREFORE, BE IT RESOLVED**, That the Board of Trustees in accordance with the legislative restrictions hereby sets the employer contribution rate for the fiscal year beginning July 1, 2020, at fourteen percent and one-half percent (14.5%).

**Adopted this 3<sup>rd</sup> day of February 2020.**

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**Mr. Danny Knight, Chair**  
**Arkansas Teacher Retirement System Board**

**ARKANSAS TEACHER RETIREMENT SYSTEM  
1400 West Third Street  
Little Rock, Arkansas 72201**

**RESOLUTION  
No. 2020-07**

**2020-2021 Member Contribution Rate**

**WHEREAS**, A.C.A. § 24-7-406, authorizes the Board of Trustees (Board) of the Arkansas Teacher Retirement System (ATRS) to establish and modify the member contribution rate paid into ATRS by contributory members; and

**WHEREAS**, A.C.A. § 24-7-406 dictates that the member contribution rate shall be set by the Board following consultation with its actuary based on the annual actuarial valuation and that the rate shall be set to maintain actuarial soundness;

**WHEREAS**, Arkansas Teacher Retirement System is 80% funded, with an amortization period to pay off unfunded liabilities of 28 years, which shows that ATRS is in a strong financial position as of the last actuarial valuation at the end of the last fiscal year; and

**WHEREAS**, The ATRS Board, on November 13, 2017, adopted an member contribution rate schedule that established the member contribution rate for FY2020 should be 6.5%.

**NOW, THEREFORE, BE IT RESOLVED**, That the Board of Trustees in accordance with the legislative restrictions hereby sets the member contribution rate for the fiscal year beginning July 1, 2019, at six and one-half percent (6.5%).

**Adopted this 3<sup>rd</sup> day of February, 2020.**

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**Mr. Danny Knight, Chair**

**ARKANSAS TEACHER RETIREMENT SYSTEM  
1400 WEST THIRD STREET  
LITTLE ROCK, ARKANSAS 72201**

**RESOLUTION  
No. 2020-08**

**Adoption of Contribution Rate for Outsourced Positions**

**WHEREAS**, ATRS now has a surcharge on salary paid to certain embedded positions that are outsourced at certain ATRS employers; and

**WHEREAS**, The contribution rate for outsourced positions is set by law with the option for the ATRS Board to increase the outsourced rate after an implementation period; and

**WHEREAS**, The authorized rate by law for fiscal year 2021 is three percent (3%); and

**WHEREAS**, ATRS should set the contribution rate for outsourced salary as a part of its regular function.

**NOW, THEREFORE, BE IT RESOLVED**, that the Board of Trustees of the Arkansas Teacher Retirement System hereby declares that the contribution rate for applicable outsourced salaries for fiscal year 2021 is three percent (3%) in accordance with Arkansas law.

**Adopted this 3<sup>rd</sup> day of February, 2020.**

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**Mr. Danny Knight, Chair**  
**Arkansas Teacher Retirement System Board**

# Arkansas Teacher Retirement System

Annual Actuarial Valuation of  
Active and Inactive Members  
June 30, 2019



# Report of the June 30, 2019 Actuarial Valuation

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-	Cover Letter
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<b>Section B</b>	<b>Valuation Results</b>
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B-2	Historical Contribution Rates
B-3	Actuarial Liabilities
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B-5	Financing Benefit Promises (Pie Chart)
B-6	Short Condition Test
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<b>Section C</b>	<b>Summary of Benefits</b>
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<b>Section F</b>	<b>Financial Principles</b>
<b>Section G</b>	<b>Actuarial Assumptions</b>
<b>Section H</b>	<b>Glossary</b>

December 13, 2019

Board of Trustees  
Arkansas Teacher Retirement System  
Little Rock, Arkansas

Dear Board Members:

Presented in this report are the results of the ***Annual Actuarial Valuation of non-retired members as of June 30, 2019***. The June 30<sup>th</sup> annual valuation of retired lives receiving monthly benefits indicates the liabilities for future benefit payments to existing retirees. These liabilities are covered in detail in a separate report. They are also covered briefly in this report on page B-4.

The purposes of the valuation are to measure the System's funding progress and to determine the amortization period that results from the statutory employer and employee rates and the actuarial assumptions that the Board has adopted. This report should not be relied on for any purpose other than the purposes described herein. Financial results associated with the benefits described in this report that are developed for purposes other than those identified above may be significantly different than those in this report.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the Retirement System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The valuation was based upon census data and financial information provided by the System's administrative staff. Preparation of this data requires considerable staff time. The helpful cooperation of the Arkansas Teacher Retirement System (ATRS) staff in furnishing the data is acknowledged with appreciation. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of any data provided by ATRS.

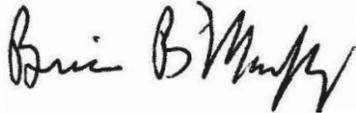
This report was prepared using certain assumptions approved by the Board. The actuarial assumptions used for valuation purposes are summarized in Section G. These assumptions reflect experience during the period July 1, 2010 to June 30, 2015 and expectations for the future.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law. The scope of an actuarial valuation does not contain an analysis of the potential range of such future measurements.

To the best of our knowledge, this report is complete and accurate and was made in accordance with standards of practice promulgated by the Actuarial Standards Board. The actuarial assumptions used for the valuation produce results which, individually and in the aggregate, are reasonable.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. Brian B. Murphy, Judith A. Kermans and Heidi G. Barry are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The individuals submitting this report are independent of the plan sponsor.

Respectfully submitted,



Brian B. Murphy, FSA, EA, FCA, MAAA, PhD



Judith A. Kermans, EA, FCA, MAAA



Heidi G. Barry, ASA, FCA, MAAA

BBM/JAK/HGB:rmn

## **SECTION A**

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### **EXECUTIVE SUMMARY**

## Executive Summary

**General Financial Objective.** Section 24-7-401 (a) of the Arkansas Code provides as follows (emphasis added):

- (1) The financial objective of the Arkansas Teacher Retirement System is to establish and receive contributions that expressed as percentages of active member payroll will **remain approximately level from generation to generation of Arkansas citizens.**
- (2) Contributions received each year shall be sufficient:
  - (A) To **fully cover the costs of benefit commitments** being made to members for their service being rendered **in that year**; and
  - (B) To **make a level payment** that if paid annually over a reasonable period of future years will **fully cover the unfunded costs** of benefit commitments for service previously rendered.

**Arkansas Teacher Retirement System Status:** Based upon the results of the June 30, 2019 actuarial valuations, **ATRS is satisfying the financial objective of level-contribution-percent financing.**

This report contains the results of the June 30, 2019 valuation. The table below shows a summary of the data used in the valuation. This data was the basis for determining valuation results and recommended employer contribution rates.

	Number	Average	Type of Average
Active not in T-DROP	68,457	\$39,065	Pay
Active in T-DROP	3,707	62,812	Pay
Deferred Vested	13,033	5,336	Annual Projected Benefit
Retired	48,677	23,558	Annual Current Benefit
<b>Total Members</b>	<b>133,874</b>		

Included in the 2019 valuation were 4,077 reemployed retirees (included in the Retired data file) with total earnings of \$120.0 million. ATRS receives full employer contributions on these individuals per Arkansas Code Section 24-7-708. The actuarial valuation assumes the number of working members will remain constant at the current level. In some recent years the total number of working members has decreased. A decreasing population means less contribution income for the retirement system than expected and can lead to funding difficulty in extreme cases. ATRS receives employer contributions on behalf of all working members.

**Actuarial Assumptions:** There were no assumption changes in the June 30, 2019 valuation. In our judgement the actuarial assumptions in use, and in particular the 7.5% investment return assumption, are reasonable for the purposes described in this report. However, it is possible that the 7.5% assumption may not satisfy actuarial standards for purposes of the June 30, 2020 valuation.

**Benefit Changes:** There were no benefit provision changes adopted for consideration in the June 30, 2019 valuation.

## Executive Summary - (Continued)

### Contribution Rate Changes

Employer and member contribution rates will change in the future according to the following schedule. This schedule of changes has been incorporated into the results shown in this report.

Fiscal Year	Contribution Rate	
	Member	Employer
2020	6.25%	14.25%
2021	6.50%	14.50%
2022	6.75%	14.75%
2023 and Later	7.00%	15.00%

### Results of the Valuation

**The amortization period this year is 28 years**, unchanged from last year's period of 28 years. This result is heavily dependent upon member and employer rates increasing in accordance with the schedule above. While 28 years is a reasonable period that meets statutory requirements, use of such a period will result in unfunded liabilities that are projected to increase in dollar amount for approximately the next 10 years. This condition is called "negative amortization" and is falling out of favor. The ATRS has targeted 18 years as the threshold in recent legislation. The contribution rate based upon the target amortization period would be approximately 17.7% payroll.

**The Arkansas Teacher Retirement System remains stable with an 80.2% funded position** as of June 30, 2019. Unless there is an investment loss in Fiscal Year 2020, the amortization period is likely to decrease in the next valuation due to the scheduled phase-in of net investment gains.

**The rate of Investment return was 5.19%<sup>#</sup>** this year. As of June 30, 2019, the market value of assets exceeded the actuarial value of assets by approximately \$329 million. (Please refer to page D-3 for details.) Investment gains and losses that occur each year are smoothed in over a 4-year period. After considering smoothing, the recognized return this year was 7.90%, compared to an assumed 7.5% return for Fiscal 2019. The smoothing is expected to introduce downward pressure on the amortization period next year.

<sup>#</sup> *The actuary calculated this return figure which may not exactly match the investment consultant's figure.*

## Executive Summary - (Continued)

### Other Observations

#### **General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status**

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.50% on the actuarial value of assets), it is expected that:

- 1) The unfunded actuarial accrued liabilities will be fully amortized after 28 years.
- 2) The funded status of the plan will increase gradually towards a 100% funded ratio.
- 3) The unfunded accrued liability will increase for an extended period before beginning to decline.

#### **Limitations of Funded Status Measurements**

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

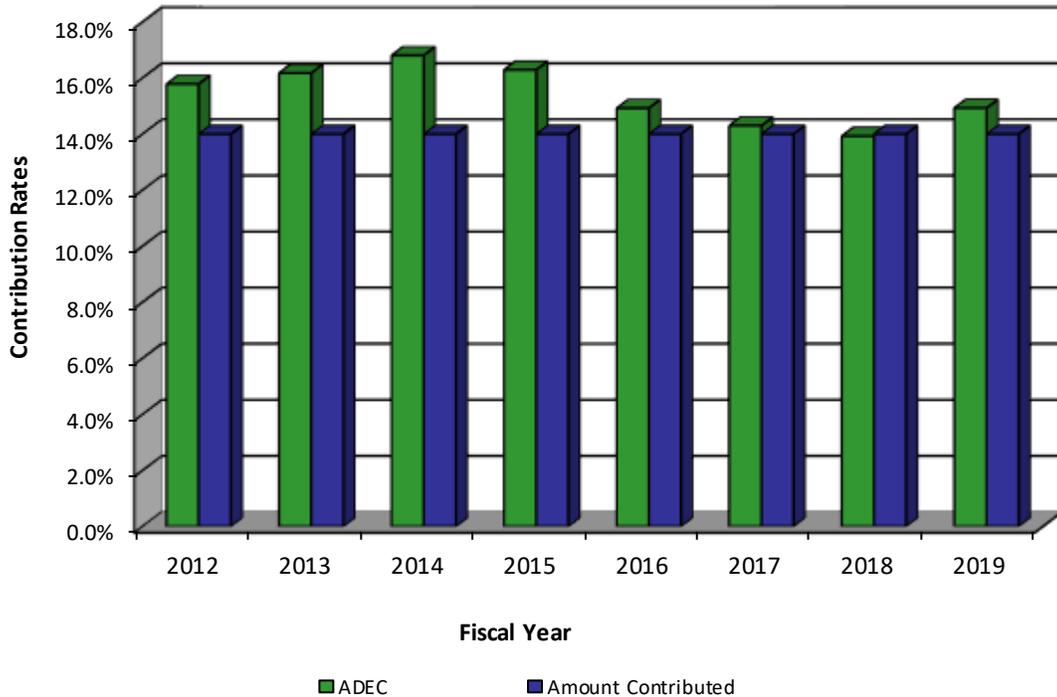
- 1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations; in other words, of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
- 2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
- 3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

#### **Limitations of Project Scope**

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

## Executive Summary - (Concluded)

The following graph shows a history of the amounts contributed vs. the employer contributions, based on a maximum amortization period of 30 years. The results would look different if the Actuarially Determined Employer Contribution (ADEC) were calculated according to the Board's target of 18 years.



The amount contributed is less than the 30-year contribution in FY 2012-2017 and FY 2019. In FY 2018 (June 30, 2016 valuation), the amount contributed exceeded the 30-year contribution.

The calculated amortization period was 29 years in the June 30, 2017 valuation, which determined the FY 2019 ADEC, and was based on anticipated increases in the employer and member contribution rates. The employer and member rates are scheduled to increase by 0.25% increments beginning in Fiscal Year 2020 and ending in Fiscal Year 2023. The ultimate employer and member contribution rates will be 15% and 7%, respectively. Because the FY 2019 employer contribution rate was 14%, the amount contributed in FY 2019 was less than the 30-year contribution ADEC.

## **SECTION B**

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### **VALUATION RESULTS**

## Determination of Amortization Period Computed as of June 30, 2019 and June 30, 2018

Computed Contributions for	Percents of Active Member Payroll			
	June 30, 2019			June 30, 2018
	Teachers	Support	Combined	Combined
Normal Cost				
Age & Service Annuities	10.43%	6.93%	<b>9.44%</b>	9.40%
Deferred Annuities	1.19%	2.08%	<b>1.44%</b>	1.44%
Survivor Benefits	0.36%	0.27%	<b>0.33%</b>	0.33%
Disability Benefits	0.48%	0.38%	<b>0.45%</b>	0.45%
Refunds of Member Contributions	0.46%	1.11%	<b>0.64%</b>	0.65%
<b>Total</b>	<b>12.92%</b>	<b>10.77%</b>	<b>12.30%</b>	<b>12.27%</b>
Average Member Contributions	6.47%	4.93%	<b>6.04%</b>	6.01%
Net Employer Normal Cost	6.45%	5.84%	<b>6.26%</b>	6.26%
Unfunded Actuarial Accrued Liabilities			<b>8.74%</b>	8.74%
<b>Employer Contribution Rate</b>			<b>15.00%</b>	15.00%
<b>Amortization Years</b>			<b>28</b>	28

The calculated amortization period of 28 years is based on anticipated increases in the employer and member contribution rates. The Fiscal Year 2019 employer and member contribution rates were 14% and 6%, respectively. The employer and member rates are scheduled to increase by 0.25% increments beginning in Fiscal Year 2020 and ending in Fiscal Year 2023. The ultimate employer and member contribution rates will be 15% and 7%, respectively, which are reflected in the above schedule.

The amortization period is the number of years it will take to pay off the unfunded liability of \$4.3 billion assuming that the employer contribution rate increases to 15% according to the schedule described above. Since 2000, the period has varied from a low of 19 years to a high of over 100 years. Unless there is an investment loss in FY 2020, the amortization period is likely to decrease in the next valuation. Please see additional comments regarding the amortization period on page A-2.

## Computed Employer Contribution Rates 10-Year Comparative Statement

Valuation Date June 30	Active Members in Valuation **		Average Annual Pay		Consumer Price (Inflation) Index		Employer Contributions	
	Number	Annual Payroll (\$Millions)			Value	% Change	Computed Financing Period (Years)	Total Employer Rate
			Amount	% Change				
2010#	72,208	\$ 2,381	\$ 32,980	0.5 %	\$ 218.0	1.1 %	52	14.0 %
2011#*	76,780	2,728	35,534	7.7 %	225.7	3.6 %	66	14.0 %
2012	75,627	2,714	35,891	1.0 %	229.5	1.7 %	over 100	14.0 %
2013#	74,925	2,727	36,400	1.4 %	233.5	1.8 %	70	14.0 %
2014	74,352	2,758	37,092	1.9 %	238.3	2.1 %	39	14.0 %
2015	72,919	2,777	38,088	2.7 %	238.6	0.1 %	33	14.0 %
2016	72,232	2,785	38,557	1.2 %	241.0	1.0 %	29	14.0 %
2017#*	72,148	2,814	38,997	1.1 %	245.0	1.6 %	29	14.0 %
2018*	72,341	2,872	39,702	1.8 %	252.0	2.9 %	28	14.0 %
2019*	72,164	2,907	40,285	1.5 %	256.1	1.6 %	28	14.0 %

\* Revised assumptions; employer and employee rates scheduled to increase to 15% and 7%, respectively, in 4 steps beginning in FY 2020.

# Legislated benefit or contribution rate changes.

\*\* Beginning with the June 30, 2011 valuation, active members include T-DROP members and payroll. ATRS also receives contributions on return to work retirees, but they are not included on this schedule.

## Computed Actuarial Liabilities as of June 30, 2019

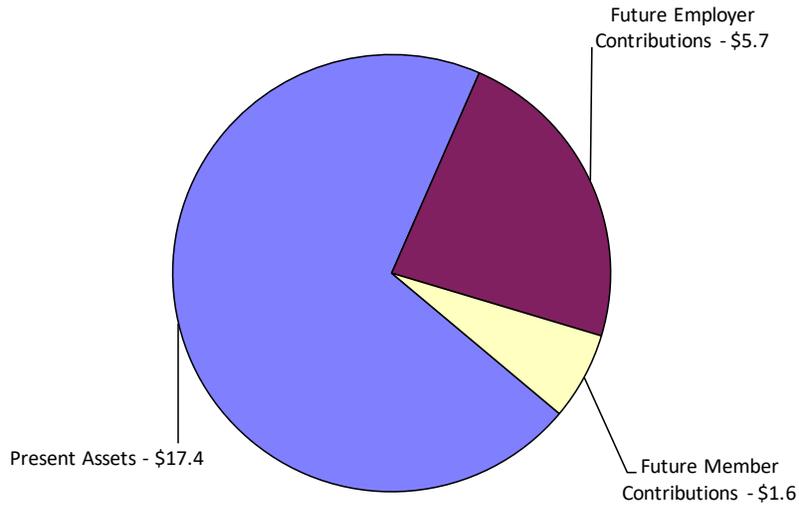
Actuarial Present Value of	(1) Total Present Value	Entry Age Actuarial Cost Method	
		(2) Portion Covered by Future Normal Cost Contributions	(3) Actuarial Accrued Liabilities (1)-(2)
Age and service retirement allowances based on total service likely to be rendered by present active members.	\$ 8,499,151,125	\$2,293,101,942	\$ 6,206,049,183
Age and service retirement allowances based on total service likely to be rendered by present T-DROP members.	2,156,293,215	46,120,476	2,110,172,739
Vested Deferred Benefits likely to be paid present active and inactive members.	1,166,885,755	356,030,916	810,854,839
Survivor benefits expected to be paid on behalf of present active members.	223,686,863	82,295,078	141,391,785
Disability Benefits expected to be paid on behalf of present active members.	218,496,068	107,868,475	110,627,593
Refunds of Member contributions expected to be paid on behalf of present active members.	20,368,008	150,338,146	(129,970,138)
Benefits payable to present retirees and beneficiaries.	12,459,741,018	0	12,459,741,018
<b>Total</b>	<b>\$24,744,622,052</b>	<b>\$3,035,755,033</b>	<b>\$21,708,867,019</b>
Funding Value of Assets	17,412,534,651	0	17,412,534,651
Liabilities to be Covered by Future Contributions	<b>\$ 7,332,087,401</b>	<b>\$3,035,755,033</b>	<b>\$ 4,296,332,368</b>

## Liabilities for Retirees July 1, 2019 Tabulated by Type of Benefit Being Paid

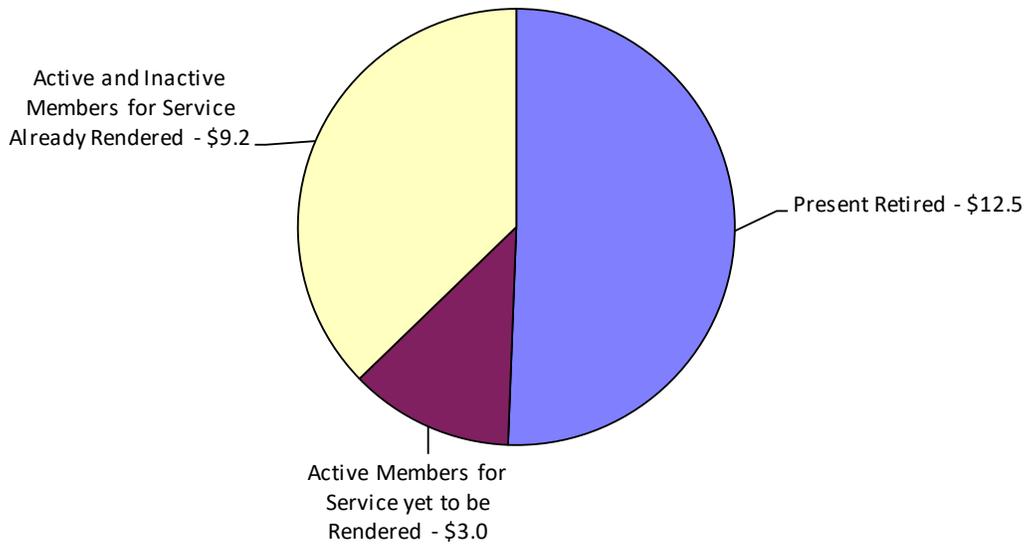
Type of Annuity	Liabilities July 1, 2019		
	Men	Women	Totals
<b>RETIREMENT RESERVE ACCOUNT</b>			
Age & Service Annuities			
Option 1 (Straight Life)	\$ 1,429,353,924	\$ 6,932,439,545	\$ 8,361,793,469
Option A (100% Joint & Survivor)	853,640,970	922,770,063	1,776,411,033
Option B (50% Joint & Survivor)	416,536,325	656,173,461	1,072,709,786
Option C (10 Years Certain & Life)	29,232,531	137,380,133	166,612,664
Beneficiaries	59,095,326	165,455,980	224,551,306
<b>Total Age &amp; Service</b>	<b>2,787,859,076</b>	<b>8,814,219,182</b>	<b>11,602,078,258</b>
Disability Annuities			
Option 1	50,134,417	280,225,085	330,359,502
Option A	27,571,540	44,463,076	72,034,616
Option B	5,459,407	12,791,619	18,251,026
Option C	200,950	2,039,728	2,240,678
Beneficiaries	19,613,307	23,826,698	43,440,005
<b>Total Disability</b>	<b>102,979,621</b>	<b>363,346,206</b>	<b>466,325,827</b>
Act 793	9,461,601	5,584,844	15,046,445
Retirement Reserve Account	2,900,300,298	9,183,150,232	12,083,450,530
Act 808 Retirement Reserve Account	8,090,772	3,026,689	11,117,461
<b>Total Retirement Reserve Account</b>	<b>2,908,391,070</b>	<b>9,186,176,921</b>	<b>12,094,567,991</b>
<b>SURVIVORS' BENEFIT ACCOUNT</b>			
Beneficiaries of Deceased Members	\$ 48,241,084	\$ 58,065,350	\$ 106,306,434
<b>RETIREMENT SYSTEM TOTALS</b>			
Total Annuity Liabilities	2,956,632,154	9,244,242,271	12,200,874,425
Cash Benefit Account Liabilities			133,829,621
Liabilities for Lump Sum Death Benefits			125,036,972
<b>Total</b>	<b>\$ 2,956,632,154</b>	<b>\$ 9,244,242,271</b>	<b>\$ 12,459,741,018</b>

# Financing \$24.7 Billion of Benefit Promises for Present Active and Retired Members June 30, 2019

Sources of Funds  
(\$ Billions)



Uses of Funds



## Short Condition Test

ATRS' funding objective is to meet long-term benefit promises through contributions that remain approximately level from year to year as a percent of member payroll. If the contributions to the System are level in concept and soundly executed, the System will **pay all promised benefits when due -- the ultimate test of financial soundness**. Testing for level contribution rates is the long-term test.

**A short condition test** is one means of checking a system's progress under its funding program. In a short condition test, the plan's present assets (cash and investments) are compared with: 1) Member contributions on deposit; 2) The liabilities for future benefits to present retired lives; and 3) The liabilities for service already rendered by members. In a system that has been following the discipline of level percent-of-payroll financing, the liabilities for member contributions on deposit (liability 1) and the liabilities for future benefits to present retired lives (liability 2) will be fully covered by present assets (except in rare circumstances). In addition, the liabilities for service already rendered by members (liability 3) will be partially covered by the remainder of present assets. The larger the funded portion of liability 3, the stronger the condition of the system. Liability 3 being fully funded is unusual, but highly desired.

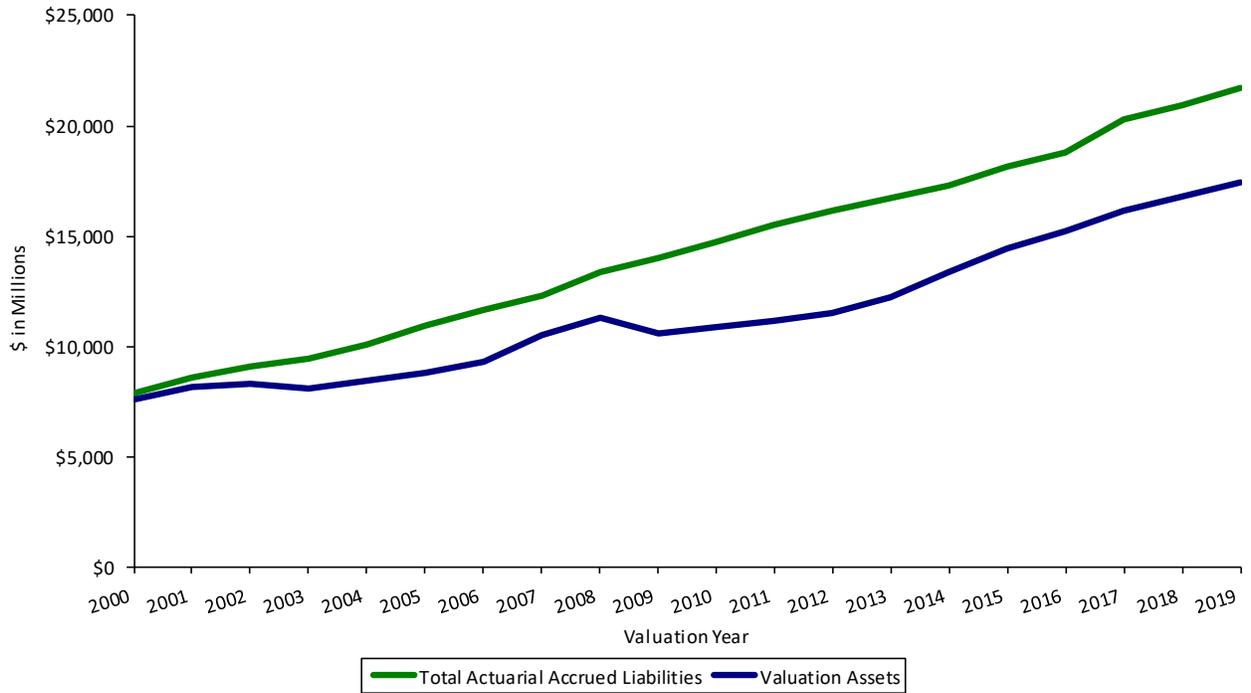
The schedule below illustrates the history of Liability 3 of the System and is indicative of the ATRS objective of following the discipline of level percent-of-payroll financing.

Val. Date June 30	(1) Member Contrb.	(2) Retirees and Benef.	(3) Active and Inactive Members (Employer Financed Portion)	Present Valuation Assets	Portion of Present Values Covered by Present Assets			
					(1)	(2)	(3)	Total
-----\$ Millions-----								
2010#	\$ 848	\$ 6,516	\$ 7,333	\$ 10,845	100%	100%	47%	74%
2011#*	929	7,132	7,460	11,146	100%	100%	41%	72%
2012	981	7,649	7,509	11,484	100%	100%	38%	71%
2013#	1,027	8,181	7,510	12,247	100%	100%	40%	73%
2014	1,077	8,777	7,456	13,375	100%	100%	47%	77%
2015	1,128	9,778	7,230	14,434	100%	100%	49%	80%
2016	1,184	10,430	7,198	15,239	100%	100%	50%	81%
2017#*	1,254	11,337	7,707	16,131	100%	100%	46%	79%
2018	1,312	11,851	7,772	16,756	100%	100%	46%	80%
2019	1,377	12,460	7,872	17,413	100%	100%	45%	80%

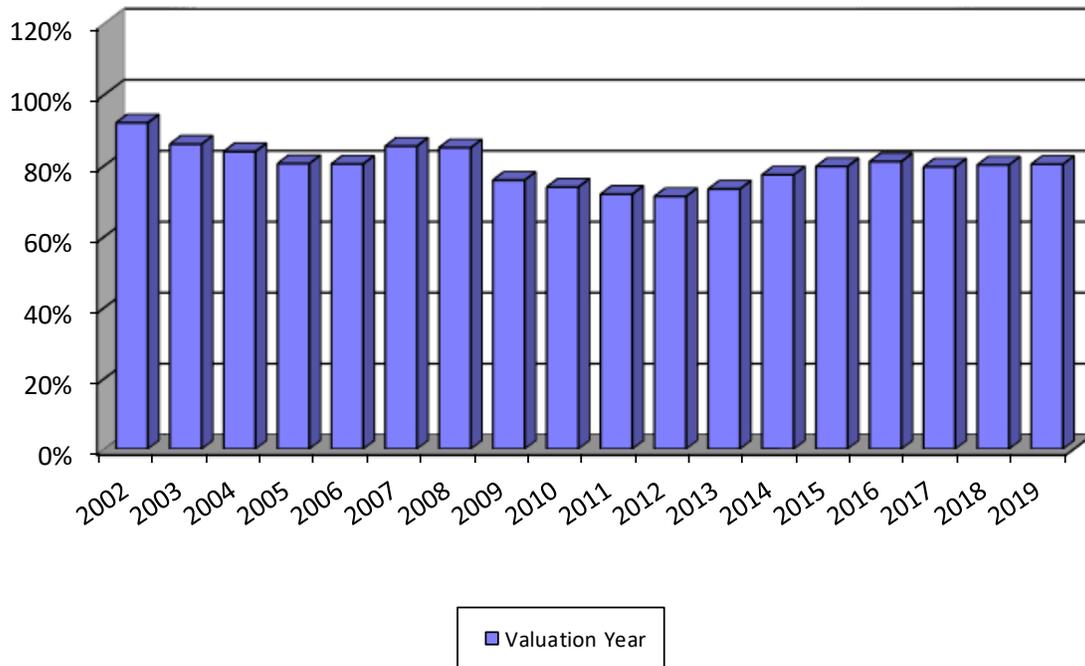
\* Revised actuarial assumptions or methods.

# Legislated benefit or contribution rate change.

## Actuarial Accrued Liabilities and Valuation Assets

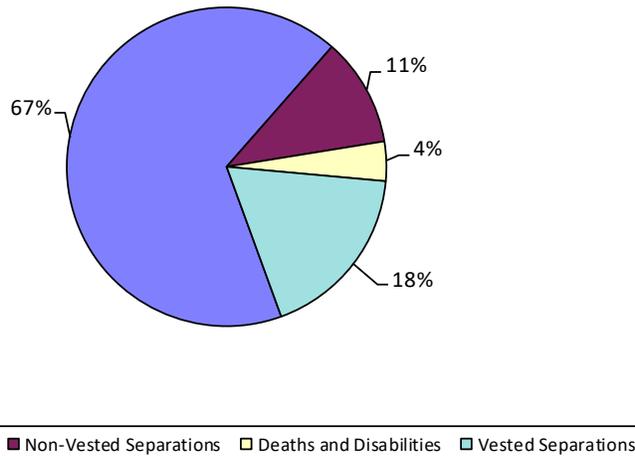
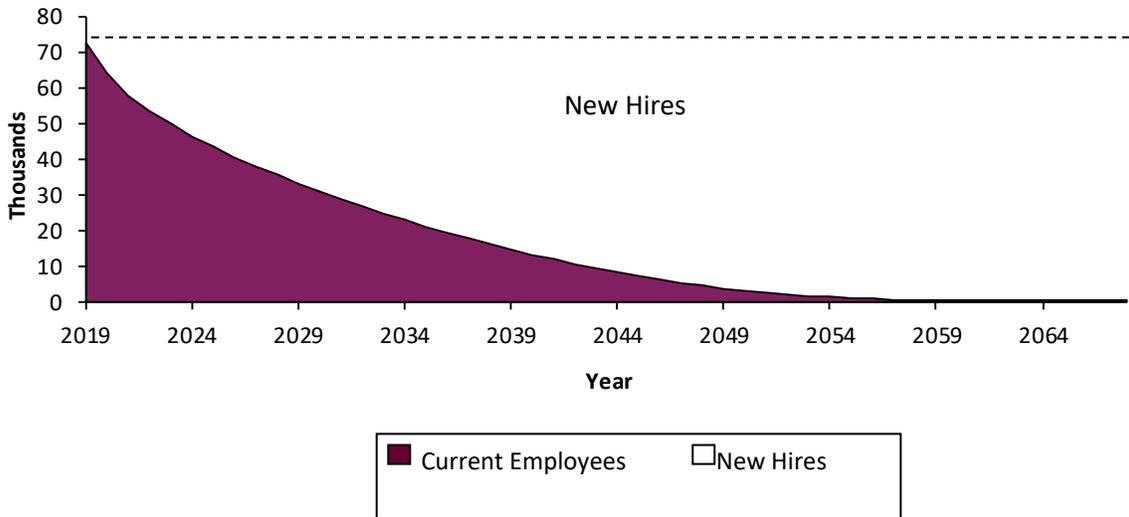


## Valuation Assets as a Percent of Accrued Liabilities (Funded Ratio)



# Expected Development of Present Population June 30, 2019 (Excludes Rehired Retirees)

## Population Projection



The charts show the expected future development of the present population in simplified terms. The retirement system presently covers 72,164 active members (includes T-DROP). Eventually, 11% of the population is expected to terminate covered employment prior to retirement and forfeit eligibility for an employer provided benefit. Approximately 85% of the present population is expected to receive monthly retirement benefits. Approximately 4% of the present population is expected to become eligible for death-in-service or disability benefits. Within 9 years, over half of the covered membership is expected to consist of new hires.

## SECTION C

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### SUMMARY OF BENEFITS

# Summary of Provisions

## June 30, 2019

1. **Voluntary Retirement – A.C.A. § 24-7-701.** A member may retire at age 60 with 5 or more years of credited service, or after 28 years of credited service regardless of age.
2. **Early Retirement – A.C.A. § 24-7-702.** A member who has more than 25 but less than 28 years of credited service and has not attained age 60 years may retire and receive an immediate early retirement annuity. The early annuity is an age & service annuity reduced by the lesser of (i) and (ii) below:
  - (i) 10/12 of 1% multiplied by the number of months by which early retirement precedes completion of 28 years of service, or
  - (ii) 10/12 of 1% multiplied by the number of months by which early retirement precedes the attainment of age 60 years.

Act 750 of 2017 allows the ATRS Board to set by resolution the early annuity reduction at a rate between 5% and 15% per year, to be prorated monthly if the System's actuary certifies that the amortization period to pay the unfunded liabilities exceeds 18 years. The Board adjusted the reduction to 10% per year beginning August 1, 2017 by Resolution 2017-14 on April 17, 2017.

3. **Deferred Retirement – A.C.A. § 24-7-707.** An inactive member who has 5 or more years of credited ATRS service will be entitled to an age & service annuity beginning at age 60, provided accumulated contributions are on deposit with the retirement system.
4. **Disability Retirement – A.C.A. § 24-7-704.** An active member with 5 or more years of actual and reciprocal service, who becomes totally and permanently disabled may be retired and receive a disability annuity computed in the same manner as an age & service annuity. In order to qualify for disability retirement, the member must exhibit symptoms of physical or mental incapacitation while the member is an active member (Act 973 of 2011). A member who is eligible for age and service retirement (age 60 and 5 years of service or 28 years of service at any age) is no longer eligible to apply for disability retirement. Act 219 of 2015 requires an ATRS disability retiree to obtain a Social Security Administration determination letter finding that the retiree is disabled within 36 months of the effective date of disability retirement. If a member cannot provide the SSA determination letter within the 36-month period, benefits will be terminated, the member will be returned to active service, and all member history will be restored. The requirement to qualify for SSA disability shall not apply to a disability retiree who was age 57 or older before July 1, 2015, because that member would qualify for age & service benefits prior to requiring the SSA determination of disability. Additionally, the retiree may apply for an extension of the 36-month deadline if the retiree can demonstrate the SSA determination is in progress. Act 549 of 2017 allows a disabled retiree to return to work for an ATRS covered employer as a part-time employee or in a lesser position than held previously and not be disqualified from disability retirement.

## Summary of Provisions

### June 30, 2019

4. **Disability Retirement – A.C.A. § 24-7-704 (Cont.)** If a retiree tries to return to full time employment, and fails, the suspended disability benefit will be restored to what it would have been had they not tried to return to work, or a recomputed benefit using the additional service, whichever is higher. Additionally, this act allows a retiree who was unable to secure a fully favorable Social Security disability determination letter to seek the ATRS medical committee's review of the case and its findings, which may find that the member is still disabled according to the ATRS definition of “disabled”, shall be ruled as a final disposition in the matter.
  
5. **Final Average Salary (FAS) – A.C.A. § 24-7-736.** The ATRS Board made changes to the final average salary by Resolution 2017-33 on November 13, 2017. Effective in Fiscal Year 2019, a member’s final average salary is the average of the annual salaries paid during the period of 5 years of credited service producing the highest annual average. Except for inactive members, a benchmark 3-year FAS of as of 6/30/2018 is established as a minimum FAS. Beginning July 1, 2009, no salary paid in any year which is utilized in the computation of the members’ final average salary, shall exceed the percentage increase of the base year, unless the difference in value between the next-highest year and the base year is within the amount of the salary differential (defined below). (Act 611 of 2017). If a member has a break in covered employment for eight years or more between any of the member's highest salary years used in the calculation of final average salary, then anti-spiking checking does not apply to the next highest year in the formula (Act 225 of 2011 – effective date of law July 27, 2011). There will no longer be any stacking of part-time college/teaching work for school district employees (Act 513 of 2011). Act 555 of 2013 limits the use of a reciprocal system's calculation of FAS if the ATRS member's reciprocal service credit is less than the number of years used to calculate the FAS for ATRS. Beginning July 1, 2014, if a member has less than three years of reciprocal service (the number of years used to calculate ATRS' FAS), then ATRS will obtain the salary and service credit from the reciprocal system, and use that salary and service as if it had all been earned in ATRS to calculate a FAS for retirement. Act 720 of 2013 made a minor change to final average salary for members who stop work during their last year of employment immediately before retirement. The Board may adjust the final average salary calculation by board resolution provided that the percentage range is no lower than 105% nor higher than 120% per year; and the salary differential is no lower than \$1,250 nor higher than \$5,000. Act 611 of 2017. The ATRS Board adjusted the percentage lower to 110% and salary differential allowance to \$5,000 by Resolution 2017-13 on April 17, 2017.
  
6. **Age & Service Annuity and Disability Annuity – A.C.A. §§ 24-7-705, 24-7-727 (stipend).** The annuity payable will not be less than the total of: years of contributory service times 2.15% of FAS; plus years of noncontributory service times 1.39% of FAS (1.25% for service earned after 2019); plus stipend for all members with 10 or more years of ATRS actual service. Act 966 of 2013 allows the ATRS Board to set the contributory multiplier for service credit earned after June 30, 2013, within a range of 1.75% to 2.15%. The noncontributory multiplier for service credit earned after June 30, 2013, may be set within a range of 0.5% and 1.39%. In addition, this act would allow the Board to set special multiplier rates for the first 10 years of ATRS service earned after June 30, 2013, for both contributory and noncontributory service. This act is dependent upon the actuary's certification that the amortization period is in excess of 18 (Act 551 of 2017) years to pay unfunded liabilities prior to any reduction to the multipliers.

## Summary of Provisions

### June 30, 2019

6. **Age & Service Annuity and Disability Annuity – A.C.A. §§ 24-7-705, 24-7-727 (stipend) Cont. By Board Resolution 2017-31 on November 13, 2017, the noncontributory multiplier will become 1.25% beginning in FY 2020. By Board Resolution 2017-32 on November 13, 2017, the contributory multiplier and noncontributory multiplier for the first 10 years of service has been reduced to 1.75% and 1.0% respectively beginning July 1, 2018. Once a member accrues 10 years of service, all service including the first 10 years is then credited at the standard rate in place at the time the service was earned.**
7. **T-DROP – A.C.A. §§ 24-7-1301–1316.** A member with 28 or more years of service may participate in the Teacher Deferred Retirement Option Plan (T-DROP, Act 1096 of 1995). T-DROP participants do not make member contributions. A T-DROP deposit is made monthly to the participant's T-DROP account. The T-DROP deposit is the amount that would have been paid had the member retired, reduced by 1% for each year of contributory, noncontributory, and reciprocal service (Act 605 of 2013). Members who enter T-DROP with less than 30 years of service are subject to an additional 6% reduction for each year less than 30 years. Act 750 of 2017 allows the Board to adjust the additional T-DROP reduction factor between ½% and 1% of the plan benefit for each month the member begins participating in the plan prior to having 30 years of credited service. T-DROP deposits are increased each year by 3% of the member's initial T-DROP deposit. T-DROP Deposits cease at the earlier of 10 years of T-DROP participation or separation from service. T-DROP participants may continue in covered employment after 10 years of T-DROP participation, but do not accumulate additional T-DROP deposits. T-DROP participants receive interest annually on the balance of the T-DROP account. Regular T-DROP interest is credited for 10 or less years of participation. Post 10-year T-DROP interest is credited for more than 10 years of participation.

Regular T-DROP interest is a combination of a fixed interest rate and an incentive interest rate. An incentive rate may be approved by the Board to encourage continued participation in T-DROP, if the estimated ATRS rate of return is 2% greater than the ATRS actuarial assumed rate of return in the preceding calendar year. Beginning in fiscal year 2019, the Board has set the Regular T-DROP fixed interest rate at 3% and the maximum incentive rate at 3% by Resolution 2017-35 on November 13, 2017. The fixed and incentive interest rates may be adopted by board resolution prior to the beginning of the fiscal year and would apply to subsequent fiscal years unless modified by the Board. For fiscal year 2019, the Board set the Regular T-DROP fixed interest rate at 3% and the incentive interest rate at 3%, resulting in a total interest rate of 6%, by Resolution 2018-09 on February 5, 2018.

Post 10-year T-DROP interest has been in effect since July 1, 2010. Act 1049 of 2017 allows the Post 10-year T-DROP interest rate (24-7-1307) to be determined as appropriate by the Board and adopted by the resolution prior to the beginning of the fiscal year in which the interest rate shall apply. Post 10-year T-DROP interest is a combination of a variable interest rate and an incentive interest rate, to encourage continued participation in T-DROP. The Post 10-year T-DROP variable interest rate formula is based on investment returns and other factors. On November 13, 2017, the ATRS Board by Resolution 2017-36 set the formula for the variable interest rate and the maximum combined variable and incentive interest rate for fiscal year 2019 and beyond. The Post 10-year T-DROP variable interest rate is calculated as 2% less than the system's rate of return, but not less than 4%, nor greater than 6%. The maximum Post 10-year T-DROP combined interest rate including the incentive interest rate is 7.5%. The Post 10-year T-DROP incentive interest rate can be awarded if the estimated ATRS rate of

## Summary of Provisions June 30, 2019

**T-DROP – A.C.A. § 24-7-1301-1316 (Cont).** return is 2% greater than the ATRS actuarial assumed rate of return in the preceding calendar year. For fiscal year 2019, the Board set the Post 10-year T-DROP variable interest rate at 6% and the incentive interest rate at 1%, resulting in a combined interest rate of 7%, by Resolution 2018-10 on February 5, 2018.

Upon actual retirement, the member may receive the T-DROP account balance in the form of a lump sum, a Cash Balance Account (CBA), or as an additional annuity. The T-DROP distribution may be a combination of lump sum, CBA, and additional annuity.

8. **Post-Retirement Increases – A.C.A. §§ 24-7-713, 24-7-727 (compound COLA).** Each July 1, annuities are adjusted to be equal to the base annuity times 100% plus 3% for each full year in the period from the effective date of the base annuity to the current July 1. The base annuity is the amount of the member's annuity on the later of July 1, 2001 or the effective date of retirement, as re-determined by Acts 396 of 1999 and 992 of 1997. The July 1, 2009 cost of living adjustment for retirees was compounded. The annuity was set to 103% of the June 30, 2009 retirement benefit amount. After it was calculated on July 1, 2009, the base amount was reset to be the July 1, 2009 benefit amount. Future cost of living raises will be established by the new updated base amount. Future cost of living adjustments will be evaluated on an annual basis to determine if a simple or compound cost of living increase will be given, depending on the financial condition of the System. Act 967 of 2013 gives the ATRS Board authority to reverse the compounding of a benefit and reset the base amount to the pre-compounding amount. If this reversal were to occur, it would include participants in the T-DROP plan. The future benefits of a member would not be reduced to recover any benefits paid to a member as a result of the compounding. In addition, the member's benefit on the date of the reversal would not be impacted, but future COLA's would be based upon the reset base amount. This act is dependent upon the actuary's certification that the amortization period is in excess of 30 years to pay unfunded liabilities prior to any reversal of the compounding of the COLA. Act 780 of 2017 allows the right to reverse the 2009 compound COLA when unfunded liabilities exceed an 18 year amortization. The act also allows a phase in of the change during months in which a COLA raise is given to prevent any retiree or option beneficiary from having an actual reduction in monthly benefit payments.
9. **Survivor Benefits – A.C.A. § 24-7-710.** Upon the death of an active member, who has 5 or more years of actual and reciprocal service, the following annuities are payable:
  - (a) The surviving spouse receives an annuity computed in the same manner as if the member had (i) retired the date of his death with entitlement to an annuity, (ii) elected Option A - 100% Survivor Annuity, and (iii) nominated the spouse as joint beneficiary. If the member has attained age 60 and has acquired 5 years of credited service or has acquired 25 years of credited service regardless of age, the annuity begins immediately; otherwise the annuity begins the month following the date the member would have attained age 60. Under certain circumstances, a lump sum distribution may be made to the beneficiary(ies) of the deceased member.

# Summary of Provisions

## June 30, 2019

### Survivor Benefits – A.C.A. § 24-7-710. Cont.

(b) A surviving child's benefit is prorated to an amount equal to 1% of the member's highest salary year for each quarter of a year credited as actual service in the system, up to 20% or up to a maximum of \$20,000 per year. If there is more than 1 surviving dependent, the benefits are capped to the lesser of 60% of the member highest salary or \$60,000 per year to be divided equally among the dependents. Act 505 of 2017. A child is dependent until the child's death, marriage, or attainment of age 18 (age 23 if the child is a full-time student).

10. **Lump Sum Death Benefit – A.C.A. § 24-7-720.** Beneficiaries of deceased active members or retirees with 10 or more years of ATRS credited service are eligible to receive a lump sum death benefit of up to \$10,000 (\$6,667 for noncontributory service-benefit). The amount will be prorated for members who have both contributory service and noncontributory service. Members with 15 or more years of contributory service will receive the full \$10,000 (Act 977 of 2011).
11. **Members' Contributions – A.C.A. § 24-7-406. Member Contributions – A.C.A. § 24-7-406.** Through FY 2019, contributory members contribute 6% of their salaries. Members that are participating in the T-DROP program or are working retirees do not make member contributions. If a member leaves service prior to becoming eligible to retire, the accumulated member contributions are returned upon request. No interest is credited to a member's contributions for the first year of membership; after 1 year, interest is credited. The ATRS Board set the interest rate on refunded contributions to 0.08% for fiscal year 2017 and beyond by Resolution 2017-17 on April 17, 2017. Act 550 of 2017 allows the ATRS Board to increase the employee contribution rate beyond 6% if the amortization period to pay the unfunded liabilities of the system exceeds 18 years. The Board set the member contribution rate to 6.25%, 6.50%, 6.75%, and 7.00% for FY 2020, FY 2021, FY2022, and FY 2023 and thereafter, respectively, by Resolution 2017-30 on November 13, 2017.

Effective July 1, 1986, a noncontributory plan was created. Effective July 1, 1999 the default choice for new members is contributory. Effective July 1, 1997, all future member contributions are tax-deferred in accordance with §414(h) of the Internal Revenue Code of the United States. Effective July 1, 2005, all noncontributory members whose status changes from support to teacher (contracted for more than 181 days), will become contributory. Each July 1, members who previously elected to be noncontributory may elect to change to contributory status under Act 385 of 2005. The election is irrevocable.

12. **Act 808 Retirement – A.C.A. § 24-4-732.** Any employee of a state agency who was an active member of the Arkansas Teacher Retirement System on April 8, 1987, and who qualified for retirement before January 1, 1988, could become a member of the Arkansas Public Employees Retirement System and retire from that system. All credited service was transferred to that system but the member's contributions were retained by the Arkansas Teacher Retirement System and the benefit amount is transferred monthly to the Arkansas Public Employees Retirement System. Each July 1, annuities are adjusted by 3% (compound escalator).

## Summary of Provisions

### June 30, 2019

13. **Act 793 Retirement – A.C.A. § 24-4-522.** Any employee who was a member of the rehabilitation services in 1977 was permitted to become a member of the Arkansas Public Employees Retirement System. Liabilities associated with prior service earned through June 30, 1978 remain in the Arkansas Teacher Retirement System. Future service is allocated to the Arkansas Public Employees Retirement System. Each July 1, annuities are adjusted by 3% (compound escalator).
14. **Retiree Benefit Stipend – A.C.A. § 24-7-713.** Each retired member as of June 30, 2008, with 5 or more years of ATRS credited service receives a \$75 per month stipend. Members in T-DROP do not receive the \$75 per month stipend until actual retirement. For all members retiring on or after July 1, 2008, a minimum of 10 years of ATRS credited service is required to receive the \$75 per month stipend. Act 603 of 2013 allows the ATRS Board to increase or decrease the stipend to a minimum of \$1 per month and a maximum of \$75 per month. This act is dependent upon the actuary's certification that the amortization period is in excess of 18 years to pay unfunded liabilities prior to any reduction in the current stipend. The stipend for fiscal year 2018 remains at \$75 per month. **By Board Resolution 2017-34 on November 13, 2017 the benefit stipend is removed from the base amount for all retirees and beneficiaries beginning in fiscal year 2019 and the benefit stipend will be reduced to \$50.00 for fiscal year 2020 and beyond. The Resolution contains a “hold harmless” provision that prevents the lowering of the stipend if it would actually reduce the total monthly benefit. This would only affect retirees when the COLA is less than \$25 per month.**

15. **Optional Forms of Benefits – A.C.A. § 24-7-706:**

**Option 1 (Straight Life Annuity)**

A member will receive the maximum monthly benefit for which he/she qualifies, throughout his/her lifetime. No monthly benefits will be paid to his/her beneficiary after the member's death. Should a member die before he/she has drawn in benefits an amount equal to his/her contributions plus earned interest, the balance will be paid to a designated beneficiary. The designated beneficiary may be anyone chosen by the member.

**Option A (100% Survivor Annuity)**

Under this option a member will receive a reduced annuity throughout his/her lifetime. Upon the member's death, the designated beneficiary will receive the same annuity for the balance of his/her lifetime.

**Option B (50% Survivor Annuity)**

Under this option a member will receive a reduced annuity throughout his/her lifetime. Upon the member's death, the designated beneficiary will receive one-half (1/2) of this annuity for the balance of his/her lifetime.

**Option C (Annuity for Ten Years Certain and Life Thereafter)**

A reduced monthly benefit payable for 120 months. After that time, a member's monthly allowance will revert to the amount he/she would have received under the regular plan and continue for life. If the member dies before receiving 120 payments, the designated beneficiary will receive a monthly benefit in the same amount until monthly benefits to both the member and the beneficiary equal 120 monthly payments. No further benefits are then payable to the beneficiary.

## Summary of Provisions

### June 30, 2019

#### Pop-Up Election

Following the death of or a divorce from the member's designated beneficiary, his or her benefit reverts (pops-up) to the straight life annuity amount from the elected optional annuity amount. The member may then elect new beneficiaries in accordance with Arkansas Code and rules adopted by the ATRS board.

Option Factors are based upon a 5.0% interest rate and the RP-2014/MP2017 tables (static projection to 2022) adjusted with a 50% unisex mix.

16. **Refund of Member Contributions – A.C.A. § 24-7-711.** Any termination refund made to a member or a lump sum payout made to a surviving spouse after July 1, 2011, cancels all service credit, including noncontributory service credit (Act 976 of 2011); any repurchase of refunded service will be as contributory years at actuarial cost (Act 69 of 2011). Act 140 of 2013 specifies that all membership rights (including noncontributory service credit) and beneficiary designations to the ATRS are cancelled when a member gets a refund of his or her contributions.
17. **Contract Buyout – A.C.A. § 24-7-735.** During periods of contract buyout/litigation/termination, members will not receive service credit if no on-call service or on site work is performed. ATRS will not allow the purchase of the time between actual work and the settlement (Act 163 of 2011) unless the settlement was made to resolve a claim of wrongful termination (Act 436 of 2017).
18. **Actuarial Cost of Service – A.C.A. §§ 24-1-107, 24-2-502, 24-7-202, 24-7-406, 24-7-501, 24-7-502, 24-7-612, 24-7-602, 24-7-603, 24-7-604, 24-7-606, 24-7-607, 24-7-610, 24-7-611.** Effective July 1, 2011, all service purchases will be at actuarial cost (Act 69 of 2011).
19. **Deceased Member Refund of Contributions – § 24-7-711.** Effective July 1, 2011, if a beneficiary is not eligible for survivor benefits, or if a surviving spouse is eligible and chooses a contribution refund, the interest on the refund stops the July 1 following the member's death (Act 136 of 2011).
20. **Limit Lookback to Five Years – A.C.A. §§ 24-7-202, 24-7-205.** Effective July 1, 2011, absent intentional nondisclosure, fraud, misrepresentation, criminal act, or obvious/documentated error by an employer of ATRS members can no longer establish old service previously unreported unless such service is acquired by purchase at actuarial cost (Act 138 of 2011). Act 241 of 2017 allows ATRS to correct an understated service credit error upon which all required contributions have been paid, even if beyond the 5-year look-back period.
21. **Service Credit Requirements – A.C.A. §§ 24-7-501, 24-7-502, 24-7-601, 24-7-603, 24-7-604, 24-7-606, 24-7-607, 24-7-611.** Effective July 1, 2011, members must receive 160 days of service to be credited with a year of service credit (Act 974 of 2011).
22. **T-DROP Cash Balance Account.** Effective July 1, 2012, a T-DROP cash balance account was established that allows members exiting (retiring) from T-DROP to place all or a portion of their T-DROP proceeds into a Cash Balance Account (CBA) at ATRS. On November 13, 2017, by Resolution 2017-38 the Board set the CBA interest rate schedule based on years of participation as follows: 2.50% for year one, 2.75% for year two, 3.00% for year three, 3.25% for year four, 3.50% for year five, and 4.00% for year

## Summary of Provisions June 30, 2019

six and beyond. The Board granted all CBA participants a 1% incentive rate for fiscal year 2019 by Resolution 2018-11 on February 5, 2018.

23. **Delinquent Member Contributions – A.C.A. § 24-7-205.** Act 336 of 2013 allows members to forfeit service credit for any contributory fiscal year for which there is a balance due to the system.
24. **Purchase of “Air Time” as a Result of Wrongful Termination – A.C.A. §§ 24-7-702, 24-7-735, 6-17-413.** Act 521 of 2013 allows a member to purchase service credit under a settlement agreement or court order to resolve a claim of wrong termination if the service credit is purchased from the date of termination by an ATRS employer to the date of the resolution of the dispute. This service credit would be purchased at actuarial cost.
25. **Buyout of Inactive Members—A.C.A. § 24-7-505.** Act 606 of 2013 allows the ATRS Board to create a voluntary "buyout plan" for inactive vested members. The System will make a one-time lump sum payment to a member, a surviving spouse, or an alternate payee in exchange for a member, surviving spouse, or alternate payee's cancellation of membership and retirement benefit rights. The buyout plan will be established by Board rules. The rule is 16-1 Cash and Savings Help Program for Members (CASH). This particular plan offering ended June 30, 2015. Depending upon the success of the plan, it may be extended by the Board. Act 647 of 2017 allows the buyout plan to be extended, modified, or expanded by board resolution. The ATRS Board expanded the CASH program to include all inactive vested members, regardless of service type by Resolution 2017-18 on May 10, 2017. The ATRS Board offered the FY 2019 CASH program for all inactive vested members to end on June 30, 2019 by Resolution 2017-35 on October 1, 2018.
26. **Private School Service—A.C.A. § 24-7-607.** Prior to Act 90 of 2015, private school service had to be recognized by the Arkansas Department of Education as positions that required the issuance of teaching licenses. The certification of this service credit was performed by one employee of the Arkansas Department of Education, and that one employee retired. Upon that employee's retirement, the Arkansas Department of Education no longer certified private school service credit. No certifications occurred for approximately a year until legislation could be passed to allow ATRS to make this determination. In addition, a distinction was made between certified and noncertified private school service credit. Certified private school service (basically administrative and teaching) could be purchased at actuarial cost, up to 15 years. Noncertified private school service could be purchased at actuarial cost, up to 5 years.
27. **Military Service Credit—A.C.A. § 24-7-602.** Act 301 of 2015 made technical corrections to the ATRS laws. In the military service credit section, ATRS was not in compliance with a state law that was passed in 2009, Act 295, which repealed the requirement for free military service credit to be granted only if the service was not credited under any other plan except Social Security and the requirement that receipt of a pension from the federal military retirement system paid solely for disability shall not be considered as having service with another retirement plan. The military technical corrections bill raised questions by some of the legislators, and Act 558 of 2015 was passed to further clarify military service credit. Compulsory military service was changed throughout the law to read: "federal military draft". The word "honorable" was inserted before discharge in order for the member to obtain free military service credit throughout the law.

## Summary of Provisions

### June 30, 2019

28. **Lump-Sum Payment of Reserve Value of Small Annuity—A.C.A. 24-7-716.** Prior to passage of Act 225 of 2015, ATRS would pay out a reserve value to a member whose monthly benefit was less than \$20 per month. This was optional for the member. The reserve value was calculated by multiplying the annual annuity by the reserve factor for the member's age. Act 225 of 2015 repealed this law..
29. **Pension Advance Prohibition – A.C.A. § 24-7-715.** Prohibits a pension advance company from obtaining a retiree's benefit to repay a loan. Act 199 of 2017.
30. **Accrued Sick Leave – A.C.A. § 24-7-601.** Allows unused accrued sick leave, whether paid or unpaid, to count as service credit to determine retirement eligibility for survivor benefits and lump sum death benefits. One day of service shall be added to the service credit for the fiscal year of the member's death for each day of unused sick leave. This does not include catastrophic leave and other unused donated leave. Act 200 of 2017.
31. **Spousal Survivor Benefit – A.C.A. § 24-7-710.** Members may direct an alternative residual beneficiary to receive a lump sum payment of the member's residue amount or T-DROP balance. No spousal survivor benefits will be payable if an alternative beneficiary who is not the surviving spouse is designated by the member. Act 243 of 2017.
32. **Settlement Agreements – A.C.A. § 24-7-202, § 24-7-735.** Salary or service credit may be purchased as part of a settlement agreement between a member and his/her employer. Salary will be added to the salary at the time of purchase and will be determined using the same factors used to calculate an additional monthly benefit in the annuitization of a T-DROP distribution. It is assumed the member would have retired immediately at the time of the purchase. Act 436 of 2017.
33. **Outsourcing – A.C.A. § 24-7-506.** This Act defines outsourcing to mean employment for an ATRS covered employer through a third party, private employer, independent contractor, or other contractual relationship. This Act defines that a person who performs services that are necessary for the normal daily operation for an ATRS covered employer is considered an Embedded Employee. This Act gives the ATRS covered employer a one-time decision to choose between two options for handling their Embedded Employees. The decision must be made within 60 days after the effective date of this Act or that first outsourcing. The first option for the ATRS covered employer is to become a participating employer and make embedded employees participating members of ATRS. The second option for the ATRS covered employer is to become a Surcharge Employer and opt to pay a surcharge on the Embedded Employee's salary to ATRS to help cover the actuarial cost. The surcharge starts at ½% the first year and slowly rises to 3% over 4 years with a hard cap of 4%. The Embedded Employees of a Surcharge Employer will not be members of ATRS. The services necessary for normal daily operations include: substitute teaching, teacher's aides, food service, transportation service, custodial service, security services, and school nursing. Only those working on the premises are subject to the surcharge. The surcharge is ONLY on SALARY of embedded employees. All salary is reported in the aggregate with the contractor's salary amount being the final word unless it is clearly in error. The Division of Youth Services shall be a participating Employer and may designate any or all Embedded Employees as members of ATRS. The law shall not apply to post-secondary higher education institutions. Act 575 of 2017.

## Summary of Provisions June 30, 2019

34. **Concurrent Reciprocal Service Credit – A.C.A. § 24-7-601.** This act allows ATRS members with the option of waiving their ATRS service in the event the member had concurrent service in two (2) state-supported retirement systems. This Act gives the member the option to surrender either ATRS service or the reciprocal plan service. If a member worked full time under a reciprocal retirement system and only part-time under ATRS, this Act will allow the member to waive the ATRS service to obtain a higher benefit based upon the full time service in the other system. This act will allow concurrent reciprocal members the option to voluntarily elect to waive service in ATRS. The member's employer-accrued contributions and employee-accrued contributions in the system remain with the system. Act 612 of 2017.
35. **Employer Contribution Rate – A.C.A. § 24-7-401.** Employer contributions are collected on active members, T-DROP participants (even those who work beyond the 10-year participation period), and working retirees (Act 743 of 2009). Through fiscal year 2019, the employer contribution rate is 14%. For the fiscal year beginning July 1, 2018, the Board may modify the employer contribution rate for future fiscal years above 14% in increments of 0.25% per fiscal year provided the system has a greater than 18-year amortization period to pay unfunded liabilities without an employer contribution rate of more than 14% limited to a maximum employer contribution rate of 15%. Act 821 of 2017. The Board set the employer contribution rate to 14.25%, 14.50%, 14.75%, and 15.00% for FY 2020, FY 2021, FY2022, and FY 2023 and thereafter, respectively, by Resolution 2017-40 on November 13, 2017.
36. **Forfeiture of Benefits by Certain Persons – A.C.A. §§ 24-1-301, 302, 303, 304, 305.** Act 756 of 2017 provides for a beneficiary's forfeiture of benefits under a public retirement system when the beneficiary unlawfully kills a member or retiree.

## Sample Benefit Computations for a Member Retiring June 30, 2019

The data for the Example member is shown below.

A.	\$35,000	Final Average Compensation
B.	32	Total Service Credit
C.	27	Contributory Service Credit
D.	60	Age of Retiree
E.	55	Age of Spouse
F.	100%	Percentage of Retirement Allowance to Continue to Spouse after Retiree's Death (Retiree Chooses this Percentage)

The computations that would be made for this case are:

	<b>Annual</b>
G. Non-Contributory Base: $1.39\% \times A \times B$	\$15,568
H. Extra for Contributory: $0.76\% \times A \times C$	<u>7,182</u>
I. Subtotal Benefit: G + H	22,750
J. Health Stipend	<u>600</u>
K. Total Benefit: I + J	23,350
L. Adjustment for Line F election: $(1 - 0.78571) \times I$	<u>4,875</u>
M. Annual Amount Payable	\$18,475

Projected Benefits, taking into account increases after retirement would be:

Year Ended June 30	Annual Amount
2020	\$18,475
2021	19,011
2022	19,547
2023	20,083
2024	20,619

Thereafter, the amount would increase by \$536 annually for life.

## Sample T-DROP Benefit Computations for a Member Entering T-DROP June 30, 2019

The data for the Example member is shown below.

A.	\$35,000	Final Average Compensation
B.	28	Total Service Credit
C.	28	Contributory Service Credit
D.	55	Age of Retiree

The computations that would be made for this case are:

		<b>Annual Amount</b>
E.	Non-Contributory Base: $1.39\% \times A \times B$	\$13,622
F.	Extra for Contributory: $0.76\% \times A \times C$	7,448
G.	Reduction for T-DROP Plan: (1% for each year of service) $0.28 \times (E+F)$	5,900
H.	Reduction for Entering T-DROP with less than 30 years of service (6% for each year less than 30): $0.12 \times (E + F - G)$	<u>1,820</u>
I.	Annual Deposit $E + F - G - H$	\$13,350

Projected Deposits, taking into account increases after DROP, and 5 years duration would be:

Year Ended June 30	Amount Deposited
2020	\$13,350
2021	13,751
2022	14,151
2023	14,552
2024	14,952
Total	\$70,756

The amount deposited, plus credited interest, can be paid as a lump sum or as an annuity. A portion of the deposits can also be placed into a Cash Balance account.

## SECTION D

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### **FINANCIAL INFORMATION**

This information is presented in draft form for review by the System's auditor. Please let us know if there are any items the auditor changes so that we may maintain consistency with the System's financial statements.

## Asset Valuation Method

An essential step in the valuation process is comparing valuation assets with computed liabilities. Valuation assets are those assets that are recognized for funding purposes.

Asset valuation methods are distinguished by the timing of the recognition of investment income. Total investment income is the sum of ordinary income and capital value changes. Under a pure market value approach, ordinary investment income and all capital value changes would be recognized immediately. Because of market volatility, use of pure market values in retirement funding can result in volatile contribution rates and unstable financial ratios, contrary to ATRS objectives.

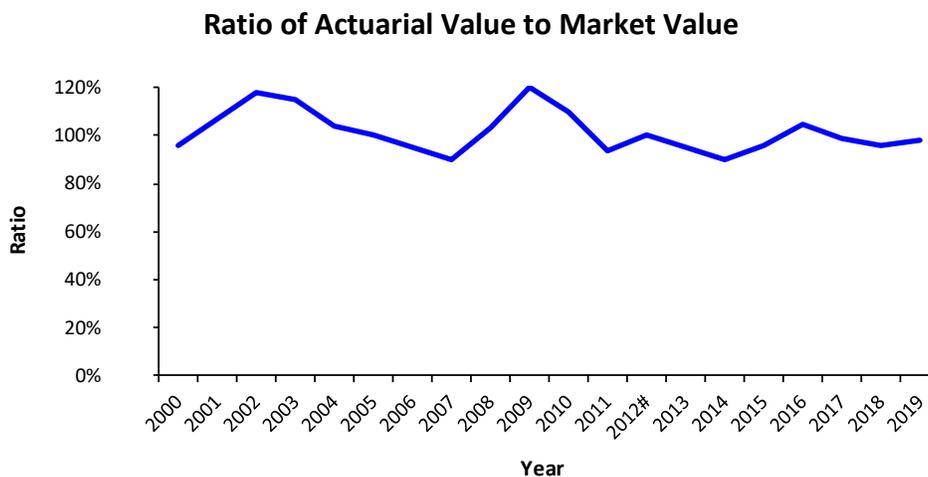
Under the ATRS asset valuation method (see page D-3), assumed investment return is recognized fully each year. Differences between actual and assumed investment return are phased-in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, the funding value will tend to be less than the market value. Conversely, during periods when investment performance is less than the assumed rate, funding value will tend to be greater than market value. If assumed rates are exactly realized for 3 consecutive years, funding value will become equal to market value.

A multi-year comparison of market value to funding (actuarial) value is on the following page.

## Asset Valuation Method

Valuation Date June 30	Market Value of Assets (1)	Actuarial Value of Assets (2)	Ratio of AV to MV (2) / (1)
2000	\$ 7,978	\$ 7,620	96%
2001	7,643	8,166	107%
2002	7,084	8,328	118%
2003	7,050	8,113	115%
2004	8,122	8,424	104%
2005	8,811	8,817	100%
2006	9,868	9,332	95%
2007	11,637	10,519	90%
2008	11,018	11,319	103%
2009	8,847	10,617	120%
2010	9,884	10,845	110%
2011	11,895	11,146	94%
2012#	11,484	11,484	100%
2013	12,830	12,247	95%
2014	14,856	13,375	90%
2015	15,036	14,434	96%
2016	14,559	15,239	105%
2017	16,285	16,131	99%
2018	17,493	16,756	96%
2019	17,742	17,413	98%

# Actuarial Value set equal to Market Value.



This year the market value of assets is greater than the actuarial value (see page A-2 for a more detailed explanation). To prevent unreasonably large differences between market value and actuarial value, there is a requirement that the recognized assets must always be between 80% and 120% of the market value (see page D-3).

## Development of Funding Value of Assets

Year Ended June 30:	2016	2017	2018	2019	2020	2021	2022
A. Funding Value Beginning of Year	\$ 14,433,823,989	\$ 15,238,522,015	\$ 16,131,466,927	\$ 16,756,062,928			
B. Market Value End of Year	14,558,576,729	16,284,808,245	17,492,627,740	17,741,621,773			
C. Market Value Beginning of Year	15,035,701,313	14,558,576,729	16,284,808,245	17,492,627,740			
D. Non-Investment Net Cash Flow	(504,645,210)	(555,761,481)	(606,938,770)	(642,256,050)			
E. Investment Return							
E1. Market Total: B - C - D	27,520,626	2,281,992,997	1,814,758,265	891,250,083			
E2. Assumed Rate	8.00%	8.00%	7.50%	7.50%	7.50%		
E3. Amount for Immediate Recognition	1,134,520,111	1,196,851,302	1,187,099,816	1,232,620,118			
E4. Amount for Phased-In Recognition: E1-E3	(1,106,999,485)	1,085,141,695	627,658,449	(341,370,035)			
F. Phased-In Recognition of Investment Return							
F1. Current Year: 0.25 x E4	(276,749,871)	271,285,424	156,914,612	(85,342,509)	Unknown	Unknown	Unknown
F2. First Prior Year	(107,015,212)	(276,749,871)	271,285,424	156,914,612	\$ (85,342,509)	Unknown	Unknown
F3. Second Prior Year	364,334,749	(107,015,212)	(276,749,871)	271,285,424	156,914,612	\$ (85,342,509)	Unknown
F4. Third Prior Year	194,253,459	364,334,750	(107,015,210)	(276,749,872)	271,285,423	156,914,613	\$ (85,342,508)
<b>F5. Total Recognized Investment Gain</b>	<b>174,823,125</b>	<b>251,855,091</b>	<b>44,434,955</b>	<b>66,107,655</b>	342,857,526	71,572,104	(85,342,508)
G. Funding Value End of Year:							
G1. Preliminary Funding Value End of Year: A+D+E3+F5	<b>15,238,522,015</b>	<b>16,131,466,927</b>	<b>16,756,062,928</b>	<b>17,412,534,651</b>			
G2. Upper Corridor Limit: 120% x B	<b>17,470,292,075</b>	<b>19,541,769,894</b>	<b>20,991,153,288</b>	<b>21,289,946,128</b>			
G3. Lower Corridor Limit: 80% x B	<b>11,646,861,383</b>	<b>13,027,846,596</b>	<b>13,994,102,192</b>	<b>14,193,297,418</b>			
<b>G4. Funding Value End of Year</b>	<b>15,238,522,015</b>	<b>16,131,466,927</b>	<b>16,756,062,928</b>	<b>17,412,534,651</b>			
H. Actual/Projected Difference between Market and Funding Value	(679,945,286)	153,341,318	736,564,812	329,087,122	(13,770,404)	(85,342,508)	-
I. Market Rate of Return	0.19 %	15.98 %	11.36 %	5.19 %			
J. Funding Rate of Return	9.23 %	9.68 %	7.78 %	7.90 %			
K. Ratio of Funding Value to Market Value	104.67 %	99.06 %	95.79 %	98.15 %			

The Funding Value of Assets recognizes assumed investment return (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased-in over a closed 4-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than Market Value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than Market Value. **The Funding Value of Assets is unbiased with respect to Market Value.** At any time it may be either greater or less than Market Value. If assumed rates (applied to the funding value of assets) are exactly realized for 3 consecutive years, it will become equal to Market Value.

**The assets** of the Retirement System, as of June 30, 2019, were reported to your actuary to be \$17,741,621,773. This amount, reduced by a funding value adjustment of \$329,087,122 this year, is used to finance the Retirement System liability.

Accounts	Assets at June 30	
	2019	2018
Regular Accounts		
Members' Deposit Accounts		
Contributions	\$ 1,348,149,014	\$ 1,287,855,312
Interest	9,669,786,261	9,645,971,617
Total	11,017,935,275	10,933,826,929
T-Drop Member Deposit Accounts		
Contributions	28,594,336	23,942,761
Interest	26,900,241	27,387,222
Total	55,494,577	51,329,983
Cash Balance Account	133,829,621	109,036,167
Employer's Accumulation Account	(5,848,501,337)	(5,509,753,553)
Retirement Reserve Account	11,844,778,384	11,366,265,784
Act 808 Retirement Reserve Account	11,497,384	12,599,124
T-Lump Payable	411,492,155	417,126,689
Survivors Benefit Account	105,863,197	102,835,207
Total Regular Accounts	17,732,389,256	17,483,266,330
Other Accounts		
Income Expense Account	9,232,517	9,361,410
Other Special Reserves	-	-
Miscellaneous	-	-
Total Other Accounts	9,232,517	9,361,410
Total Accounting Value of Assets	17,741,621,773	17,492,627,740
Funding Value Adjustment	(329,087,122)	(736,564,812)
Funding Value of Assets	\$ 17,412,534,651	\$ 16,756,062,928

## Market Value of Assets

The net market value of assets at year-end was \$17,741,621,773 and was invested as shown below.

	Market Value at June 30	
	2019	2018
Cash	\$ 256,387,142	\$ 318,615,761
Receivables		
Unsettled Trades and Accrued Return	60,000,798	69,884,770
Member Contributions	8,667,210	7,880,721
Employer Contributions	28,253,478	26,178,880
Other	571,587	250,097
Total Receivables	97,493,073	104,194,468
Investments		
Government Securities	50,473,001	25,842,362
Domestic Equities	2,472,540,708	2,849,088,275
International Equities	1,073,645,442	961,598,275
Commingled Funds	7,233,968,477	7,041,685,885
Corporate Bonds	1,076,593,959	706,597,635
Asset and Mortgage-backed Securities	39,156,489	40,072,559
Mortgages (CMO's)	-	1,970,135
Conventional Mortgages	-	-
Alternative Investments	5,386,398,892	5,196,546,158
Limited Partnerships	72,122,080	70,411,826
Real Estate	52,354,702	57,238,826
Other Investments	-	208,000,000
Investment Derivative Instruments	(93,525)	939,281
Total Investments	17,457,160,225	17,159,991,217
Invested Securities Lending	469,822,525	506,400,659
Net Equipment	222,647	251,858
Total Assets	18,281,085,612	18,089,453,963
Liabilities		
Survivor Benefits for Minors	227,543	238,734
Other Payables	8,569,746	8,830,843
Securities Related Payables	60,879,610	81,447,941
Securities Lending Collateral	469,786,940	506,308,705
Total Liabilities	539,463,839	596,826,223
Net Market Value	\$ 17,741,621,773	\$ 17,492,627,740
Change from Prior Year	248,994,033	1,207,819,495

## Market Value Reconciliation

Assets developed during the year as follows:

	Year Ended June 30	
	2019	2018
Net Market Value July 1	\$ 17,492,627,740	\$ 16,284,808,245
<b>Additions</b>		
Employer Contributions	430,864,656	424,488,126
Employee Contributions	141,885,632	138,766,747
Appreciation	806,983,870	1,747,857,306
Interest	38,632,142	30,987,644
Dividends	92,234,448	81,573,200
Real Estate	7,671,704	7,596,033
Other	1,182,214	1,247,762
Securities Lending Activity	4,421,291	5,075,453
<b>Total Additions</b>	<b>1,523,875,957</b>	<b>2,437,592,271</b>
<b>Deductions</b>		
Age & Service Benefits	1,008,092,044	958,281,766
Disability Benefits	40,330,710	39,770,821
Option Benefits	30,013,681	28,756,398
Survivor Benefits	11,267,137	10,848,118
Reciprocal Service	55,891,519	52,914,304
Act 808	2,439,111	2,725,690
Refunds	9,679,783	9,455,405
Active Member Death	278,972	304,927
T-DROP Benefits	41,550,591	44,827,681
CBA Benefits	13,318,361	11,297,546
CASH Benefit Program	2,144,429	11,010,987
Investment Expense	52,740,802	50,242,703
Administrative Expense	7,134,784	9,336,430
<b>Total Deductions</b>	<b>1,274,881,924</b>	<b>1,229,772,776</b>
Miscellaneous	-	-
<b>Net Market Value June 30</b>	<b>\$ 17,741,621,773</b>	<b>\$ 17,492,627,740</b>

## Schedule of Funding Progress (Dollar Amounts in Millions)

Valuation Date June 30	(1) Actuarial Value of Assets	(2) Entry Age AAL	(3) UAAL (2)-(1)	(4) Funding Ratio (1)/(2)	(5) Annual Payroll	Liabilities as a % of Payroll		
						Unfunded (3)/(5)	Funded (1)/(5)	Total (2)/(5)
2000+	\$ 7,620	\$ 7,879	\$ 259	96.7%	\$ 1,485	17.4%	513.2%	530.6%
2001+	8,166	8,561	395	95.4%	1,557	25.4%	524.4%	549.8%
2002*	8,328	9,062	734	91.9%	1,628	45.1%	511.5%	556.6%
2003+	8,113	9,445	1,332	85.9%	1,683	79.1%	482.1%	561.2%
2004	8,424	10,050	1,626	83.8%	1,748	93.0%	481.9%	574.9%
2005	8,817	10,973	2,156	80.4%	1,962	109.9%	449.4%	559.3%
2006	9,332	11,623	2,291	80.3%	2,080	110.1%	448.7%	558.8%
2007+	10,519	12,329	1,810	85.3%	2,191	82.6%	480.1%	562.7%
2008+	11,319	13,334	2,015	84.9%	2,268	88.8%	499.1%	587.9%
2009	10,617	14,019	3,402	75.7%	2,318	146.8%	458.0%	604.8%
2010+	10,845	14,697	3,852	73.8%	2,381	161.8%	455.5%	617.3%
2011+*	11,146	15,521	4,375	71.8%	2,728	160.4%	408.6%	569.0%
2012	11,484	16,139	4,655	71.2%	2,714	171.5%	423.2%	594.7%
2013+*	12,247	16,718	4,471	73.3%	2,727	164.0%	449.1%	613.1%
2014	13,375	17,310	3,935	77.3%	2,758	142.7%	484.9%	627.6%
2015	14,434	18,136	3,702	79.6%	2,777	133.3%	519.8%	653.1%
2016	15,239	18,812	3,573	81.0%	2,785	128.3%	547.2%	675.5%
2017+*	16,131	20,298	4,167	79.5%	2,814	148.1%	573.2%	721.3%
2018+*	16,756	20,935	4,179	80.0%	2,872	145.5%	583.4%	728.9%
2019	17,413	21,709	4,296	80.2%	2,907	147.8%	599.0%	746.8%

+ Legislated benefit or contribution rate change.

\* Revised actuarial assumptions.

A system with a high ratio of assets or liabilities to payroll will tend to experience more volatility than a system with a lesser ratio, assuming a similar asset allocation.

## Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. Investment risk – actual investment returns may differ from the expected returns;
2. Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. Salary and Payroll risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
6. Other demographic risks – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise, if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

## Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures are discussed below and on the following pages. An additional historical summary of plan maturity measures can be found on page D-11.

	2019	2018	2017	2016	2015
Ratio of the Market Value of Assets to Total Payroll	6.1	6.1	5.8	5.2	5.4
Ratio of Actuarial Accrued Liability to Payroll	7.5	7.3	7.2	6.8	6.5
Ratio of Actives to Retirees and Beneficiaries	1.5	1.5	1.6	1.7	1.8
Ratio of Net Cash Flow to Market Value of Assets	-3.6%	-3.5%	-3.4%	-3.5%	-3.0%
Duration of the Present Value of Future Benefits	13.82	13.86	13.88	13.39	13.50

### Ratio of the Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. The market value of assets is currently 6.1 times the payroll indicating that a return on assets 2% different from assumed would equal approximately 12% of payroll. Such a change could affect the amortization period by approximately 5 years based on 2019 results. While asset smoothing would reduce the effect, asset gains and losses much larger than 2% are common. An increasing level of this maturity measure generally indicates an increasing volatility in the amortization period.

### Ratio of Actuarial Accrued Liability to Payroll

As the ratio of actuarial accrued liability to payroll increases, the amortization period becomes increasingly sensitive to the effects of demographic gains and losses, and assumption changes. For example, a 1% demographic gain or loss would correspond to 7.468% of payroll and would affect the amortization period by 3 years based on the 2019 results.

### Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

### Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

# Plan Maturity Measures (Concluded)

## Duration of Present Value of Future Benefits

The duration of the present value of future benefits may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, the current duration of 13.8 indicates that the present value of future benefits would increase approximately 13.8% if the assumed rate of return were lowered 1%. Such a change could affect the amortization period by 20 years or more.

## Funded Ratio

The Funded ratio is the most widely known measure of a plan's financial strength, but the trend in the funded ratio is much more important than the absolute ratio. The funded ratio should trend to 100%. As it approaches 100%, it is important to re-evaluate the level of investment risk in the portfolio and potentially to re-evaluate the assumed rate of return.

## Ratio of Unfunded Actuarial Accrued Liability to Payroll

The ratio of unfunded liability to payroll gives an indication of the plan sponsor's ability to actually pay off the unfunded liability. A value above approximately 300% or 400% may indicate difficulty in discharging the unfunded liability within a reasonable time frame.

## Standard Deviation of Investment Return to Payroll

This measure illustrates the impact of a one standard deviation change in investment return as a percent of payroll. Investment return experience other than expected ultimately affects the employer contribution rates. The higher the ratio of this risk metric, the greater the expected volatility in employer contribution rates. Absent changes in investment policy, this metric is expected to increase as the assets grow to 100% of the AAL.

## Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

## Plan Maturity Measures (Based on Market Value of Assets)

Valuation Date June 30	(1) Accrued Liabilities (AAL)	(2) Market Value of Assets	(3) Unfunded AAL (1)-(2)	(4) Valuation Payroll	(5) % Change in Payroll	(6) Funded Ratio (2)/(1)	(7) Annuitant Liabilities (AnnLiab)	(8) AnnLiab/ AAL (7)/(1)	(9) Liability/ Payroll (1)/(4)	(10) Assets/ Payroll (2)/(4)	(11) Est. Portfolio Std. Dev.	(12) Std. Dev. % of Pay (10)x(11)	(13) Unfunded/ Payroll (3)/(4)	(14) Net External Cash Flow (NECF)	(15) NECF/ Assets (9)/(2)	(16) Portfolio Rate of Return	(17) 10-year Trailing Average
2010#	\$ 14,697	\$ 9,884	\$ 4,813	\$ 2,381	2.7%	67.2%	\$ 6,516	44.3%	617.3%	415.1%			202.2%	\$ (203)	-2.1%	14.2%	3.6%
2011#*	15,521	11,895	3,626	2,728	14.6%	76.6%	7,132	46.0%	569.0%	436.1%			132.9%	(201)	-1.7%	22.6%	6.1%
2012	16,139	11,484	4,655	2,714	-0.5%	71.2%	7,649	47.4%	594.7%	423.2%			171.5%	(285)	-2.5%	-1.1%	6.6%
2013#	16,718	12,830	3,888	2,727	0.5%	76.7%	8,181	48.9%	613.1%	470.5%			142.6%	(337)	-2.6%	14.9%	8.0%
2014	17,310	14,856	2,454	2,758	1.1%	85.8%	8,777	50.7%	627.6%	538.6%			89.0%	(395)	-2.7%	19.2%	8.2%
2015	18,136	15,036	3,100	2,777	0.7%	82.9%	9,778	53.9%	653.1%	541.5%			111.6%	(445)	-3.0%	4.3%	7.7%
2016	18,812	14,559	4,253	2,785	0.3%	77.4%	10,430	55.4%	675.5%	522.8%			152.7%	(505)	-3.5%	0.2%	6.3%
2017#*	20,298	16,285	4,013	2,814	1.0%	80.2%	11,337	55.9%	721.3%	578.7%			142.6%	(556)	-3.4%	16.0%	6.0%
2018	20,935	17,493	3,442	2,872	2.1%	83.6%	11,851	56.6%	728.9%	609.0%	12.7%	77.3%	119.9%	(607)	-3.5%	11.4%	7.6%
2019	21,709	17,742	3,967	2,907	1.2%	81.7%	12,460	57.4%	746.8%	610.3%	12.5%	76.3%	136.5%	(642)	-3.6%	5.2%	10.4%

(\*) ATRS had experience studies in these years leading to a change or "true up" in actuarial assumptions. A pattern of periodic studies is a sign of a well-run system and suggests the extent to which the liability measures the actuary provides are likely to be realistic.

(#) ATRS had benefit changes in these years. Benefit increases cause liabilities to rise; benefit decreases cause liabilities to fall. In either case benefit changes affect the year by year comparability of the measures on this page.

(6). The Funded ratio is the most widely known measure of a plan's financial strength, but the trend in the funded ratio is much more important than the absolute ratio. The funded ratio should trend to 100%. As it approaches 100%, it is important to re-evaluate the level of investment risk in the portfolio and potentially to re-evaluate the assumed rate of return.

(9) and (10) The ratios of liabilities and assets to payroll gives an indication of both maturity and volatility. Many systems have values between 500% and 700%. Values significantly above that range may indicate difficulty in supporting the benefit level as a level % of payroll.

(13) The ratio of unfunded liability to payroll gives an indication of the plan sponsor's ability to actually pay off the unfunded liability. A value above approximately 300% or 400% may indicate difficulty in discharging the unfunded liability within a reasonable time frame.

(14) and (15) The ratio of Net External Cash Flow to assets is an important measure of sustainability. Negative ratios are common and expected for a maturing system. In the longer term, this ratio should be on the order of approximately -4%. A ratio that is significantly more negative than that for an extended period could be a leading indicator of potential exhaustion of assets.

(16) and (17) Investment return is probably the largest single risk that most systems face. The year by year return and the 10-year geometric average give an indicator of the realism of the systems assumed return. The averages are of course distorted by the extraordinary events of 2008.

## SECTION E

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### COVERED MEMBER DATA

**Active Members in Valuation June 30, 2019  
by Attained Age and Years of Service  
(Excludes T-Drop and Rehired Retirees)**

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
Under 20	749							749	\$ 1,686,825
20-24	2,075	10						2,085	45,016,677
25-29	4,913	1,219	12					6,144	217,986,790
30-34	3,292	3,310	778	9				7,389	280,302,302
35-39	3,023	2,226	2,833	801	5			8,888	359,454,908
40-44	2,416	1,933	2,067	2,262	552	5		9,235	395,273,138
45-49	1,916	1,747	1,955	1,811	2,324	508		10,261	466,712,664
50-54	1,515	1,293	1,473	1,565	1,446	1,412	48	8,752	378,447,800
55-59	1,404	1,010	1,300	1,356	1,420	999	78	7,567	290,157,367
60	209	202	205	215	266	199	18	1,314	49,188,509
61	187	176	200	220	211	170	11	1,175	44,366,470
62	201	153	155	159	183	158	21	1,030	36,880,165
63	206	144	140	122	135	124	10	881	32,419,343
64	140	116	106	120	112	85	7	686	23,723,412
65	139	98	101	87	60	73	17	575	18,477,768
66	102	79	48	15	20	30	4	298	8,424,447
67	105	58	44	16	11	8	6	248	5,771,560
68	100	52	34	17	4	6	2	215	4,554,845
69	101	45	15	3	3	3	1	171	3,066,676
70 & Up	439	219	100	20	8	1	7	794	12,359,050
<b>Totals</b>	<b>23,232</b>	<b>14,090</b>	<b>11,566</b>	<b>8,798</b>	<b>6,760</b>	<b>3,781</b>	<b>230</b>	<b>68,457</b>	<b>\$2,674,270,716</b>

Group Averages:

Age: 44.1 years

Service: 10.1 years

**WOMEN Active Members in Valuation June 30, 2019**  
**by Attained Age and Years of Service**  
**(Excludes T-Drop and Rehired Retirees)**

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
Under 20	245							245	\$ 631,188
20-24	1,511	4						1,515	33,962,850
25-29	3,746	944	6					4,696	162,853,679
30-34	2,569	2,470	606	5				5,650	204,638,294
35-39	2,481	1,742	2,221	616	3			7,063	272,414,521
40-44	1,956	1,557	1,618	1,791	421	2		7,345	298,180,439
45-49	1,480	1,407	1,629	1,493	1,797	407		8,213	356,043,245
50-54	1,102	976	1,213	1,342	1,158	1,103	31	6,925	287,319,794
55-59	964	725	992	1,141	1,222	802	61	5,907	218,520,669
60	139	144	155	179	230	173	15	1,035	37,810,323
61	122	122	158	171	185	149	10	917	34,170,718
62	132	97	109	128	152	127	15	760	26,254,069
63	115	97	110	96	116	111	7	652	23,665,586
64	79	67	78	92	86	74	7	483	16,479,269
65	83	53	77	61	51	63	16	404	13,226,986
66	59	53	32	12	13	27	3	199	5,740,454
67	55	29	31	13	8	7	5	148	3,642,409
68	51	27	19	12	3	5	2	119	2,475,536
69	54	25	9	2	2	3	1	96	1,738,142
70 & Up	225	106	51	15	6		6	409	6,268,773
<b>Totals</b>	<b>17,168</b>	<b>10,645</b>	<b>9,114</b>	<b>7,169</b>	<b>5,453</b>	<b>3,053</b>	<b>179</b>	<b>52,781</b>	<b>\$ 2,006,036,944</b>

Group Averages:

Age: 44.2 years

Service: 10.5 years

**MEN Active Members in Valuation June 30, 2019**  
**by Attained Age and Years of Service**  
**(Excludes T-Drop and Rehired Retirees)**

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
Under 20	504							504	\$ 1,055,637
20-24	564	6						570	11,053,827
25-29	1,167	275	6					1,448	55,133,111
30-34	723	840	172	4				1,739	75,664,008
35-39	542	484	612	185	2			1,825	87,040,387
40-44	460	376	449	471	131	3		1,890	97,092,699
45-49	436	340	326	318	527	101		2,048	110,669,419
50-54	413	317	260	223	288	309	17	1,827	91,128,006
55-59	440	285	308	215	198	197	17	1,660	71,636,698
60	70	58	50	36	36	26	3	279	11,378,186
61	65	54	42	49	26	21	1	258	10,195,752
62	69	56	46	31	31	31	6	270	10,626,096
63	91	47	30	26	19	13	3	229	8,753,757
64	61	49	28	28	26	11		203	7,244,143
65	56	45	24	26	9	10	1	171	5,250,782
66	43	26	16	3	7	3	1	99	2,683,993
67	50	29	13	3	3	1	1	100	2,129,151
68	49	25	15	5	1	1		96	2,079,309
69	47	20	6	1	1			75	1,328,534
70 & Up	214	113	49	5	2	1	1	385	6,090,277
<b>Totals</b>	<b>6,064</b>	<b>3,445</b>	<b>2,452</b>	<b>1,629</b>	<b>1,307</b>	<b>728</b>	<b>51</b>	<b>15,676</b>	<b>\$ 668,233,772</b>

Group Averages:

Age: 44.1 years

Service: 9.1 years

## Summary of Active Members (Excludes T-Drop and Rehired Retirees)

	Teachers		Support		Total Active Members	
	No.	Valuation Payroll	No.	Valuation Payroll	No.	Valuation Payroll
Women	27,709	\$ 1,403,840,634	25,072	\$ 602,196,310	52,781	\$ 2,006,036,944
Men	7,882	454,753,715	7,794	213,480,057	15,676	668,233,772
All	35,591	\$ 1,858,594,349	32,866	\$ 815,676,367	68,457	\$ 2,674,270,716

	Teachers	Support	Total
Members Contributing Now	33,398	18,108	51,506
Members Not Contributing	2,193	14,758	16,951
All	35,591	32,866	68,457

June 30	Number	Group Averages			Active Member Payroll (\$ Millions)
		Age	Service	Annual Earnings	
2002	62,011	43.8	9.4	\$26,254	\$1,628
2003	62,432	44.0	9.5	26,963	1,683
2004	63,185	44.2	9.5	27,660	1,748
2005	65,793	44.2	9.4	29,826	1,962
2006	67,710	44.3	9.3	30,714	2,080
2007	69,226	44.4	9.3	31,645	2,191
2008	70,172	44.5	9.4	32,319	2,268
2009	70,655	44.7	9.5	32,804	2,318
2010	72,208	44.7	9.7	32,980	2,381
2011	72,293	44.8	9.9	33,995	2,458
2012	71,195	45.0	10.1	34,362	2,446
2013	70,660	45.0	10.2	34,920	2,467
2014	70,225	44.7	10.2	35,673	2,505
2015	68,945	44.6	10.3	36,717	2,531
2016	68,368	44.4	10.2	37,235	2,546
2017	68,337	44.3	10.2	37,707	2,577
2018	68,645	44.2	10.2	38,477	2,641
2019	68,457	44.1	10.1	39,065	2,674

## Deferred Vested Members at June 30, 2019 by Attained Age

Age	Number	Estimated Annual Benefits	Contribution Balance
Below 40	1,899	\$ 10,695,715	\$ 26,282,786
40	258	1,497,825	3,704,122
41	285	1,814,616	4,335,409
42	255	1,691,865	4,259,864
43	317	2,100,931	4,791,186
44	325	2,120,942	4,836,793
45	353	2,154,416	4,532,601
46	304	1,848,805	4,165,053
47	377	2,228,671	4,498,105
48	451	2,752,481	5,402,116
49	393	2,348,489	4,704,381
50	411	2,564,524	4,912,708
51	468	2,587,194	4,330,874
52	477	2,689,386	5,019,764
53	470	2,526,053	4,561,587
54	568	3,147,753	5,630,910
55	600	3,065,297	5,474,877
56	542	3,253,342	5,597,267
57	589	3,447,382	6,369,820
58	595	3,515,258	7,208,314
59	586	3,528,461	7,002,140
60 & Up	2,437	7,480,447	13,197,405
Future Beneficiaries #	73	486,252	0
<b>Totals</b>	<b>13,033</b>	<b>\$ 69,546,105</b>	<b>\$ 140,818,082</b>

# These are beneficiaries of deceased active members who are eligible for a pension at age 62.

An inactive member is no longer actively working but has sufficient service credit to qualify for a monthly benefit at retirement age.

## All Members Participating in T-DROP at June 30, 2019 by Attained Age

Age	Number	Current T-DROP Contribution	Original T-DROP Contribution	T-DROP Account Balance	Pay
48	3	\$ 32,971	\$ 32,011	\$ 33,051	\$ 114,786
49	2	64,326	61,331	106,415	171,700
50	22	496,349	480,161	562,698	1,489,907
51	77	1,734,051	1,667,730	2,321,444	4,955,931
52	145	3,052,696	2,913,678	4,854,599	8,909,063
53	188	4,172,539	3,924,946	8,882,600	12,126,307
54	252	5,710,027	5,330,084	14,207,682	16,577,333
55	274	6,010,991	5,488,371	20,093,220	17,245,473
56	318	7,096,010	6,428,354	26,397,601	20,329,773
57	355	8,220,127	7,334,346	38,493,675	22,787,894
58	350	8,022,818	7,008,437	44,406,625	21,995,355
59	334	7,577,755	6,833,693	45,945,147	21,176,284
60	316	6,165,850	6,266,867	48,872,778	19,758,642
61	315	6,035,199	6,099,274	47,561,558	19,393,667
62	238	4,027,379	4,466,868	36,534,422	14,263,915
63	187	3,444,595	3,730,996	28,150,467	11,516,850
64	160	2,355,900	2,882,061	23,281,641	9,444,484
65	79	1,340,367	1,515,012	13,193,876	4,919,201
66	37	518,226	698,405	6,042,976	2,164,957
67	22	352,332	393,951	3,629,471	1,331,107
68	17	361,170	320,568	2,570,301	1,050,932
69	5	79,352	80,713	759,649	366,201
70	3	90,040	76,611	531,365	225,515
71	4	76,894	61,622	651,353	223,505
72	4	112,574	93,902	802,026	303,474
<b>Totals</b>	<b>3,707</b>	<b>\$ 77,150,538</b>	<b>\$ 74,189,992</b>	<b>\$ 418,886,640</b>	<b>\$ 232,842,256</b>

A T-DROP member continues to work, but does not accrue retirement benefits. A reduced benefit is paid into the T-DROP account (see pages C-3 and C-4) during T-DROP participation. Deposits to T-DROP cease at 10 years of T-DROP participation. T-DROP participants may continue in covered employment after 10 years of participation, but do not accumulate additional service credit or make member contributions. ATRS receives full employer contributions on behalf of these people.

## Active, TDROP and Return to Work Members as of June 30, 2019

June 30	Number				Total Payroll
	Active	TDROP	RTW	Total	\$Millions
2011	72,293	4,487	4,093	80,873	\$ 2,818
2012	71,195	4,432	4,001	79,628	2,803
2013	70,660	4,265	4,025	78,950	2,819
2014	70,225	4,127	3,845	78,197	2,851
2015	68,945	3,974	3,741	76,660	2,874
2016	68,368	3,864	3,829	76,061	2,888
2017	68,337	3,811	3,881	76,029	2,922
2018	68,645	3,696	4,029	76,370	2,986
2019	68,457	3,707	4,077	76,241	3,027

The actuarial valuation assumes the number of working members will remain constant at the current level. In some recent years the total number of working members has decreased. A decreasing population means less contribution income for the Retirement System than expected and can lead to funding difficulties in extreme cases.

## Annuities Being Paid Retirees and Beneficiaries July 1, 2019 by Type of Annuity Being Paid

Type of Annuity	No.	Annual Amounts		
		Original Annuities	Base Annuities	Current Annuities
<b>RETIREMENT RESERVE ACCOUNT</b>				
Age & Service				
Option 1 (Basic single life)	34,822	\$ 536,527,556	\$ 635,952,502	\$ 817,888,770
Option A (Joint & 100% Survivor)	5,347	90,885,402	105,199,277	135,091,423
Option B (Joint & 50% Survivor)	2,646	59,630,747	72,029,638	92,575,663
Option C (10 year certain)	647	10,487,013	10,843,078	13,301,146
Beneficiaries	1,184	20,870,802	19,822,864	26,335,193
Totals	44,646	718,401,520	843,847,359	1,085,192,195
Disability				
Option 1	2,325	23,916,629	26,462,857	34,361,609
Option A	366	4,014,482	4,098,562	5,243,781
Option B	82	1,176,934	1,265,843	1,612,749
Option C	19	153,776	142,976	189,228
Beneficiaries	287	3,174,378	3,407,328	4,621,403
Totals	3,079	32,436,199	35,377,566	46,028,770
Act 793	168	\$ 942,172	\$ 1,849,229	1,849,229
Totals	47,893	751,779,891	881,074,154	1,133,070,194
<b>SURVIVOR'S BENEFIT ACCOUNT</b>				
Beneficiaries of Deceased Members	741	\$ 7,821,593	\$ 8,879,432	\$ 11,313,962
<b>OTHER ANNUITIES</b>				
Act 808	43	818,053	2,355,810	2,355,810
<b>RETIREMENT SYSTEM TOTALS</b>				
Total Annuities Being Paid	48,677	\$ 760,419,537	\$ 892,309,396	\$ 1,146,739,966

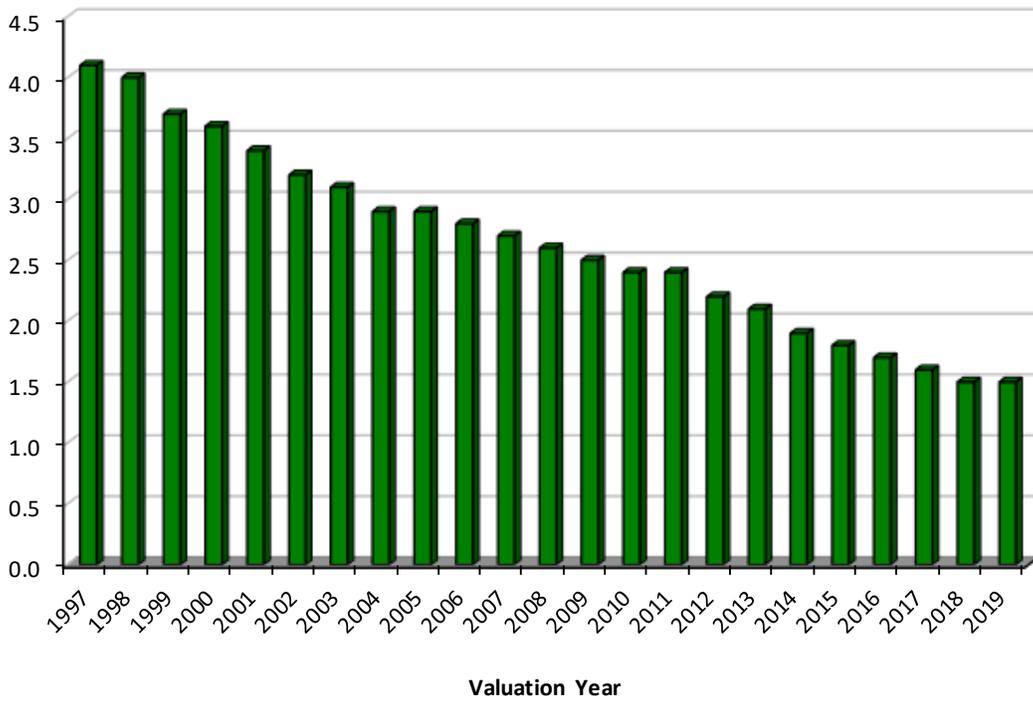
**The Original Annuity** is the annuity at the date of retirement.

**The Base Annuity** is the amount from which the 3.0% COLA is calculated.

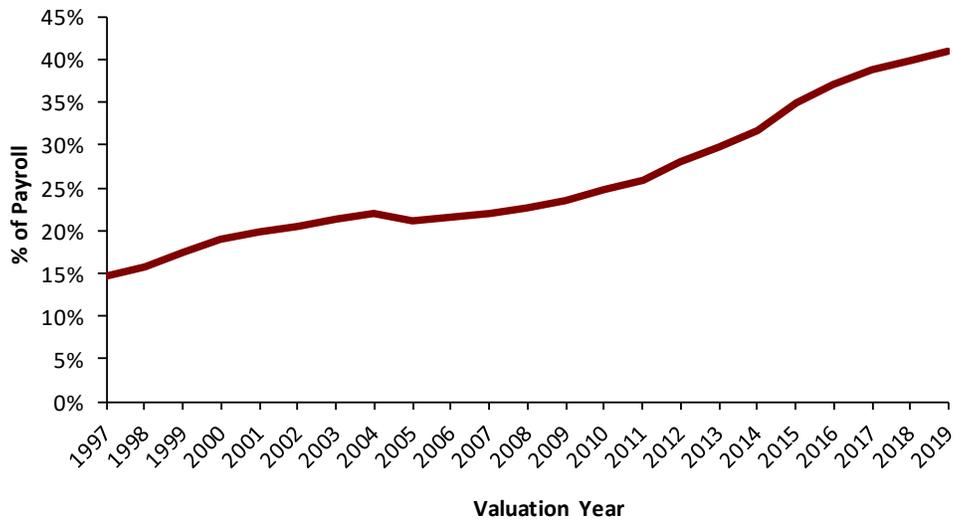
**The Current Annuity** is the annuity payable at July 1, 2019 (Includes July 1 COLA).

# Historical Graphs

## Active Members Per Retired Life \*



## Retirement Benefits Being Paid as a Percent of Member Payroll \*



\* Beginning with the June 30, 2011 valuation, active members include T-DROP participants and payroll.

## Benefit Changes during Recent Years of Retirement & Related Changes in Purchasing Power (1990 \$)

Year Ended June 30	Increase Beginning of Year+	Benefit Dollars in Year*	Inflation (Loss) in Year#	Purchasing Power at Year End	
				1990 \$	% of 1990
1990	\$ ----	\$ 11,000	----	\$ 11,000	100%
1991	330	11,330	(4.7)%	10,822	98%
1992	1,005	12,335	(3.1)%	11,429	104%
1993	1,045	13,380	(3.0)%	12,036	109%
1994	1,082	14,462	(2.5)%	12,693	115%
1995	400	14,862	(3.0)%	12,660	115%
1996	400	15,262	(2.8)%	12,652	115%
1997	772	16,034	(2.3)%	12,993	118%
1998	481	16,515	(1.7)%	13,161	120%
1999	1,383	17,898	(2.0)%	13,989	127%
2000	1,129	19,027	(3.7)%	14,336	130%
2001	1,406	20,433	(3.2)%	14,911	136%
2002	807	21,240	(1.1)%	15,337	139%
2003	562	21,802	(2.1)%	15,417	140%
2004	562	22,364	(3.3)%	15,314	139%
2005	562	22,926	(2.5)%	15,312	139%
2006	562	23,488	(4.3)%	15,037	137%
2007	562	24,050	(2.7)%	14,994	136%
2008	562	24,612	(5.0)%	14,611	133%
2009	562	25,174	1.4 %	15,161	138%
2010	755	25,929	(1.1)%	15,453	140%
2011	778	26,707	(3.6)%	15,370	140%
2012	778	27,485	(1.7)%	15,558	141%
2013	778	28,263	(1.8)%	15,723	143%
2014	778	29,041	(2.1)%	15,828	144%
2015	778	29,819	(0.1)%	16,232	148%
2016	778	30,597	(1.0)%	16,491	150%
2017	778	31,375	(1.6)%	16,638	151%
2018	778	32,153	(2.9)%	16,575	151%
2019	751	32,904	(1.6)%	16,687	152%
2020	451	33,355			

\* The \$11,000 benefit used to begin this schedule is an arbitrary amount. A smaller beginning amount could show a smaller purchasing power loss in percent loss.

# Based on Consumer Price Index, All Urban Consumers, United States City Average (June values).

## Benefit Changes During Recent Years of Retirement & Related Changes in Purchasing Power (2000 \$)

Year Ended June 30	Increase Beginning of Year+	Benefit Dollars in Year*	Inflation (Loss) in Year#	Purchasing Power at Year End	
				2000 \$	% of 2000
2000	\$ ----	\$ 11,600	----	\$ 11,600	100%
2001	1,003	12,603	(3.2)%	12,207	105%
2002	523	13,126	(1.1)%	12,579	108%
2003	372	13,498	(2.1)%	12,668	109%
2004	372	13,870	(3.3)%	12,605	109%
2005	372	14,242	(2.5)%	12,624	109%
2006	372	14,614	(4.3)%	12,417	107%
2007	372	14,986	(2.7)%	12,400	107%
2008	372	15,358	(5.0)%	12,100	104%
2009	372	15,730	1.4 %	12,573	108%
2010	472	16,202	(1.1)%	12,815	110%
2011	486	16,688	(3.6)%	12,746	110%
2012	486	17,174	(1.7)%	12,902	111%
2013	486	17,660	(1.8)%	13,039	112%
2014	486	18,146	(2.1)%	13,125	113%
2015	486	18,632	(0.1)%	13,460	116%
2016	486	19,118	(1.0)%	13,675	118%
2017	486	19,604	(1.6)%	13,797	119%
2018	486	20,090	(2.9)%	13,745	118%
2019	459	20,549	(1.6)%	13,831	119%
2020	159	20,708			

\* The \$11,600 benefit used to begin this schedule is an arbitrary amount. A smaller beginning amount could show a smaller purchasing power loss in percent loss.

# Based on Consumer Price Index, All Urban Consumers, United States City Average (June values).

## Benefit Changes During Recent Years of Retirement & Related Changes in Purchasing Power (2010 \$)

Year Ended June 30	Increase Beginning of Year	Benefit Dollars in Year*	Inflation (Loss) in Year#	Purchasing Power at Year End	
				2010 \$	% of 2010
2010	\$ ----	\$ 11,900	----	\$ 11,900	100%
2011	357	12,257	(3.6)%	11,836	99%
2012	357	12,614	(1.7)%	11,981	101%
2013	357	12,971	(1.8)%	12,108	102%
2014	357	13,328	(2.1)%	12,188	102%
2015	357	13,685	(0.1)%	12,499	105%
2016	357	14,042	(1.0)%	12,699	107%
2017	357	14,399	(1.6)%	12,812	108%
2018	357	14,756	(2.9)%	12,764	107%
2019	330	15,086	(1.6)%	12,837	108%
2020	30	15,116			

\* The \$11,900 benefit used to begin this schedule is an arbitrary amount. A smaller beginning amount could show a smaller purchasing power loss in percent loss.

# Based on Consumer Price Index, All Urban Consumers, United States City Average (June values).

## **SECTION F**

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### **FINANCIAL PRINCIPLES**

## Financial Principles and Operational Techniques

**Promises Made and To Be Paid For.** As each year is completed, the System, in effect, hands an “IOU” to each member then acquiring a year of service credit. The “IOU” says: “The Arkansas Teacher Retirement System owes you one year’s worth of retirement benefits, payments in cash commencing when you qualify for retirement.”

The related *key financial questions* are:

**Which generation of taxpayers contributes the money to cover the IOU?**

**The present taxpayers**, who receive the benefit of the member’s present year of service?

**Or the future taxpayers**, who happen to be in Arkansas at the time the IOU becomes a cash demand?

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The financial objective of the ATRS is that this year’s taxpayers contribute the money to cover the IOUs being handed out this year so that **the employer contribution rate will remain approximately level from generation to generation** -- our children and our grandchildren will not have to contribute greater percents of pay than we contribute now. This objective was set forth in Act 793 of 1977.

(There are systems which have **a design for deferring contributions to future taxpayers**, lured by a lower contribution rate now and putting aside the fact that the contribution rate must then relentlessly grow much greater over decades of time -- consume now, and let your children face higher contribution rates after you retire.)

An inevitable byproduct of the level-cost design is the accumulation of reserve assets for decades and the income produced when the assets are invested. **Investment income** becomes the **third and largest contributor** for benefits to employees, and is interlocked with the contribution amounts required from employees and employers.

Translated to actuarial terminology, this level-cost objective means that the contribution rates must total at least the following:

Normal Cost (the cost of members’ service being rendered this year)

... plus ...

Interest on Unfunded Actuarial Accrued Liabilities (unfunded accrued liabilities are the difference between (i) liabilities for service already rendered and (ii) the accrued assets of the plan).

**Computing Contributions to Support System Benefits.** From a given schedule of benefits and from the employee data and asset data furnished, the actuary determines the contribution rates to support the benefits, by means of **an actuarial valuation**. An actuarial valuation has a number of ingredients such as: the rate of investment income which plan assets will earn; the rates of withdrawal of active members who leave covered employment before qualifying for any monthly benefit; the rates of mortality; the rates of disability; the rates of pay increases; and the assumed age or ages at actual retirement. In an actuarial valuation, assumptions must be made as to what the above rates will be, for the next year and for decades in the future. Only the subsequent actual experience of the System can indicate the degree of accuracy of the assumptions.

**Reconciling Differences Between Assumed Experience and Actual Experience.** Once actual experience has occurred and been observed, it will not coincide exactly with assumed experience, regardless of the accuracy of the various financial assumptions or the skill of the actuary and the precision of the calculations made. The System copes with these continually changing differences by having annual actuarial valuations. Each actuarial valuation is a complete recalculation of assumed future experience, taking into account all past differences between assumed and actual experience. The result is continual adjustments in financial position.

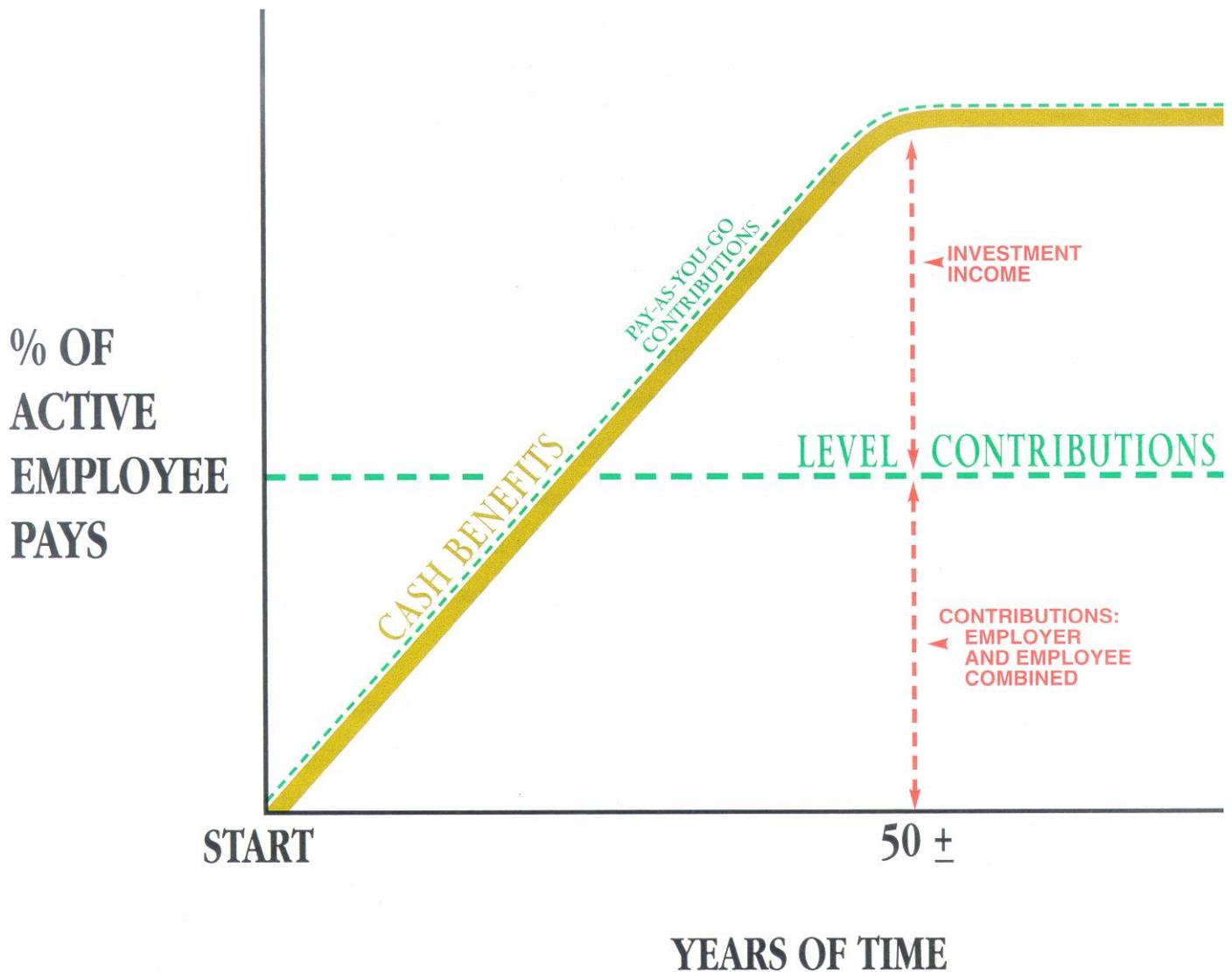
## The Actuarial Valuation Process

*The financing diagram* on the next page shows the relationship between the two fundamentally different philosophies of paying for retirement benefits: the method where contributions match cash benefit payments (or barely exceed cash benefit payments, as in the Federal Social Security program), and is thus an **increasing contribution method**; and the **level contribution method** which equalizes contributions between the generations.

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*The actuarial valuation* is the mathematical process by which the level contribution rate is determined, and the flow of activity constituting the valuation may be summarized as follows:

- A. **Census Data**, furnished by plan administrator
  - Retired lives now receiving benefits
  - Former employees with vested benefits not yet payable
  - Active employees
- B. + **Asset data** (cash & investments), furnished by plan administrator
- C. + **Benefit provisions** that establish eligibility and amounts of payments to members
- D. + **Assumptions concerning future financial experiences in various risk areas**, which assumptions are established by the Board of Trustees after consulting with the actuary.
- E. + **The funding method** for employer contributions (the long-term planned pattern for employer contributions)
- F. + **Mathematically combining the assumptions, the funding method, and the data**
- G. = Determination of:
  - Plan financial position**, and/or
  - New Employer Contribution Rate**



**CASH BENEFITS LINE.** This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

**LEVEL CONTRIBUTION LINE.** Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

Economic Risk Areas

- Rates of investment return
- Rates of pay increase
- Changes in active member group size

Non-Economic Risk Areas

- Ages at actual retirement
- Rates of mortality
- Rates of withdrawal of active members (turnover)
- Rates of disability

## **SECTION G**

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### **ACTUARIAL ASSUMPTIONS**

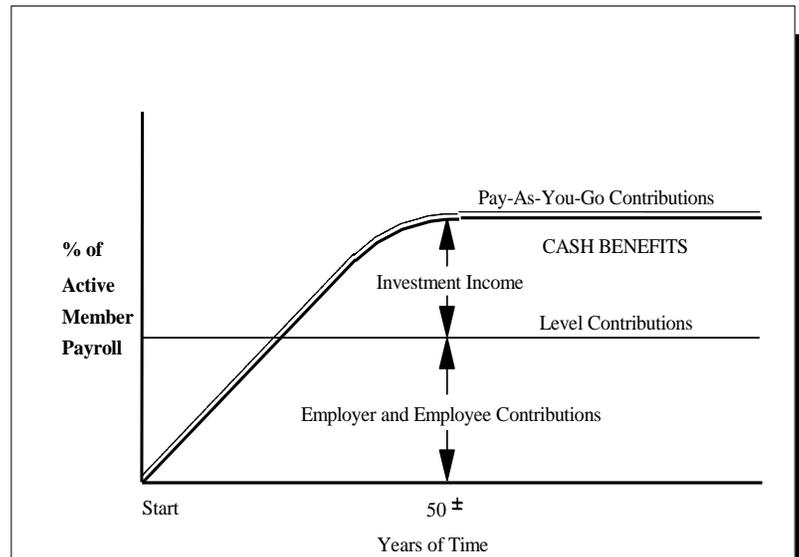
# Selection of Assumptions Used in Actuarial Valuations

## Economic Assumptions

Investment return  
Pay increases to individual employees:  
the portion for economic changes  
Active member group size and  
total payroll growth

## Demographic Assumptions

Actual ages at service retirement  
Pay increases to individual members:  
the portion for merit & seniority  
Disability while actively employed  
Separations before retirement  
Mortality after retirement  
Mortality before retirement



## Relationship Between Plan Governing Body and the Actuary

The actuary should have the primary responsibility for choosing the **demographic** assumptions used in the actuarial valuation, making use of specialized training and experience.

The actuary and other professionals can provide guidance concerning the choice of suitable economic assumptions.

Guidance regarding the selection of economic assumptions for measuring pension obligations is provided by Actuarial Standards of Practice (ASOP) No. 27. The standard requires that the selected economic assumptions be consistent with each other. That is, the selection of the investment return assumption should be consistent with the selection of the payroll growth and inflation assumptions.

ASOP No. 27 defines a reasonable economic assumption as an assumption that has the following characteristics: (a) It is appropriate for the purpose of the measurement; (b) It reflects the actuary's professional judgment; (c) It takes into account historical and current economic data that is relevant as of the valuation date; (d) It reflects the actuary's estimate of future experience, the actuary's observation of the estimates inherent in market data, or a combination thereof; and (e) It has no significant bias (i.e., it is not significantly optimistic or pessimistic), except when provisions for adverse deviation or plan provisions that are difficult to measure are included and disclosed under Section 3.5.1, or when alternative assumptions are used for the assessment of risk.

# Summary of Assumptions Used in Actuarial Valuations for the Arkansas Teacher Retirement System Assumptions Adopted by Board of Trustees After Consulting with Actuary

The actuarial assumptions used in the valuation are shown in this section. Assumptions were established based upon an Experience Study covering the period July 1, 2010 through June 30, 2015. The Board of Trustees adopts the actuarial assumptions used for actuarial valuation purposes after consulting with the actuary. The actuarial assumptions represent estimates of future experience.

## Economic Assumptions

The **price inflation** assumption is 2.50% although no specific Price Inflation is needed for this valuation. It is assumed that the 3% COLA will always be paid.

The **wage inflation** assumption is 2.75%. This consists of 2.50% related to pure price inflation and 0.25% related to general economic improvements.

**The investment return rate** used in the valuation was 7.50% per year, compounded annually (net after administrative expenses). This rate of return is not the assumed real rate of return. The real rate of return over wage inflation in this valuation is defined to be the portion of investment return which is more than the wage inflation rate. Considering wage inflation recognition of 2.75%, the 7.50% rate translates to an assumed real rate of return over wage inflation of 4.75%. This rate was first used for the **June 30, 2017** valuation. The assumed real rate of return over price inflation is 5%.

**Pay increase assumptions** for individual active members are shown on pages G-7 and G-8. Part of the assumption for each age is for a merit and/or seniority increase, and the other 2.75% recognizes wage inflation. These rates were first used for the **June 30, 2017** valuation.

The Active Member Group size is assumed to remain constant at its present level.

**Total active member payroll** is assumed to increase 2.75% per year, which is the portion of the individual pay increase assumptions attributable to wage inflation. This rate was first used for the **June 30, 2017** valuation.

## Non-Economic Assumptions

**The mortality tables** used were the RP-2014 Healthy Annuitant, Disabled Annuitant and Employee Mortality headcount weighted tables for males and females. Mortality rates were adjusted for future mortality improvements using projection scale MP-2017 from 2006. Related values are shown on page G-4. These tables were first used for the **June 30, 2017** valuation.

A limited fluctuation credibility procedure was used to determine the appropriate scaling factor of each gender and each member classification (see the 2010-2015 Experience Study), and are shown below:

	<b>Scaling Factor</b>
Healthy Male Retirees	<b>101%</b>
Healthy Female Retirees	<b>91%</b>
Disabled Male Retirees	<b>99%</b>
Disabled Female Retirees	<b>107%</b>
Male Active Members	<b>94%</b>
Female Active Members	<b>84%</b>

**The probabilities of retirement** for members eligible to retire are shown on pages G-5 and G-6. The rates for full retirement and reduced retirement were first used in the **June 30, 2017** valuation.

**The probabilities of withdrawal from service, death-in-service and disability** are shown for sample ages on pages G-7 and G-8. These rates were first used in the **June 30, 2017** valuation.

**The entry age actuarial cost method of valuation** was used in determining accrued liabilities and normal cost.

Differences in the past between assumed experience and actual experience (“actuarial gains and losses”) become part of actuarial accrued liabilities.

Unfunded actuarial accrued liabilities are amortized to produce contribution amounts (the total of principal & interest) which are level percents of payroll contributions.

These cost methods were first used in the June 30, 1986 valuation.

The Fiscal Year 2019 employer and member contribution rates were 14% and 6%, respectively. The employer and member rates are scheduled to increase by 0.25% increments beginning in Fiscal Year 2020 and ending in Fiscal Year 2023. The ultimate employer and member contribution rates will be 15% and 7%, respectively. The projected unfunded actuarial accrued liabilities were increased when developing the amortization period to account for the temporary shortfalls in the employer and employee contribution rates.

**Asset Valuation Method.** A market value related asset method is used as described on page D-1. This method was first used in the June 30, 1995 valuation. It was modified following the 1997-2002 Experience Study to include an 80% - 120% market value corridor.

**The data about persons now covered and about present assets** was furnished by the System’s administrative staff. Although examined for general reasonableness, the data was not audited by the Actuary. Members whose dates of birth were not supplied were assumed to be 40 years old on the valuation date. Members whose salaries were not supplied and that entered T-DROP were assumed to have the group average pay of those with salary data as of the valuation date that entered T-DROP.

## Single Life Retirement Values

Sample Attained Ages in 2019	Present Value of \$1.00 Monthly for Life		Present Value of \$1 Monthly for Life Increasing 3.0% Annually		Future Life Expectancy (Years)		Percent Dying within Next Year	
	Men	Women	Men	Women	Men	Women	Men	Women
40	\$150.78	\$154.22	\$198.67	\$205.14	42.65	46.91	0.33 %	0.28 %
45	146.82	151.45	191.26	199.48	37.86	42.10	0.41 %	0.32 %
50	141.65	147.57	181.99	192.01	33.15	37.29	0.53 %	0.36 %
55	135.01	142.16	170.65	182.24	28.57	32.49	0.71 %	0.44 %
60	126.70	135.10	157.13	170.16	24.16	27.81	0.98 %	0.60 %
65	116.61	126.06	141.50	155.51	20.00	23.29	1.36 %	0.82 %
70	104.37	114.48	123.61	137.92	16.08	18.95	1.97 %	1.24 %
75	89.86	100.41	103.61	117.82	12.46	14.88	3.07 %	2.05 %
80	73.73	84.39	82.70	96.30	9.24	11.25	5.10 %	3.48 %
85	57.47	67.50	62.75	74.91	6.57	8.15	8.75 %	6.12 %
Base	2635 x 1.01	2636 x 0.91	2635 x 1.01	2636 x 0.91				
Projection	939	940	939	940				

\* Applicable to calendar year 2019. Rates and life expectancies in future years are determined by the MP-2017 projection scale.

Sample Attained Ages	Benefit Increasing 3.0% Yearly	Portion of Age 60 Lives Still Alive	
		Men	Women
60	\$100.00	100%	100%
65	115.00	95%	97%
70	130.00	88%	92%
75	145.00	79%	86%
80	160.00	67%	77%
Ref		2635 x 1.01	2636 x 0.91

## Probabilities of Retirement for Members

Retirement Ages	% of Active Participants Retiring with Unreduced Benefits			
	Education		Support	
	Male	Female	Male	Female
48	8%	7%	8%	6%
49	8%	7%	8%	6%
50	8%	7%	8%	6%
51	8%	7%	8%	6%
52	8%	7%	8%	6%
53	8%	7%	8%	6%
54	8%	7%	8%	6%
55	8%	9%	8%	6%
56	8%	9%	8%	6%
57	8%	11%	8%	11%
58	8%	11%	8%	11%
59	17%	14%	8%	15%
60	17%	17%	13%	13%
61	24%	17%	13%	15%
62	24%	29%	28%	23%
63	27%	26%	25%	19%
64	27%	24%	25%	23%
65	54%	50%	47%	50%
66	54%	53%	47%	44%
67	54%	39%	47%	38%
68	54%	39%	47%	38%
69	54%	39%	47%	38%
70	54%	39%	47%	38%
71	54%	39%	47%	38%
72	54%	39%	47%	38%
73	54%	39%	47%	38%
74	54%	39%	47%	38%
75	100%	100%	100%	100%
Ref	2634	2635	2636	2637

These rates are based upon data presented in the 2010-2015 experience study and were first used in the 2017 valuation.

## Probabilities of Reduced Retirement for Members

Retirement Ages	% of Active Participants Retiring with Reduced Benefits			
	Education		Support	
	Male	Female	Male	Female
50	1.5%	1.0%	0.5%	1.5%
51	1.5%	1.0%	1.0%	1.5%
52	1.5%	1.5%	1.5%	2.0%
53	1.5%	2.0%	2.0%	2.0%
54	2.0%	2.0%	2.5%	2.0%
55	2.5%	2.5%	3.0%	2.0%
56	3.0%	2.5%	3.5%	2.0%
57	5.0%	2.5%	4.5%	2.5%
58	5.0%	2.5%	4.5%	2.5%
59	3.5%	2.5%	4.5%	2.5%
Ref	2640	2638	2641	2639

These are 50% of the rates presented in the 2010-2015 experience study and were first used in the 2017 valuation. These rates anticipate reduced election of early retirement due to the increase in the early retirement reduction from 5% to 10%.

## Duration of T-DROP for Members

Present T-DROP members are assumed to remain in T-DROP according to the following table:

Entry Age	Assumed Duration Years
50-56	7
57	6
58	5
59+	4

# Teachers

## Separations from Active Employment Before Age and Service Retirement & Individual Pay Increases

Sample Ages in 2019	Percent of Active Members Separating within the Next Year						
	Service	Death		Disability		Other	
		Men	Women	Men	Women	Men	Women
	0					17.80%	12.60%
	1					13.10%	11.10%
	2					12.10%	10.10%
	3					8.60%	8.70%
	4					5.70%	6.50%
25	5 & Up	0.06%	0.02%	0.03%	0.03%	4.50%	5.40%
30		0.06%	0.02%	0.03%	0.03%	3.60%	4.30%
35		0.07%	0.03%	0.03%	0.04%	2.70%	2.90%
40		0.08%	0.05%	0.05%	0.09%	2.00%	2.00%
45		0.12%	0.07%	0.16%	0.19%	1.60%	1.60%
50		0.19%	0.11%	0.40%	0.43%	1.30%	1.40%
55		0.32%	0.19%	0.86%	0.73%	1.10%	1.20%
60		0.56%	0.28%	1.15%	1.00%	0.90%	1.00%
65		0.97%	0.39%	1.15%	1.00%	0.70%	0.80%
Ref:						1029	1030
		2633 x 0.94	2634 x 0.84	747 x 1	748 x 1	1381	1382

\* Applicable to calendar year 2019. Rates and life expectancies in future years are determined by the MP-2017 projection scale.

Age	Pay Increase Assumptions for an Individual Member		
	Merit & Seniority	Base (Economic)	Increase Next Year
20	5.00%	2.75%	7.75%
25	2.90%	2.75%	5.65%
30	2.40%	2.75%	5.15%
35	1.90%	2.75%	4.65%
40	1.40%	2.75%	4.15%
45	0.70%	2.75%	3.45%
50	0.30%	2.75%	3.05%
55	0.00%	2.75%	2.75%
60	0.00%	2.75%	2.75%
65	0.00%	2.75%	2.75%
Ref:	472		

## Support Employees

### Separations From Active Employment Before Age and Service Retirement & Individual Pay Increases

Sample Ages in 2019	Percent of Active Members Separating within the Next Year						
	Service	Death		Disability		Other	
		Men	Women	Men	Women	Men	Women
	0					49.90%	47.50%
	1					30.10%	28.30%
	2					19.40%	19.10%
	3					15.30%	14.90%
	4					11.80%	12.10%
25	5 & Up	0.06%	0.02%	0.03%	0.02%	9.20%	9.70%
30		0.06%	0.02%	0.09%	0.04%	7.30%	6.90%
35		0.07%	0.03%	0.09%	0.05%	5.60%	5.00%
40		0.08%	0.05%	0.10%	0.07%	4.50%	4.40%
45		0.12%	0.07%	0.22%	0.16%	3.70%	4.00%
50		0.19%	0.11%	0.51%	0.34%	3.30%	3.60%
55		0.32%	0.19%	0.86%	0.59%	3.30%	3.30%
60		0.56%	0.28%	1.11%	0.76%	3.30%	2.80%
65		0.97%	0.39%	1.11%	0.80%	2.80%	2.10%
Ref:		2633 x 0.94	2634 x 0.84	749 x 1	750 x 1	1031 1383	1032 1384

\* Applicable to calendar year 2019. Rates and life expectancies in future years are determined by the MP-2017 projection scale.

Age	Pay Increase Assumptions for an Individual Member		
	Merit & Seniority	Base (Economic)	Increase Next Year
20	5.00%	2.75%	7.75%
25	3.75%	2.75%	6.50%
30	2.60%	2.75%	5.35%
35	2.40%	2.75%	5.15%
40	2.10%	2.75%	4.85%
45	1.00%	2.75%	3.75%
50	0.50%	2.75%	3.25%
55	0.00%	2.75%	2.75%
60	0.00%	2.75%	2.75%
65	0.00%	2.75%	2.75%
Ref:	473		

## Miscellaneous and Technical Assumptions

### June 30, 2019

<b>Marriage Assumption:</b>	100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses.
<b>Pay Increase Timing:</b>	Beginning of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
<b>Decrement Timing:</b>	Decrements are assumed to occur mid-year, with the exception of normal and early retirement, which are assumed to occur at the beginning of the year. This implies that people who worked the entire school year are reported as active members even if they retired at the end of the year.
<b>Eligibility Testing:</b>	Eligibility for benefits is determined based upon the age nearest birthday and the service nearest whole year on the date of the valuation.
<b>Decrement Relativity:</b>	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
<b>Decrement Operation:</b>	Disability does not operate during the first 5 years of service. Disability and turnover do not operate during retirement eligibility.
<b>Normal Form of Benefit:</b>	The assumed normal form of benefit is the straight life form.
<b>Incidence of Contributions:</b>	Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made. The payroll used for this purpose is payroll for all active members plus payroll for members in the T-DROP and retirees who returned to work.
<b>Liability Adjustments:</b>	The liability calculations assume that the non-contributory and contributory multipliers for the first ten years of service are at the standard rate at the time the service is earned.
<b>Data Adjustments:</b>	Members whose dates of birth were not supplied were assumed to be 40 years old on the valuation date.  Members whose salaries were not supplied and that entered the T-DROP were assumed to have the group average pay of those with salary data as of the valuation that entered the T-DROP.

## **SECTION H**

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### **GLOSSARY**

## Glossary

**Accrued Service.** The service credited under the plan which was rendered before the date of the actuarial valuation.

**Accumulated Benefit Obligation.** The actuarial present value of vested and non-vested benefits based on service to date and past and current salary levels.

**Actuarial Accrued Liability.** The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as “accrued liability” or “past service liability.”

**Actuarial Assumptions.** Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

**Actuarial Cost Method.** A mathematical budgeting procedure for allocating the dollar amount of the “actuarial present value of future plan benefits” between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”

**Actuarial Equivalent.** A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.

**Actuarial Present Value.** The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

**Actuarial Present Value of Credited Projected Benefits or Pension Benefit Obligation.** The present value of future benefits based on service to date and the effect projected salary increases.

**Actuary.** A person who is trained in the applications of probability and compound interest to solve problems in business and finance that involve payment of money in the future, contingent upon the occurrence of future events. Most actuaries in the United States are Members of the American Academy of Actuaries. The Society of Actuaries is an international research, education and membership organization for actuaries in the life and health insurance, employee benefits, and pension fields. It administers a series of examinations leading initially to Associateship and the designation A.S.A. and ultimately to Fellowship with the designation F.S.A. The federal government certifies actuaries to practice under ERISA with the designation of E.A.

**Amortization.** Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

## Glossary

**Experience Gain (Loss).** A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used.

**Normal Cost.** The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as “current service cost.” Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

**Plan Termination Liability.** The actuarial present value of future plan benefits based on the assumption that there will be no further accruals for future service and salary. The termination liability will generally be less than the liabilities computed on a “going concern” basis and is not normally determined in a routine actuarial valuation.

**Reserve Account.** An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

**Unfunded Actuarial Accrued Liability.** The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as “unfunded accrued liability.”

**Valuation Assets.** The value of current plan assets recognized for valuation purposes. Generally based on book value plus a portion of unrealized appreciation or depreciation.

December 13, 2019

Mr. Clint Rhoden  
Executive Director  
Arkansas Teacher Retirement System  
1400 West Third  
Little Rock, Arkansas 72201

**Re: Report of June 30, 2019 Actuarial Valuation of Active and Inactive Members**

Dear Mr. Rhoden

Enclosed are 15 copies of the report. If you need anything else, please call.

Sincerely,



Judith A. Kermans, EA, FCA, MAAA

JAK:rmn  
Enclosures

# Arkansas Teacher Retirement System

Annual Actuarial Valuation of Annuities Being Paid to  
Retirees and Beneficiaries  
June 30, 2019



# OUTLINE OF CONTENTS

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December 13, 2019

Board of Trustees  
Arkansas Teacher Retirement System  
Little Rock, Arkansas

Dear Board Members:

Presented in this report are the results of the ***Annual Actuarial Valuation of annuities being paid to retirees and beneficiaries*** of the Arkansas Teacher Retirement System.

***The date of the valuation*** was June 30, 2019 (using amounts payable as of July 1, 2019).

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the Retirement System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The valuation was based upon census data and financial information provided by the System's administrative staff. Preparation of this data requires considerable staff time. The helpful cooperation of the Arkansas Teacher Retirement System staff in furnishing the data is acknowledged with appreciation. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the data provided by ATRS.

This report was prepared using certain assumptions approved by the Board. The actuarial assumptions used for valuation purposes are summarized in the Appendix. These assumptions reflect experience during the period July 1, 2010 to June 30, 2015 and expectations for the future.

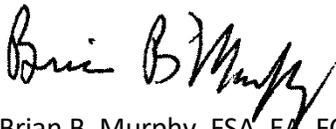
Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law. The scope of an actuarial valuation does not contain an analysis of the potential range of such future measurements.

This is one of multiple documents comprising the actuarial results. The other documents include the active and inactive valuation dated November 25, 2019, and the presentation dated December 2, 2019.

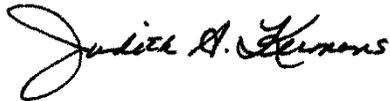
To the best of our knowledge, this report is complete and accurate and was made in accordance with standards of practice promulgated by the Actuarial Standards Board. The actuarial assumptions used for the valuation produce results which, individually and in the aggregate, are reasonable.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. Brian B. Murphy, Judith A. Kermans and Heidi G. Barry are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. The actuaries submitting this report are independent of the plan sponsor.

Respectfully submitted,



Brian B. Murphy, FSA, EA, FCA, MAAA, PhD



Judith A. Kermans, EA, FCA, MAAA



Heidi G. Barry, ASA, FCA, MAAA

BBM/JAK/HGB:ah

## Comments

As expected, during the year ended June 30, 2019 the number of retired lives increased, as did the total amount being paid monthly to retired lives.

**The financing diagram** on page 7 shows the general pattern in which cash benefits increase (the green line). The schedule below shows how ATRS history illustrates the general pattern.

June 30	Retired Lives Receiving Benefits		
	No.	Annual Rates (millions)	% of Active Payroll#
1967	3,846	\$ 6.27	
1972	5,453	11.08	
1977	7,524	23.96	
1982	8,828	36.64	
1987	10,526	66.45	10.0%
1992	12,033	115.50	10.7%
1997	14,233	194.90	15.0%
1998	14,802	220.38	16.1%
1999	15,887	248.75	17.4%
2000	16,657	280.14	18.9%
2001	17,778	309.03	19.8%
2002	19,199	334.15	20.5%
2003	20,271	359.98	21.4%
2004	21,428	386.23	22.1%
2005	22,680	415.04	21.2%
2006	24,153	449.77	21.6%
2007	25,611	484.55	21.1%
2008	26,801	515.56	21.5%
2009	28,818	564.59	22.8%
2010	30,587	612.77	23.1%
2011	32,099	657.08	24.1%
2012	34,160	709.17	26.1%
2013	36,254	763.76	28.0%
2014	38,478	822.19	29.8%
2015	40,748	916.62	33.0%
2016	43,095	983.87	35.3%
2017	45,092	1,044.74	37.1%
2018	46,824	1,099.35	38.3%
2019	48,677	1,146.74	39.4%

*# Doesn't include payroll for retirees who have returned to work.*

**A significant financial goal** for the Teacher Retirement System was to reach a point in time where System assets fully covered the liabilities for future benefit payments to retirees and beneficiaries then on rolls. This goal was achieved in 1980 and retired life liabilities continue to be 100% funded.

## Other Observations

### General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.50% on the actuarial value of assets), it is expected that:

- 1) The unfunded actuarial accrued liabilities will be fully amortized after 28 years;
- 2) The funded status of the plan will increase gradually towards a 100% funded ratio; and
- 3) The unfunded accrued liability will increase for an extended period before beginning to decline.

### Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

- 1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations, in other words of transferring the obligations to an unrelated third party in an arm's length market value type transaction.
- 2) The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
- 3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

### Limitations of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project and is not within the actuary's domain of expertise. Consequently, the actuary performed no such evaluation.

## **FINANCIAL PRINCIPLES**

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## Annual Reserve Transfers

The annual accounting transfers listed below are recommended so that retired life accounts will be fully funded as of the valuation date.

Reserve Account	June 30, 2019 Balance Reported	Transfer Amount	June 30, 2019 Balance After Transfer
Retiree Accounts			
RRA	\$ 11,844,778,384	\$ 238,672,146	\$ 12,083,450,530
808 RRA	11,497,384	(379,923)	11,117,461
SBA	105,863,197	443,237	106,306,434
Total Retiree Accounts	11,962,138,965	238,735,460	12,200,874,425
EAA	(5,848,501,337)	(238,735,460)	(6,087,236,797)
<b>Total</b>	<b>\$ 6,113,637,628</b>	<b>\$ -</b>	<b>\$ 6,113,637,628</b>

Lump sum death benefits for retirees are paid from the Employer Accumulation Account and are not included in the figures shown in this report. The liabilities for lump sum death benefits for retirees are currently \$125.0 million.

# Financial Principles and Operational Techniques

**Promises Made and To Be Paid For.** As each year is completed, the System in effect hands an “IOU” to each member then acquiring a year of service credit. The “IOU” says: “The Arkansas Teacher Retirement System owes you one year’s worth of retirement benefits, payments in cash commencing when you qualify for retirement.”

The related *key financial questions* are:

**Which generation of taxpayers contributes the money to cover the IOU?**

**The present taxpayers**, who receive the benefit of the member’s present year of service?

**Or the future taxpayers**, who happen to be in Arkansas at the time the IOU becomes a cash demand?

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The financial objective of the ATRS is that this year’s taxpayers contribute the money to cover the IOUs being handed out this year so that **the employer contribution rate will remain approximately level from generation to generation** -- our children and our grandchildren will not have to contribute greater percents of pay than we contribute now. This objective was set forth in Act 793 of 1977.

(There are systems which have **a design for deferring contributions to future taxpayers**, lured by a lower contribution rate now and putting aside the fact that the contribution rate must then relentlessly grow much greater over decades of time -- consume now, and let your children face higher contribution rates after you retire.)

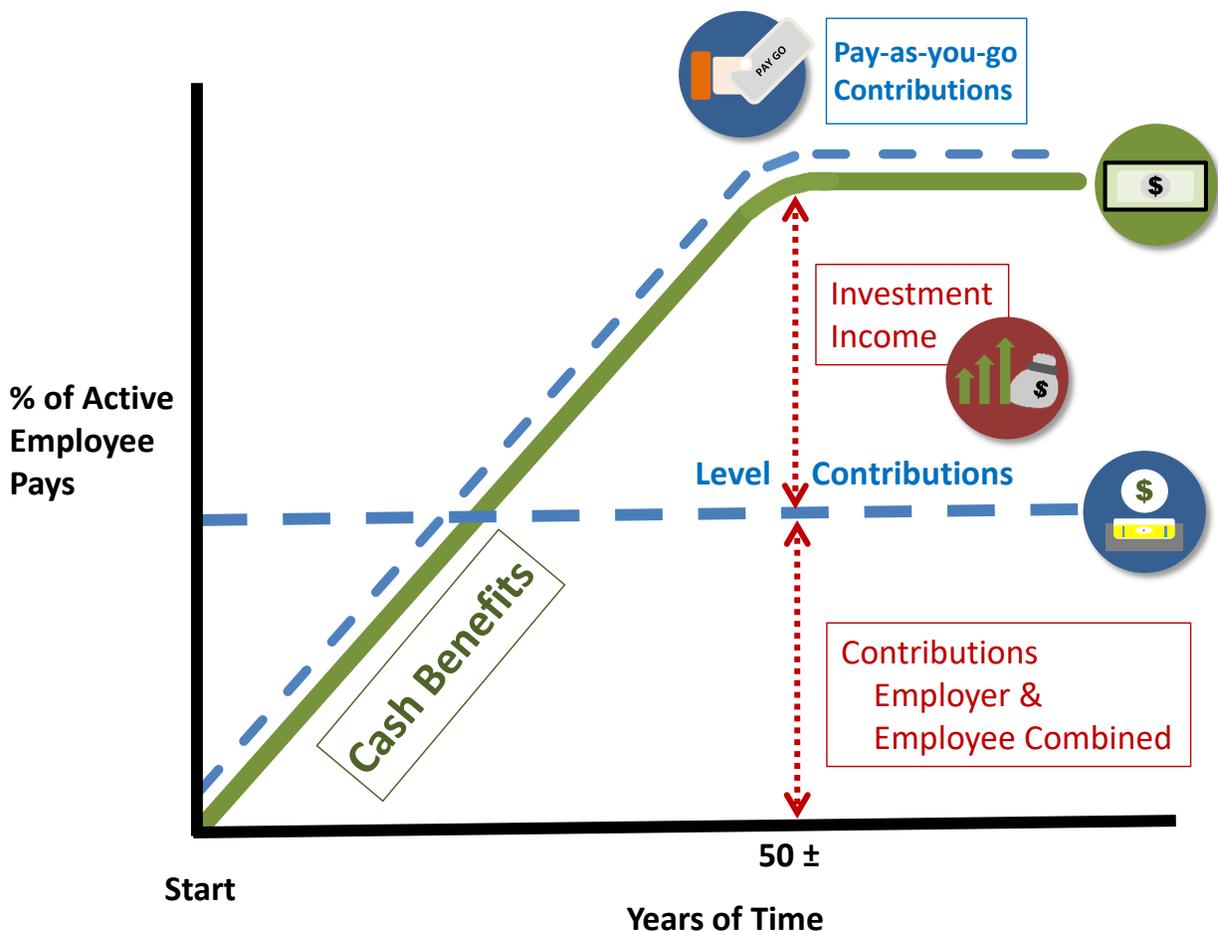
An inevitable byproduct of the level-cost design is the accumulation of reserve assets for decades and the income produced when the assets are invested. **Investment income** becomes the **third and largest contributor** for benefits to employees, and is interlocked with the contribution amounts required from employees and employers.

Translated to actuarial terminology, this level-cost objective means that the contribution rates must total at least the following:

- Normal Cost (the cost of members’ service being rendered this year)
- ... plus ...
- Interest on Unfunded Actuarial Accrued Liabilities (unfunded accrued liabilities are the difference between (i) liabilities for service already rendered and (ii) the accrued assets of the plan).

**Computing Contributions to Support System Benefits.** From a given schedule of benefits and from the employee data and asset data furnished, the actuary determines the contribution rates to support the benefits, by means of **an actuarial valuation**. An actuarial valuation has a number of ingredients such as: the rate of investment income which plan assets will earn; the rates of withdrawal of active members who leave covered employment before qualifying for any monthly benefit; the rates of mortality; the rates of disability; the rates of pay increases; and the assumed age or ages at actual retirement. In an actuarial valuation, assumptions must be made as to what the above rates will be, for the next year and for decades in the future. Only the subsequent actual experience of the System can indicate the degree of accuracy of the assumptions.

**Reconciling Differences Between Assumed Experience and Actual Experience.** Once actual experience has occurred and been observed, it will not coincide exactly with assumed experience, regardless of the accuracy of the assumptions or the skill of the actuary and the precision of the calculations made. The future can be predicted with considerable but not complete precision. ATRS copes with these continually changing differences by having annual actuarial valuations. Each actuarial valuation is a complete recalculation of assumed future experience, taking into account all past differences between assumed and actual experience. The result is continual adjustments in financial position.



**CASH BENEFITS LINE.** This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

**LEVEL CONTRIBUTION LINE.** Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

- **Economic Risk Areas**
  - Rates of investment return
  - Rates of pay increase
  - Changes in active member group size
- **Non-Economic Risk Areas**
  - Ages at actual retirement
  - Rates of mortality
  - Rates of withdrawal of active members (turnover)
  - Rates of disability

## The Actuarial Valuation Process

*The financing diagram* on the preceding page shows the relationship between the two fundamentally different philosophies of paying for retirement benefits: the method where contributions match cash benefit payments (or barely exceed cash benefit payments, as in the Federal Social Security program), and is thus an *increasing contribution method*; and the *level contribution method* which equalizes contributions between the generations.

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*The actuarial valuation* is the mathematical process by which the level contribution rate is determined, and the flow of activity constituting the valuation may be summarized as follows:

- A. **Census data**, furnished by plan administrator
  - Retired lives now receiving benefits
  - Former employees with vested benefits not yet payable
  - Active employees
- B. + **Asset data** (cash & investments), furnished by plan administrator
- C. + **Benefit provisions** that establish eligibility and amounts of payments to members
- D. + **Assumptions concerning future financial experience in various risk areas**, which assumptions are established by the Board of Trustees after consulting with the actuary
- E. + **The funding method** for employer contributions (the long-term planned pattern for employer contributions)
- F. + **Mathematically combining the assumptions, the funding method, and the data**
- G. = Determination of:
  - Plan financial position**, and/or
  - New Employer Contribution Rate**

# **BENEFIT PROVISIONS**

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## Summary of Benefit Provisions

### June 30, 2019

- 1. Post-Retirement Increases – A.C.A. §§ 24-7-713, 24-7-727 (compound COLA).** Each July 1, annuities are adjusted to be equal to the base annuity times 100% plus 3% for each full year in the period from the effective date of the base annuity to the current July 1. The base annuity is the amount of the member's annuity on the later of July 1, 2001 or the effective date of retirement, as re-determined by Acts 396 of 1999 and 992 of 1997. The July 1, 2009 cost of living adjustment for retirees was compounded. The annuity was set to 103% of the June 30, 2009 retirement benefit amount. After it was calculated on July 1, 2009, the base amount was reset to be the July 1, 2009 benefit amount. Future cost of living raises will be established by the new updated base amount. Future cost of living adjustments will be evaluated on an annual basis to determine if a simple or compound cost of living increase will be given, depending on the financial condition of the System. Act 967 of 2013 gives the ATRS Board authority to reverse the compounding of a benefit and reset the base amount to the pre-compounding amount. If this reversal were to occur, it would include participants in the T-DROP plan. The future benefits of a member would not be reduced to recover any benefits paid to a member as a result of the compounding. In addition, the member's benefit on the date of the reversal would not be impacted, but future COLA's would be based upon the reset base amount. *This act is dependent upon the actuary's certification that the amortization period is in excess of 30 years to pay unfunded liabilities prior to any reversal of the compounding of the COLA.* Act 780 of 2017 allows the right to reverse the 2009 compound COLA when unfunded liabilities exceed an 18-year amortization. The act also allows a phase in of the change during months in which a COLA raise is given to prevent any retiree or option beneficiary from having an actual reduction in monthly benefit payments.
- 2. Lump Sum Death Benefit – A.C.A. § 24-7-720.** Beneficiaries of deceased active members or retirees with 10 or more years of ATRS credited service are eligible to receive a lump sum death benefit of up to \$10,000 (\$6,667 for noncontributory service-benefit). The amount will be prorated for members who have both contributory service and noncontributory service. Members with 15 or more years of contributory service will receive the full \$10,000 (Act 977 of 2011).
- 3. Act 808 Retirement – A.C.A. § 24-4-732.** Any employee of a state agency who was an active member of the Arkansas Teacher Retirement System on April 8, 1987, and who qualified for retirement before January 1, 1988, could become a member of the Arkansas Public Employees Retirement System and retire from that system. All credited service was transferred to that system but the member's contributions were retained by the Arkansas Teacher Retirement System and the benefit amount is transferred monthly to the Arkansas Public Employees Retirement System. Each July 1, annuities are adjusted by 3% (compound escalator).
- 4. Act 793 Retirement – A.C.A § 24-4-522.** Any employee who was a member of the rehabilitation services in 1977 was permitted to become a member of the Arkansas Public Employees Retirement System. Liabilities associated with prior service earned through June 30, 1978 remain in the Arkansas Teacher Retirement System. Future service is allocated to the Arkansas Public Employees Retirement System. Each July 1, annuities are adjusted by 3% (compound escalator).

## Summary of Benefit Provisions

### June 30, 2019

5. **Retiree Benefit Stipend – A.C.A. § 24-7-713.** Each retired member as of June 30, 2008, with 5 or more years of ATRS credited service receives a \$75 per month stipend. Members in T-DROP do not receive the \$75 per month stipend until actual retirement. For all members retiring on or after July 1, 2008, a minimum of 10 years of ATRS credited service is required to receive the \$75 per month stipend. Act 603 of 2013 allows the ATRS Board to increase or decrease the stipend to a minimum of \$1 per month and a maximum of \$75 per month. This act is dependent upon the actuary's certification that the amortization period is in excess of 18 years to pay unfunded liabilities prior to any reduction in the current stipend. The stipend for fiscal year 2018 remains at \$75 per month. **By Board Resolution 2017-34 on November 13, 2017 the benefit stipend is removed from the base amount for all retirees and beneficiaries beginning fiscal year 2019 and the benefit stipend will be reduced to \$50.00 for fiscal year 2020 and beyond. The Resolution contains a “hold harmless” provision that prevents the lowering of the stipend if it would actually reduce the total monthly benefit. This would only affect retirees when the COLA is less than \$25 per month.**
  
6. **T-DROP Cash Balance Account.** Effective July 1, 2012, a T-DROP cash balance account was established that allows members exiting (retiring) from T-DROP to place all or a portion of their T-DROP proceeds into a Cash Balance Account (CBA) at ATRS. The interest rate credited will be between 2.5% and 4.0%, increasing 25 basis points for each year on deposit through the 5th year, and then 4% for the 6th and subsequent years.
  
7. **Optional Forms of Benefits – A.C.A. § 24-7-706:**
  - Option 1 (Straight Life Annuity)**

A member will receive the maximum monthly benefit for which he/she qualifies, throughout his/her lifetime. No monthly benefits will be paid to his/her beneficiary after the member's death. Should a member die before he/she has drawn benefits in an amount equal to his/her contributions plus earned interest, the balance will be paid to a designated beneficiary. The designated beneficiary may be anyone chosen by the member.
  - Option A (100% Survivor Annuity)**

Under this option a member will receive a reduced annuity throughout his/her lifetime. Upon the member's death, the designated beneficiary will receive the same annuity for the balance of his/her lifetime.
  - Option B (50% Survivor Annuity)**

Under this option a member will receive a reduced annuity throughout his/her lifetime. Upon the member's death, the designated beneficiary will receive one-half (1/2) of this annuity for the balance of his/her lifetime.

# Summary of Benefit Provisions

## June 30, 2019

### **Option C (Annuity for Ten Years Certain and Life Thereafter)**

A reduced monthly benefit payable for 120 months. After that time, or if the beneficiary dies prior to 120 months, a member's monthly allowance will revert to the amount he/she would have received under the regular plan and continue for life. If the member dies before receiving 120 payments, the designated beneficiary will receive a monthly benefit in the same amount until monthly benefits to both the member and the beneficiary equal 120 monthly payments. No further benefits are then payable to the beneficiary.

### **Pop-Up Election**

Following the death of or a divorce from the member's designated beneficiary, his or her benefit reverts (pops-up) to the straight life annuity amount from the elected optional annuity amount. The member may then elect new beneficiaries in accordance with Arkansas Code and rules adopted by the ATRS board.

## Sample Benefit Computations for a Member Retiring July 1, 2019 with a Simple 3% COLA

Data for an example member is shown below.

Annual retirement benefit as of July 1, 2019 (excluding stipend): \$30,000

Projected benefits, taking into account increases after retirement would be:

Year Ended June 30	Annual Amount		\$ Increase
	Base	Current	
2020	\$30,000	\$30,000	\$ 0
2021	30,000	30,900	900
2022	30,000	31,800	900
2023	30,000	32,700	900
2024	30,000	33,600	900

Thereafter, the amount would increase by \$900 annually for life. Act 793 members and Act 808 members receive compound COLAs.

## **CHANGES IN PURCHASING POWER**

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## Benefit Changes During Recent Years of Retirement & Related Changes in Purchasing Power (1990 \$)

Year Ended June 30	Increase Beginning of Year	Benefit Dollars in Year*	Inflation (Loss) in Year#	Purchasing Power at Year End	
				1990 \$	% of 1990
1990	\$ - - - -	\$ 11,000	- - - -	\$11,000	100%
1991	330	11,330	(4.7)%	10,822	98%
1992	1,005	12,335	(3.1)%	11,429	104%
1993	1,045	13,380	(3.0)%	12,036	109%
1994	1,082	14,462	(2.5)%	12,693	115%
1995	400	14,862	(3.0)%	12,660	115%
1996	400	15,262	(2.8)%	12,652	115%
1997	772	16,034	(2.3)%	12,993	118%
1998	481	16,515	(1.7)%	13,161	120%
1999	1,383	17,898	(2.0)%	13,989	127%
2000	1,129	19,027	(3.7)%	14,336	130%
2001	1,406	20,433	(3.2)%	14,911	136%
2002	807	21,240	(1.1)%	15,337	139%
2003	562	21,802	(2.1)%	15,417	140%
2004	562	22,364	(3.3)%	15,314	139%
2005	562	22,926	(2.5)%	15,312	139%
2006	562	23,488	(4.3)%	15,037	137%
2007	562	24,050	(2.7)%	14,994	136%
2008	562	24,612	(5.0)%	14,611	133%
2009	562	25,174	1.4 %	15,161	138%
2010	755	25,929	(1.1)%	15,453	140%
2011	778	26,707	(3.6)%	15,370	140%
2012	778	27,485	(1.7)%	15,558	141%
2013	778	28,263	(1.8)%	15,723	143%
2014	778	29,041	(2.1)%	15,828	144%
2015	778	29,819	(0.1)%	16,232	148%
2016	778	30,597	(1.0)%	16,491	150%
2017	778	31,375	(1.6)%	16,638	151%
2018	778	32,153	(2.9)%	16,575	151%
2019	751	32,904	(1.6)%	16,687	152%

\* The \$11,000 benefit used to begin this schedule is an arbitrary amount. A different beginning amount could show a different purchasing power amount, but the same in percent loss.

# Based on Consumer Price Index, All Urban Consumers, United States City Average (June values).

## Benefit Changes During Recent Years of Retirement & Related Changes in Purchasing Power (2000 \$)

Year Ended June 30	Increase Beginning of Year	Benefit Dollars in Year*	Inflation (Loss) in Year#	Purchasing Power at Year End	
				2000 \$	% of 2000
2000	\$ - - - -	\$ 11,600	- - - -	\$11,600	100%
2001	1,003	12,603	(3.2)%	12,207	105%
2002	523	13,126	(1.1)%	12,579	108%
2003	372	13,498	(2.1)%	12,668	109%
2004	372	13,870	(3.3)%	12,605	109%
2005	372	14,242	(2.5)%	12,624	109%
2006	372	14,614	(4.3)%	12,417	107%
2007	372	14,986	(2.7)%	12,400	107%
2008	372	15,358	(5.0)%	12,100	104%
2009	372	15,730	1.4 %	12,573	108%
2010	472	16,202	(1.1)%	12,815	110%
2011	486	16,688	(3.6)%	12,746	110%
2012	486	17,174	(1.7)%	12,902	111%
2013	486	17,660	(1.8)%	13,039	112%
2014	486	18,146	(2.1)%	13,125	113%
2015	486	18,632	(0.1)%	13,460	116%
2016	486	19,118	(1.0)%	13,675	118%
2017	486	19,604	(1.6)%	13,797	119%
2018	486	20,090	(2.9)%	13,745	118%
2019	459	20,549	(1.6)%	13,831	119%

\* The \$11,600 benefit used to begin this schedule is an arbitrary amount. A different beginning amount could show a different purchasing power amount, but the same in percent loss.

# Based on Consumer Price Index, All Urban Consumers, United States City Average (June values).

## Benefit Changes During Recent Years of Retirement & Related Changes in Purchasing Power (2010 \$)

Year Ended June 30	Increase Beginning of Year	Benefit Dollars in Year*	Inflation (Loss) in Year#	Purchasing Power at Year End	
				2010 \$	% of 2010
2010	\$ ----	\$ 11,900	----	\$11,900	100%
2011	357	12,257	(3.6)%	11,836	99%
2012	357	12,614	(1.7)%	11,981	101%
2013	357	12,971	(1.8)%	12,108	102%
2014	357	13,328	(2.1)%	12,188	102%
2015	357	13,685	(0.1)%	12,499	105%
2016	357	14,042	(1.0)%	12,699	107%
2017	357	14,399	(1.6)%	12,812	108%
2018	357	14,756	(2.9)%	12,764	107%
2019	330	15,086	(1.6)%	12,837	108%

\* The \$11,900 benefit used to begin this schedule is an arbitrary amount. A different beginning amount could show a different purchasing power amount, but the same in percent loss.

# Based on Consumer Price Index, All Urban Consumers, United States City Average (June values).

## VALUATION DATA

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## Summary of Annuities Being Paid Retirees and Beneficiaries July 1, 2019 by Disbursing Account and Gender

Disbursing Account	Men		Women		Totals	
	No.	Annual Annuities	No.	Annual Annuities	No.	Annual Annuities
<b>Retirement Reserve Account</b>						
Age & Service Annuities						
Retirees	9,906	\$263,327,269	33,556	\$795,529,733	43,462	\$1,058,857,002
Beneficiaries	362	7,423,666	822	18,911,527	1,184	26,335,193
Totals	10,268	270,750,935	34,378	814,441,260	44,646	1,085,192,195
Disability						
Retirees	553	8,180,079	2,239	33,227,288	2,792	41,407,367
Beneficiaries	145	2,188,356	142	2,433,047	287	4,621,403
Totals	698	10,368,435	2,381	35,660,335	3,079	46,028,770
Act 793	87	1,225,633	81	623,596	168	1,849,229
Total retirees and beneficiaries being paid from Retirement Reserve Account	11,053	282,345,003	36,840	850,725,191	47,893	1,133,070,194
<b>Survivor's Benefit Account</b>	362	5,273,304	379	6,040,658	741	11,313,962
Act 808	26	1,692,137	17	663,673	43	2,355,810
<b>Totals</b>	<b>11,441</b>	<b>289,310,444</b>	<b>37,236</b>	<b>857,429,522</b>	<b>48,677</b>	<b>1,146,739,966</b>
Prior Year Totals	11,136	\$281,747,789	35,688	\$817,600,229	46,824	\$1,099,348,018

## Summary of Annuities Being Paid Retirees and Beneficiaries July 1, 2019 by Disbursing Account and Source of Financing

Disbursing Account	Annual Annuities		Total	
	Employee Financed	Employer Financed	No.	Annual Annuities
<b>Retirement Reserve Account</b>				
Age & Service Annuities				
Retirees	\$ 72,868,878	\$ 985,988,124	43,462	\$ 1,058,857,002
Beneficiaries	440,898	25,894,295	1,184	26,335,193
Totals	73,309,776	1,011,882,419	44,646	1,085,192,195
Disability				
Retirees	1,908,942	39,498,425	2,792	41,407,367
Beneficiaries	173,717	4,447,686	287	4,621,403
Totals	2,082,659	43,946,111	3,079	46,028,770
Act 793	137,748	1,711,481	168	1,849,229
Total retirees and beneficiaries being paid from Retirement Reserve Account	75,530,183	1,057,540,011	47,893	1,133,070,194
<b>Survivor's Benefit Account</b>	459,768	10,854,194	741	11,313,962
Act 808	100,547	2,255,263	43	2,355,810
<b>Totals</b>	<b>76,090,498</b>	<b>1,070,649,468</b>	<b>48,677</b>	<b>1,146,739,966</b>
Prior Year Totals	\$ 78,179,125	\$ 1,021,168,893	46,824	\$ 1,099,348,018

## Annuities Being Paid Retirees and Beneficiaries July 1, 2019 by Type of Annuity Being Paid

Type of Annuity	No.	Annual Amounts		
		Original Annuities	Base Annuities	Current Annuities
<b>RETIREMENT RESERVE ACCOUNT</b>				
Age & Service				
Option 1 (Basic single life)	34,822	\$ 536,527,556	\$ 635,952,502	\$ 817,888,770
Option A (Joint & 100% Survivor)	5,347	90,885,402	105,199,277	135,091,423
Option B (Joint & 50% Survivor)	2,646	59,630,747	72,029,638	92,575,663
Option C (10-year certain)	647	10,487,013	10,843,078	13,301,146
Beneficiaries	1,184	20,870,802	19,822,864	26,335,193
Totals	44,646	718,401,520	843,847,359	1,085,192,195
Disability				
Option 1	2,325	23,916,629	26,462,857	34,361,609
Option A	366	4,014,482	4,098,562	5,243,781
Option B	82	1,176,934	1,265,843	1,612,749
Option C	19	153,776	142,976	189,228
Beneficiaries	287	3,174,378	3,407,328	4,621,403
Totals	3,079	32,436,199	35,377,566	46,028,770
Act 793	168	\$ 942,172	\$ 1,849,229	1,849,229
Retirement Reserve Account	47,893	751,779,891	881,074,154	1,133,070,194
Act 808 Retirement Reserve Account	43	818,053	2,355,810	2,355,810
Total Retirement Reserve Account	47,936	752,597,944	883,429,964	1,135,426,004
<b>SURVIVOR'S BENEFIT ACCOUNT</b>				
Beneficiaries of Deceased Members	741	\$ 7,821,593	\$ 8,879,432	\$ 11,313,962
<b>RETIREMENT SYSTEM TOTALS</b>				
Total Annuities Being Paid	48,677	\$ 760,419,537	\$ 892,309,396	\$ 1,146,739,966

**The Original Annuity** is the annuity at the date of retirement (includes stipend).

**The Base Annuity** is the amount from which the 3.0% COLA is calculated. Effective July 1, 2018, the stipend is no longer included.

**The Current Annuity** is the annuity payable at July 1, 2019 including the COLA granted on July 1.

**Annuities Being Paid July 1, 2019  
from the Retirement Reserve Account to  
AGE AND SERVICE Retirees and Beneficiaries  
by Attained Ages**

Attained Age	Annual Amounts			
	No.	Original Annuities	Base Annuities	Current Annuities
Under 40	8	\$ 169,518	\$ 149,393	\$ 191,571
40-44	4	34,776	31,063	37,707
45-49	27	423,225	393,648	444,593
50-54	331	8,065,902	7,824,444	8,707,094
55-59	1,377	36,453,729	36,794,068	43,628,545
60-64	6,578	125,180,389	130,785,778	159,160,096
65-69	12,277	211,144,244	230,862,041	290,456,484
70-74	10,861	172,293,123	202,197,890	266,413,259
75-79	6,627	91,157,971	117,332,453	157,843,327
80-84	3,678	44,868,691	64,767,306	87,333,134
85-89	1,887	20,216,900	34,246,068	46,131,825
90-94	775	6,934,556	14,493,354	19,499,480
95 & Up	216	1,458,496	3,969,853	5,345,080
<b>Totals</b>	<b>44,646</b>	<b>\$718,401,520</b>	<b>\$843,847,359</b>	<b>\$1,085,192,195</b>

**Annuities Being Paid July 1, 2019  
from the Retirement Reserve Account to  
DISABILITY Retirees and Beneficiaries by Attained Ages**

Attained Age	Annual Amounts			
	No.	Original Annuities	Base Annuities	Current Annuities
Under 40	20	\$ 176,907	\$ 161,757	\$ 200,390
40-44	53	558,818	526,390	611,754
45-49	120	1,253,747	1,173,946	1,359,975
50-54	229	2,997,772	2,842,145	3,346,457
55-59	500	5,395,754	5,116,670	6,289,240
60-64	659	7,091,163	6,885,291	8,820,417
65-69	578	5,770,695	6,048,739	8,221,252
70-74	484	5,140,318	6,156,852	8,402,179
75-79	252	2,589,980	3,602,702	4,901,625
80-84	98	948,419	1,575,698	2,130,675
85-89	56	383,645	860,266	1,165,319
90-94	22	92,530	312,287	423,454
95 & Up	8	36,451	114,823	156,033
<b>Totals</b>	<b>3,079</b>	<b>\$32,436,199</b>	<b>\$35,377,566</b>	<b>\$46,028,770</b>

**Annuities Being Paid July 1, 2019  
from the Retirement Reserve Account to  
ACT 793 Retirees and Beneficiaries by Attained Ages**

Attained Age	Annual Amounts		
	No.	Original Annuities	Current Annuities
Under 40	-	\$ -	\$ -
40-44	-	-	-
45-49	-	-	-
50-54	-	-	-
55-59	-	-	-
60-64	2	4,908	8,137
65-69	23	72,854	116,684
70-74	47	227,334	404,927
75-79	44	295,390	557,029
80-84	28	186,436	378,237
85-89	17	132,577	315,424
90-94	6	17,970	53,953
95 & Up	1	4,703	14,838
<b>Totals</b>	<b>168</b>	<b>\$942,172</b>	<b>\$1,849,229</b>

Base annuities are equal to current annuities since the COLA is compound.

**Annuities Being Paid July 1, 2019  
from the Retirement Reserve Account to  
SURVIVOR BENEFICIARIES by Attained Ages**

Attained Age	Annual Amounts			
	No.	Original Annuities	Base Annuities	Current Annuities
Under 40	184	\$1,464,548	\$1,448,804	\$ 1,651,453
40-44	4	36,965	37,944	45,623
45-49	9	58,568	55,277	69,903
50-54	19	201,123	204,853	252,642
55-59	47	595,044	569,744	682,363
60-64	96	1,515,017	1,525,889	1,903,514
65-69	127	1,373,828	1,453,108	1,879,486
70-74	104	1,331,951	1,514,336	2,015,562
75-79	70	668,667	895,809	1,218,795
80-84	46	372,526	656,004	891,825
85-89	23	170,186	401,925	541,343
90-94	10	28,437	94,177	131,670
95 & Up	2	4,733	21,562	29,783
<b>Totals</b>	<b>741</b>	<b>\$7,821,593</b>	<b>\$8,879,432</b>	<b>\$11,313,962</b>

**Annuities Being Paid July 1, 2019  
from the Act 808 Retirement Reserve Account to  
ACT 808 Retirees and Beneficiaries by Attained Ages**

Attained Age	Annual Amounts		
	No.	Original Annuities	Current Annuities
Under 40	-	\$ -	\$ -
40-44	-	-	-
45-49	-	-	-
50-54	-	-	-
55-59	-	-	-
60-64	-	-	-
65-69	-	-	-
70-74	-	-	-
75-79	-	-	-
80-84	10	196,530	597,768
85-89	20	366,188	1,040,386
90-94	10	219,644	605,050
95 & Up	3	35,691	112,606
<b>Totals</b>	<b>43</b>	<b>\$818,053</b>	<b>\$2,355,810</b>

Base annuities are the same as current annuities since the COLA is compound.

## Retiree and Beneficiary Data as of June 30

Year	Estimated Number		Total Retirees*	Annual Allowances (Millions)	% Increase in Annual Allowances@	Average Annual Allowances
	Added	Removed				
1990	588	337	11,654	\$ 92.69	7.0%	\$ 7,954
1991	489	253	11,890	104.60	12.8%	8,797
1992	455	312	12,033	115.50	10.4%	9,599
1993	589	316	12,306	129.71	12.3%	10,540
1994	846	512	12,640	141.87	9.4%	11,224
1995	908	342	13,206	156.59	10.4%	11,857
1996	1,107	654	13,659	170.59	8.9%	12,489
1997	1,049	475	14,233	194.90	14.3%	13,694
1998	809	240	14,802	220.38	13.1%	14,888
1999	1,582	497	15,887	248.75	12.9%	15,658
2000	1,249	479	16,657	280.14	12.6%	16,818
2001	1,571	450	17,778	309.03	10.3%	17,383
2002	1,989	568	19,199	334.15	8.1%	17,404
2003	1,621	549	20,271	359.98	7.7%	17,758
2004	1,685	528	21,428	386.23	7.3%	18,025
2005	1,822	570	22,680	415.04	7.5%	18,300
2006	1,958	485	24,153	449.77	8.4%	18,622
2007	2,017	559	25,611	484.55	7.7%	18,920
2008	1,703	513	26,801	515.56	6.4%	19,237
2009	2,721	704	28,818	564.59	9.5%	19,591
2010	2,588	819	30,587	612.77	8.5%	20,034
2011	2,394	882	32,099	657.08	7.2%	20,470
2012	2,932	871	34,160	709.17	7.9%	20,760
2013	3,039	945	36,254	763.76	7.7%	21,067
2014	3,156	932	38,478	822.19	7.7%	21,368
2015	3,326	1,056	40,748	916.62	11.5%	22,495
2016	3,272	925	43,095	983.87	7.3%	22,830
2017	2,996	999	45,092	1,044.74	6.2%	23,169
2018	2,927	1,195	46,824	1,099.35	5.2%	23,478
2019	2,849	996	48,677	1,146.74	4.3%	23,558

\* T-DROP participants are classified as active members for purposes of the valuation and are not included in this schedule.

@ T-DROP annuities for retired members included 2015 and later.

# REPORTED ASSETS

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**The assets** of the Retirement System, as of June 30, 2019, were reported to your actuary to be \$17,741,621,773. This amount, reduced by a funding value adjustment of \$329,087,122 this year, is used to finance the Retirement System liability.

Accounts	Assets at June 30	
	2019	2018
Regular Accounts		
Members' Deposit Accounts		
Contributions	\$ 1,348,149,014	\$ 1,287,855,312
Interest	9,669,786,261	9,645,971,617
Total	11,017,935,275	10,933,826,929
T-DROP Member Deposit Accounts		
Contributions	28,594,336	23,942,761
Interest	26,900,241	27,387,222
Total	55,494,577	51,329,983
Cash Balance Account	133,829,621	109,036,167
Employer's Accumulation Account	(5,848,501,337)	(5,509,753,553)
Retirement Reserve Account	11,844,778,384	11,366,265,784
Act 808 Retirement Reserve Account	11,497,384	12,599,124
T-Lump Payable	411,492,155	417,126,689
Survivors Benefit Account	105,863,197	102,835,207
Total Regular Accounts	17,732,389,256	17,483,266,330
Other Accounts		
Income Expense Account	9,232,517	9,361,410
Other Special Reserves	-	-
Miscellaneous	-	-
Total Other Accounts	9,232,517	9,361,410
Total Market Value of Assets	17,741,621,773	17,492,627,740
Funding Value Adjustment	(329,087,122)	(736,564,812)
<b>Funding Value of Assets</b>	<b>\$17,412,534,651</b>	<b>\$16,756,062,928</b>

## VALUATION RESULTS

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## Liabilities for Annuities Being Paid July 1, 2019 Tabulated by Type of Annuity Being Paid

Type of Annuity	Liabilities July 1, 2019		
	Men	Women	Totals
<b>RETIREMENT RESERVE ACCOUNT</b>			
Age & Service Annuities			
Option 1 (Straight Life)	\$ 1,429,353,924	\$ 6,932,439,545	\$ 8,361,793,469
Option A (100% Joint & Survivor)	853,640,970	922,770,063	1,776,411,033
Option B (50% Joint & Survivor)	416,536,325	656,173,461	1,072,709,786
Option C (10 Years Certain & Life)	29,232,531	137,380,133	166,612,664
Beneficiaries	59,095,326	165,455,980	224,551,306
Total Age & Service	2,787,859,076	8,814,219,182	11,602,078,258
Disability Annuities			
Option 1	50,134,417	280,225,085	330,359,502
Option A	27,571,540	44,463,076	72,034,616
Option B	5,459,407	12,791,619	18,251,026
Option C	200,950	2,039,728	2,240,678
Beneficiaries	19,613,307	23,826,698	43,440,005
Total Disability	102,979,621	363,346,206	466,325,827
Act 793	9,461,601	5,584,844	15,046,445
Retirement Reserve Account	2,900,300,298	9,183,150,232	12,083,450,530
Act 808 Retirement Reserve Account	8,090,772	3,026,689	11,117,461
Total Retirement Reserve Account	2,908,391,070	9,186,176,921	12,094,567,991
<b>SURVIVORS' BENEFIT ACCOUNT</b>			
Beneficiaries of Deceased Members	\$ 48,241,084	\$ 58,065,350	\$ 106,306,434
<b>RETIREMENT SYSTEM TOTALS</b>			
Total Annuity Liabilities	2,956,632,154	9,244,242,271	12,200,874,425
Cash Benefit Account Liabilities			133,829,621
Liabilities for Lump Sum Death Benefits			125,036,972
Total	\$ 2,956,632,154	\$ 9,244,242,271	\$ 12,459,741,018

## Retirement Reserve Account

### Comparative Statement of Annuities, Accrued Liabilities and Assets

(\$ Millions)

Valuation Date June 30	Annual Annuities Being Paid			Average	Computed Liabilities	Applicable Assets	Unfunded Retired Life Liabilities	Ratio of Assets to Liabilities
	No.	Amount	% Incr.					
1980*#	8,001	\$ 30.10	3.5%	\$ 3,761	\$ 280.70	\$ 280.7	none	100.0%
1985*+	9,331	51.49	13.6%	5,518	479.9	479.9	none	100.0%
1990	11,054	87.84	7.2%	7,946	847.7	847.7	none	100.0%
1995	12,622	150.45	10.8%	11,920	1,428.6	1,428.6	none	100.0%
2000* ##	16,172	275.65	14.6%	17,045	2,828.8	2,828.8	none	100.0%
2005	22,147	409.42	7.5%	18,486	4,148.1	4,148.1	none	100.0%
2006	23,606	443.98	8.4%	18,808	4,483.4	4,483.4	none	100.0%
2007	25,038	478.30	7.7%	19,103	4,816.4	4,816.4	none	100.0%
2008	26,258	509.29	6.5%	19,396	5,391.3	5,391.3	none	100.0%
2009	28,228	557.83	9.5%	19,762	5,891.9	5,891.9	none	100.0%
2010	29,969	605.55	8.6%	20,206	6,358.0	6,358.0	none	100.0%
2011^	31,498	649.47	7.3%	20,619	6,972.6	6,972.6	none	100.0%
2012	33,533	701.09	7.9%	20,907	7,481.0	7,481.0	none	100.0%
2013	35,622	755.26	7.7%	21,202	8,004.8	8,004.8	none	100.0%
2014	37,824	813.33	7.7%	21,503	8,561.9	8,561.9	none	100.0%
2015	40,070	907.09	11.5% <sup>@</sup>	22,638	9,515.7	9,515.7	none	100.0%
2016	42,395	973.78	7.4%	22,969	10,157.2	10,157.2	none	100.0%
2017* ^	44,394	1,034.17	6.2%	23,295	11,026.4	11,026.4	none	100.0%
2018	46,108	1,088.30	5.2%	23,603	11,515.7	11,515.7	none	100.0%
2019	47,979	1,137.79	4.5%	23,714	12,094.6	12,094.6	none	100.0%

\* After plan amendments.

# After change in interest assumption from 6.0% to 7.0%, change in post-retirement adjustments from 1.5% to 3.0% and recommended reserve transfer.

+ After redetermination of base, retroactive application of new minimum benefit formula and reserve transfers.

## Includes Act 808 and Act 793 retirees beginning in 2000.

^ After changes in assumptions.

@ T-DROP annuities for retired members included 2015 and later.

## Survivors' Benefit Account Accrued Liabilities and Assets Comparative Statement

Valuation Date June 30	Annual Annuities Being Paid		Computed Liabilities	Applicable Assets	Unfunded Accrued Liabilities	Ratio of Assets to Liabilities
	No.	Amount				
1980*#	393	\$ 772,631	\$ 7,042,644	\$ 7,042,644	none	100.0%
1985*+	421	1,240,399	12,411,800	12,411,800	none	100.0%
1990	424	1,830,743	18,117,244	18,117,244	none	100.0%
1995	416	2,723,940	26,220,218	26,220,218	none	100.0%
2000*	485	4,487,519	43,701,138	43,701,138	none	100.0%
2005	533	5,619,675	56,257,745	56,257,745	none	100.0%
2006	547	5,791,974	57,605,939	57,605,939	none	100.0%
2007	573	6,250,603	63,481,565	63,481,565	none	100.0%
2008	543	6,269,551	66,496,539	66,496,539	none	100.0%
2009	590	6,761,034	70,857,161	70,857,161	none	100.0%
2010	618	7,224,585	75,108,334	75,108,334	none	100.0%
2011^	601	7,605,212	81,150,385	81,150,385	none	100.0%
2012	627	8,081,913	84,930,745	84,930,745	none	100.0%
2013	632	8,491,667	88,139,802	88,139,802	none	100.0%
2014	654	8,861,734	89,793,996	89,793,996	none	100.0%
2015	678	9,530,889	95,272,795	95,272,795	none	100.0%
2016	700	10,084,359	98,960,258	98,960,258	none	100.0%
2017* ^	698	10,574,602	104,668,995	104,668,995	none	100.0%
2018	716	11,042,074	107,043,067	107,043,067	none	100.0%
2019	741	11,313,962	106,306,434	106,306,434	none	100.0%

\* Includes plan amendments.

# After change in interest assumption from 6.0% to 7.0%, change in post-retirement adjustments from 1.5% to 3.0% and recommended reserve transfer.

+ After redetermination of base annuity, retroactive application of new minimum benefit formula and recommended reserve transfer.

^ After changes in assumptions.

## Annual Allowances of Retired Lives by Year of Retirement as of June 30, 2019

Calendar Year of Retirement	No.	Annual Amount Being Paid			Average
		Original	Total Increase	Current	
2019*	662	\$ 7,479,646	\$ 461,133	\$ 7,940,779	\$11,995
2018	2,816	46,495,516	6,545,110	53,040,626	18,835
2017	2,818	46,014,184	8,956,007	54,970,191	19,507
2016	2,885	46,763,425	10,680,564	57,443,989	19,911
2015	3,093	50,288,803	13,329,762	63,618,565	20,569
2014	3,044	50,839,263	15,013,191	65,852,454	21,634
2013	2,783	46,559,285	15,892,841	62,452,126	22,441
2012	2,739	44,092,646	16,692,102	60,784,748	22,192
2011	2,458	39,959,667	16,201,454	56,161,121	22,848
2010	2,111	34,081,242	15,984,765	50,066,007	23,717
2009	2,181	35,821,422	18,074,280	53,895,702	24,711
2008	2,097	32,831,271	16,570,884	49,402,155	23,558
2007	1,949	30,193,930	15,572,906	45,766,836	23,482
2006	1,735	27,341,337	15,681,312	43,022,649	24,797
2005	1,721	27,403,776	17,704,054	45,107,830	26,210
2004	1,509	22,906,000	14,551,314	37,457,314	24,823
2003	1,371	20,510,695	13,704,615	34,215,310	24,956
2002	1,306	20,229,889	13,864,350	34,094,239	26,106
2001	1,329	18,443,343	12,971,203	31,414,546	23,638
2000	1,131	17,743,691	13,666,941	31,410,632	27,772
1999	977	14,117,152	12,163,402	26,280,554	26,899
1998	946	12,809,770	11,669,660	24,479,430	25,877
1997	710	10,945,747	11,046,585	21,992,332	30,975
1996	567	9,063,774	9,263,521	18,327,295	32,323
1995	609	9,803,278	10,375,949	20,179,227	33,135
1994	621	9,782,156	11,480,626	21,262,782	34,240
1993	450	7,243,381	8,949,705	16,193,086	35,985
1992	307	3,888,183	5,530,043	9,418,226	30,678
1991	225	2,549,968	3,913,353	6,463,321	28,726
1990	251	2,653,086	4,633,434	7,286,520	29,030
1989	242	2,601,138	4,765,629	7,366,767	30,441
1988	233	2,500,855	4,887,291	7,388,146	31,709
1987	227	2,342,398	5,102,404	7,444,802	32,796
1986	135	1,287,899	2,847,527	4,135,426	30,633
1985	107	961,648	2,120,533	3,082,181	28,805
Before 1984	332	1,870,073	5,451,979	7,322,052	22,054
<b>TOTAL</b>	<b>48,677</b>	<b>\$760,419,537</b>	<b>\$386,320,429</b>	<b>\$1,146,739,966</b>	<b>\$23,558</b>

\* Reporting for calendar year 2019 is not yet complete. The July 1<sup>st</sup> retirees are not included in the schedule.

## APPENDIX

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## APPENDIX

### Single Life Retirement Values Based on RP-2014 Mortality Headcount Weighted Tables Adjusted Using MP-2017 Projection Scale & 7.5% Interest

Sample Attained Ages in 2019*	Present Value of \$1.00 Monthly for Life		Present Value of \$1 Monthly for Life Increasing 3.0% Annually		Future Life Expectancy (Years)		Percent Dying within Next Year	
	Men	Women	Men	Women	Men	Women	Men	Women
40	\$150.78	\$154.22	\$198.67	\$205.14	42.65	46.91	0.33 %	0.28 %
45	146.82	151.45	191.26	199.48	37.86	42.10	0.41 %	0.32 %
50	141.65	147.57	181.99	192.01	33.15	37.29	0.53 %	0.36 %
55	135.01	142.16	170.65	182.24	28.57	32.49	0.71 %	0.44 %
60	126.70	135.10	157.13	170.16	24.16	27.81	0.98 %	0.60 %
65	116.61	126.06	141.50	155.51	20.00	23.29	1.36 %	0.82 %
70	104.37	114.48	123.61	137.92	16.08	18.95	1.97 %	1.24 %
75	89.86	100.41	103.61	117.82	12.46	14.88	3.07 %	2.05 %
80	73.73	84.39	82.70	96.30	9.24	11.25	5.10 %	3.48 %
85	57.47	67.50	62.75	74.91	6.57	8.15	8.75 %	6.12 %
Base	2635 x 1.01	2636 x 0.91	2635 x 1.01	2636 x 0.91				
Projection	939	940 x 0.91	939	940				

\* Applicable to calendar year 2019. Rates and life expectancies in future years are determined by the MP-2017 projection scale.

Sample Attained Ages in 2019	Benefit Increasing 3.0% Yearly	Portion of Age 60 Lives Still Alive	
		Men	Women
60	\$100.00	100%	100%
65	115.00	95%	97%
70	130.00	88%	92%
75	145.00	79%	86%
80	160.00	67%	77%
Ref		2635 x 1.01	2636 x 0.91

December 13, 2019

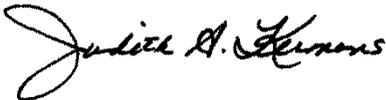
Mr. Clint Rhoden  
Executive Director  
Arkansas Teacher Retirement System  
1400 West Third Street  
Little Rock, Arkansas 72201

**Re: Report of June 30, 2019 Actuarial Valuation of Retirees and Beneficiaries**

Dear Mr. Rhoden:

Enclosed are 15 copies of this report. Please let us know if anything else is needed.

Sincerely,



Judith A. Kermans, EA, FCA, MAAA

JAK:ah  
Enclosures

**Waiver of Member Interest 2019 & 2020**  
**February 3, 2020 Board Meeting**  
**A.C.A. Sec. 24-7-205**

<u>Amount</u>	<u>Reason to Waive Interest</u>
\$ 0.27	Internal request – De minimus amount.
\$1,240.08	Internal request – Mail was delayed causing members form to be in after December 1 <sup>st</sup> deadline.

**Waiver of Employer Report Penalties 2019 2020**  
**February 3, 2020 Board Meeting**  
**A.C.A. Sec. 24-7-411**

These are typical reports of employer penalties and interest waived by ATRS during a reporting period.

<b>Employer Penalties Waived</b>	
Augusta Public Schools Augusta, AR	\$450.00
<b>Total Employer Penalties Waived</b>	<b>\$450.00</b>
<b>Employer Interest Waived</b>	
Bismarck School District Bismarck, AR	\$1,070.90
Fayetteville School District Fayetteville, AR	\$732.57
Forrest City School District Forrest City, AR	\$240.65
North Little Rock School District North Little Rock, AR	\$1,283.77
Pulaski County Special School District Little Rock, AR	\$1,497.06
Viola School District Viola, AR	\$1,206.45
<b>Total Employer Waived</b>	<b>\$6,031.40</b>
<b>Total Employer Penalties &amp; Interest Waived</b>	<b>\$6,481.40</b>

MIC Claim #	Claimant Type	Facts and Circumstances	Findings and Recommendations of Committee	Follow Up
2018-06	Member	Member worked for LRSD. LRSD did not report service for six year (1994-2000). Member wants LRSD to purchase service credit for their failure to report service and pay contributions.	ATRS Board found that a manifest injustice occurred in the matter of the Little Rock School District's error in not reporting six (6) years (1995 through 2000) of non-contributory service for an ATRS member. The Board voted to hold the member harmless for the error; waived most of the accrued interest; and directed staff to invoice the school district for employer contributions of \$19,437.47 and interest of \$16,938.86, with no additional accrual of interest if remitted before June 30, 2020.	On January 8, ATRS received payment in full from the LRSD of the \$36,376.33 invoice.

## **A.C.A. §24-7-734 FORFEITURE REPORT**

A.C.A. §24-7-734(b) provides that benefits that are not paid within five (5) years of the date they are due may be forfeited if (1) ATRS is unable to contact the person entitled to the benefit by mail addressed to the last known address on record; or (2) if the person entitled to the benefit fails to submit the required paperwork to ATRS to claim the benefit. The forfeiture of benefits is a question for the Board.

Staff has begun reviewing a list of four hundred twenty-three (423) member accounts where the member died more than five (5) years ago and where benefits have not been distributed to determine why the benefits have not been paid. In each instance, staff confirmed that ATRS had attempted to contact a family member or beneficiary, in most cases multiple times. Most often, there was simply no response at all. In one instance, a family member notified ATRS that they would not be claiming the benefits because it was so small it wasn't worth the hassle of claiming it; in another instance, the family member said that the member's debts were greater than the estate assets. In a few instances, a family member responded to ATRS correspondence and then failed to follow through with the claims process.

Staff reviewed twenty-nine (29) member accounts in this initial round of reviews and, of those reviewed, identified benefits in 13 accounts totaling in the aggregate \$181,119.33 that fall within the provisions of this Code section. Staff recommends that the Board find these benefits should be forfeited according to A.C.A. §24-7-734(b) and direct the staff to transfer these benefits to the trust assets of ATRS.

### ***A.C.A. §24-7-734. Lost payees.***

*(b) (1) If the board is unable within five (5) years after payment of a benefit is due to a member or beneficiary to make the payment because it cannot ascertain the whereabouts of the member or the identity and whereabouts of the beneficiary or personal representative by mailing to the last known address shown on the board's records and neither the member, the beneficiary, or personal representative has submitted the paperwork and forms required by the system before the expiration of the five (5) years, then, and in each case, **the board shall direct** that the amount shall be forfeited to the trust assets of the system. (emphasis added)*





INTERNAL AUDIT DEPARTMENT

**INTERNAL AUDIT REPORT:**

**ATRS Option Benefits**

July 1, 2018 – June 30, 2019

February 3, 2020

## **Introduction**

A member may elect to receive an actuarial reduced retirement benefit (option benefit) and provide a benefit for their beneficiary upon their death. There are three option benefits available for the member to choose: A, B, or C. Option A provides the beneficiary with 100% survivor annuity. The beneficiary will receive the same benefit as the retiree for the remainder of the beneficiary's lifetime. Option B provides the beneficiary with 50% survivor annuity. The beneficiary will receive one-half of the retiree's benefit for the remainder of the beneficiary's lifetime. Option C is a guaranteed one hundred twenty monthly payments. If the retiree dies prior to receiving one hundred and twenty monthly payments, the beneficiary will receive the remainder of the payments. Option A and B beneficiary maybe a spouse, married for at least one year immediately preceding the effective date of benefits or a dependent child who has been ruled physically or mentally incapacitated by a court of competent jurisdiction. Option C beneficiary can be a person or any entity that has a tax payer identification number.

If the designated beneficiary is a spouse, a retiree who elected Option A or B annuity benefits at retirement may cancel the option elected and receive full benefits under a straight life annuity for the remainder of their lifetime if their designated beneficiary dies or divorce. If the designated beneficiary is an incapacitated child, the retiree can cancel their option and elect straight life annuity when the child is declared emancipated through a court order, marries or dies. A retiree may nominate a new Option C beneficiary or elect to receive straight life annuity benefits when the beneficiary predeceases or divorces the retiree.

A retiree may elect to cancel their straight life annuity and elect Option A or B if the retiree marries or fulfills the one-year marriage requirement after retirement. The retiree has six months from the completion of the one-year marriage requirement to elect an option.

A retiree may in their first year of retirement elect to change the option they chose at retirement. The election is retroactive to the effective date of retirement. Any overpayment in benefits must be repaid to the system.

A spouse of at least one year or child who has been ruled physically or mentally incapacitated by a court may cancel the straight life annuity the retiree was receiving and elect Option A benefits if the retiree dies within the first year of retirement. The beneficiary must be the residue beneficiary under §24-7-709 and designated on the retiree's Disposition of Residue – Beneficiary Designation form on file.

In board resolution 2017-39, the Board of Trustees of the Arkansas Teacher Retirement System (ATRS) adopted new option annuity factors effective January 1, 2018. The new factors were based on RP-2014 fully generational mortality tables as recommended by ATRS actuaries, Gabriel, Roeder, Smith and Company.

## Objectives

Our objectives in conducting this audit were as follows:

- Determine retiree benefits with an option selected for the beneficiary were calculated accurately and consistently in accordance with ATRS laws, rules and procedures.
- Determine benefits for option beneficiaries were calculated accurately and consistently in accordance with ATRS laws, rules, and procedures.
- Determine option beneficiary is eligible for the option selected according to ATRS laws, rules and procedures.
- Evaluate the adequacy of staff training to calculate option benefits.
- Evaluate internal controls surrounding the calculation of option benefits, including review procedures.

## Scope and Methodology

Our audit covered option benefits selected by the member or beneficiary and became effective July 1, 2018 through June 30, 2019. To accomplish the objective of verifying the option benefits were calculated by ATRS laws and procedures and the beneficiary is eligible as the option beneficiary, we gathered the following populations and selected samples using a random number generator.

In order to verify the retiree was drawing the correct option benefit amount selected at retirement, Internal Audit (IA) obtained a listing of all retirees who retired during fiscal year (FY) 2019 and elected to receive an option benefit. There were five hundred twenty-two members who retired during FY 2019 with an option benefit. Internal Audit gathered a sample of thirty. The selected member's benefit calculation was analyzed for the correct option factor being applied to the member's benefit. The selected member's beneficiary was analyzed for eligibility as an option beneficiary.

In order to verify a retiree was drawing the correct annuity benefit when a change to their annuity option took place after retirement, IA obtained a listing of all retirees whose option had been changed on the Arkansas Teacher Retirement Member Information System (ATRMIS) during FY 2019. From this list, there were eleven retirees who elected within their first year of retirement to change their annuity option selected at retirement. IA analyzed all eleven for accuracy in calculating their new option benefit and the eligibility of the option beneficiary. There were seven who changed their annuity option due to marrying after retirement. IA analyzed all seven for accuracy in calculating their new option benefit and the eligibility of the option beneficiary. There were seventy-one who changed their annuity option selected at retirement due to divorce or death of their option beneficiary. IA selected a sample of thirty. The selected sample was reviewed for the accuracy of changing the member's benefit to straight life annuity. There were ninety-three who selected Option C benefits at retirement and had drawn one hundred twenty benefit payments. IA selected a sample of thirty. The selected members were reviewed for accuracy of the benefit being changed to straight life annuity benefits.

In order to verify that the option beneficiary of a retiree is being paid an accurate option benefit, IA obtained a listing of all retirees who died during FY 2019 and had selected an option annuity. From this listing a sample of thirty was selected. IA determined if the correct option benefit amount was being paid to the option beneficiary.

In order to verify that the option beneficiary of a retiree who deceased within the first year of retirement was being paid an accurate option benefit, IA obtained a listing of all retirees who died during FY 2019, had been retired for less than one year and retired with straight life annuity. There were thirteen retirees who meet these criteria. Of these thirteen, two retirees had beneficiaries eligible for option benefits. IA reviewed both beneficiaries option benefit amount for accuracy.

In order to evaluate the adequacy of staff training and the internal controls over the option benefit calculation and payment, IA conducted interviews with employees.

### **Findings and Recommendations**

The objectives of a system of internal controls are to provide management with reasonable, but not absolute, assurance that transactions are executed in accordance with policies and guidelines and are recorded properly. Our findings and recommendations are provided to assist management in implementing internal controls that ensure proper procedures are implemented and followed, and should not be used for any other purpose.

**Finding 1:** Out of one hundred forty members reviewed, one member received an incorrect benefit for one month, the option benefit amount one beneficiary was given in correspondence was incorrect, two members did not send in all of their documentation. This is less than a three percent error rate.

**Recommendation:** Option benefit calculations are done manually by payroll personnel for all option changes made after a member retires. Internal Audit recommends all benefit calculations be programmed. In order for there to be segregation of duties and to safeguard assets, Internal Audit also recommend all benefit calculations be performed by Member Services department and paid by the Payroll department.

**Management Response:** Staff concurs with this recommendation and will coordinate efforts between Payroll, Member Services and Data Processing to achieve the objective.

**Finding 2:** ATRS uses the option benefit factors established at the time the member retired and the member and beneficiary ages at the time of marriage when calculating the option benefits for members who married after retirement. Internal Audit consulted with Judith Kermans, ATRS actuary with Gabriel, Roeder, and Smith. She replied that from an actuarial equivalence perspective, you would want to use the new factors based on the age of the retiree and the new beneficiary at the time of the election.

**Recommendation:** IA recommends that for all option annuity calculations, ATRS use the new factors. For members who marry after retirement and change to an option annuity, the age of the member and new beneficiary be calculated at the time of the election.

**Management Response:** Staff concurs with the recommendation and will use current factors at the time of the election.

## **Conclusion**

Option annuities are being calculated and paid accurately and timely. The staff is doing an excellent job overseeing the member and beneficiary's benefits. In order to safeguard ATRS assets, segregation of duties needs to be established by moving all benefit calculations to the Member Services department. Programming needs to be created to calculate all benefits.

# **ATRS Board Policy 4**

## **STATEMENT OF INVESTMENT POLICY**

A.C.A. § 24-7-305

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### **I. Board - Investment Policies and Procedures**

#### **A. Statement of Investment Policy**

1. This Investment Policy has been prepared within the context of applicable Arkansas laws and is intended to allow for sufficient flexibility in the investment process to capture opportunities, yet ensure that both prudence and care are maintained in the execution of the investment program. While safety of principal is given primary consideration, the Arkansas Teacher Retirement System Board of Trustees, hereinafter "Board" may take appropriate levels of risk to earn higher levels of investment return.
2. The Board has arrived at this policy through careful study of the rates of return and risks associated with various investment strategies in relation to the current and projected liabilities of the Arkansas Teacher Retirement System, hereinafter, "the System". This policy has been chosen as the most appropriate for achieving the financial objectives of the System. The policy will be reviewed periodically as circumstances dictate.
3. The Board has adopted a long-term investment horizon so that the chances and duration of investment losses are carefully weighed against the long-term potential for appreciation of assets. The assets of the System will be invested in a manner that provides the safeguards and diversity to which a prudent investor would adhere. All transactions undertaken on behalf of the System will be in the sole interest of the members of the System.
4. To achieve the overall investment goal of the System, one or more investment consultants may be retained by the Board as investment advisors. The scope of duties, together with the terms and conditions of engagement, of any investment consultant will be set forth in a contract approved by the Board. Throughout this document, investment advisors are referred to as investment consultants.
5. The System shall manage those assets not specifically allocated to investment managers. No investment shall be made without an investment consultant's recommendation.

#### **B. Standard of Care**

1. The standard of care for the Board and Executive Director of the assets of the System is: when investing and reinvesting trust assets and in acquiring, retaining, managing and disposing of investments of the trust assets, there shall be exercised the reasonable care, skill, and caution that a prudent investor would use after considering the purposes, terms, distribution requirements, and other circumstances of the trust. Investment and management decisions respecting individual assets shall be evaluated not in isolation but in the context of the trust portfolio as a whole and as a part of an overall investment strategy having risk and return objectives reasonably suited to the trust. The investments of the trust shall be diversified unless the Board reasonably determines that, because of special circumstances, the purposes of the trust are better served without diversifying. The trust assets shall be invested and managed solely in the interest of the members and benefit recipients of the trust. The trust assets shall be invested in a manner to only incur costs that are appropriate and reasonable in relation to the assets and purposes of the investment. Compliance with the standard of care is determined in light of facts and circumstances at the time of action, not in hindsight.
2. Investment and management functions may be delegated to an investment agent that a prudent trustee of comparable skills could properly delegate under the circumstances. When making such delegation, the Board shall establish the scope and terms of the delegation, consistent with the purposes and terms of the trust, and shall monitor the investment agent performance and compliance with the terms of the delegation. In performing a delegated function, an investment agent owes a duty to the System and the trust to exercise reasonable care to comply with the terms of the delegation. The assets of the System allocated to the investment managers shall be diligently managed, which may include selling investments and realizing losses, if such action is considered advantageous to longer-term return maximization. In addition, the Executive Director may delegate certain duties to the System's investment staff without relieving the Executive Director from the ultimate responsibility.
3. Each party serving in a fiduciary capacity for the trust shall apply the standard of care set forth herein.

#### C. Asset Allocation

1. The Board is responsible for the prudent investment of funds and to maintain a proper allocation of the System's investment assets. The Board, in conjunction with its investment consultants, shall set and adjust the System's asset allocation ranges as necessary to provide an optimal allocation to obtain its target returns. The general investment

consultant shall notify the Executive Director and the Board when an asset liability modeling study should be undertaken. It shall be the goal of the System to maintain the following asset allocation targets and ranges:

<b>Asset Category</b>	<b>Minimum*</b>	<b>Target</b>	<b>Maximum*</b>
Total Equity	48.0	53.0	58.0**
Fixed Income	13.0	15.0	17.0
Opportunistic/Alternatives	N/A	5.0	N/A
Real Assets***	N/A	15.0	N/A
Private Equity	N/A	12.0	N/A
Cash Equivalents	0.0	0.0	5.0

\* Due to the illiquid nature of opportunistic/alternatives, real assets, and private equity, it is not prudent to set rebalancing ranges for these asset classes

\*\*Additional allocations to total equity may be made beyond the maximum range to serve as a placeholder for unfunded and uncommitted opportunistic/alternatives, real assets, and private equity

\*\*\*Real assets includes real estate, timber, agriculture, and infrastructure

#### D. Rebalancing

1. The asset allocation ranges established by the Board represent the Board's judgment of a portfolio mix that provides the greatest risk/return value. Allowing the portfolio to exceed the Board limits strays from the financial discipline, which the Board believes will - over time - provide the appropriate risk-adjusted return to the System.
2. The Executive Director is responsible for rebalancing the allowable asset classes and the individual portfolios if any of the asset classes falls outside of the designated range. The general investment consultant shall provide guidance and advice to the Executive Director to best achieve the rebalancing.
3. Rebalancing among individual investment manager portfolios within asset classes may also be necessary to ensure the appropriate level of diversification is achieved by investment style, market capitalization or risk levels (see total asset class guidelines) and/or to take advantage of market conditions, fund manager expertise, opportunities, or other circumstances that could be beneficial to ATRS.
4. The Executive Director may rebalance across all equity managers, all equity holdings, all fixed income managers, and all fixed income holdings. A Board approved transition manager may be used for

rebalancing. Rebalancing including the use of a Board approved transition manager, as needed, may be initiated by the Executive Director after recommendation from the appropriate investment consultant and positive notice to the Board Chair. The Executive Director and general investment consultant will monitor the asset values by classification for each asset manager on a monthly basis, based on month-end data provided by the custodial bank. The Executive Director and general investment consultant shall regularly inform the Board on the rebalancing pacing and strategy.

5. Whenever the minimum or maximum range of total equity or fixed income has been exceeded, a transfer of funds or other appropriate action will occur to bring the actual allocation within the prescribed range within a time frame determined to be prudent by the Executive Director in consultation with the general investment consultant.
6. Normal plan cash flows should be used to the extent possible to rebalance. Interest, dividends, and plan contributions should be used to the extent possible to fund asset classes that are below their target. Withdrawals should be made from asset classes that are above their target.

#### E. Investment Manager Selection

1. In order to implement its investment strategy, the System will use individual investment managers. Arkansas Code § 24-~~2-6103-401~~ et seq. requires ATRS to always operate under the prudent investor rule. The prudent investor rule requires all investment decisions to be made based on the experience of management, rates of return, appropriate risk, reasonable cost, and all other relevant factors that should be used by prudent investors.
2. It is the policy of the Board to include, whenever appropriate, qualified minority-owned and women-owned business enterprises in the System's investment manager selection process and to objectively evaluate all qualified investment manager candidates regardless of race, gender or disability.
3. The Board will evaluate all qualified investment manager candidates with emphasis on demonstrated professional performance, organizational depth, institutional investment management capability, and reasonableness of fee structure regardless of the amount of investment assets under management or the age of the investment management firm.
4. The Board will use professional consultants that do not use discriminatory practices in the creation and maintenance of their investment manager databases and will require the investment

consultants to affirm their use of non-discriminatory practices when recommending investment manager candidates to the Board.

#### F. Goals

1. Recognizing the purpose of the System is to remain actuarially sound and pay member benefits, the overall investment goal is to achieve, over a period of years, the greatest rate of return for the System with due consideration given to preserving capital and its purchasing power, and to maintain an appropriate level of risk consistent with the obligations of a prudent investor. The return of the System should exceed, net of fees, a policy benchmark comprised of the respective asset class benchmarks weighted by the asset class policy targets over a full market cycle (approximately five years). During periods of transition to and from nonmarketable and illiquid asset classes such as private equity and real assets, actual allocations may be used over extended periods to reflect these changes in the policy targets. Periodic performance reports will provide a detailed description of the policy benchmark composition over time.
2. The System's actuary sets an expected return based on the Board's policy decisions. Market cycles may result in the System earning a return materially above or below the actuarial rate of return for extended periods of time. Therefore, the actuarial rate of return will not be used for performance comparison purposes.

#### G. Total Equity

1. The total equity exposure of the portfolio shall be well diversified with broad exposures to small, mid, and large capitalization companies and growth and value style sectors across U.S. and non-U.S. markets.
2. The goal for total equity shall be to achieve a total rate of return that will exceed, net of all fees and costs, the return of the aggregate global equity market as measured by the Morgan Stanley Capital International (MSCI) All Country World Index (ACWI) Investable Market Index (IMI) over a full market cycle (approximately five years). Because the total equity portfolio was previously segregated into domestic and global equity components, the total equity portfolio has a bias to domestic equity relative to the MSCI ACWI IMI. Therefore, to ensure appropriate performance measurement, the benchmark for total equity will be appropriately weighted between the Dow Jones U.S. Total Stock Market Index and the MSCI ACWI IMI Index to reflect the current domestic / global asset mix until the domestic allocation is in line with the global opportunity set as defined by the MSCI ACWI IMI. The manager structure of the total equity portfolio should resemble the weighted average of their respective benchmarks and avoid any

material biases due to a concentration of managers or management styles. To achieve this goal, the Board may employ various actively managed and passive mandates. The structure of the equity component will be analyzed annually to ensure proper diversification is achieved.

#### H. Fixed Income

1. The manager structure of the aggregate fixed income portfolio's risk exposure should resemble the aggregate domestic fixed income market as measured by the Barclays U.S. Universal Bond Index. To help achieve this goal, the Board will employ investment managers that invest assets in a broad array of sectors (government, mortgage backed, credits, asset backed, and commercial mortgage backed bonds), maturities, and credit qualities so that the overall portfolio structure is not materially different from that of the domestic and global fixed income markets. To provide a broad base of low-cost diversification and readily available liquidity, the Board may allocate a portion of the fixed income assets to a passive investment portfolio that approximates the return of the broad fixed income market.
2. The goal for fixed income investments shall be to achieve a total rate of return that will exceed, net of all costs and fees, the return of the Barclays U.S. Universal Bond Index over a full market cycle (approximately five years).

#### I. Opportunistic/Alternative Investments

1. The Opportunistic/Alternatives asset class may include investments in direct hedge funds, hedge fund of funds, commodities, currency mandates, and other alternative strategies that are not closely correlated or related to the traditional asset classes (fixed income, equities, private equity, and real assets). Unique investments that do not fit within the other asset class categories may also be included in the Opportunistic/Alternative category at the Board's discretion. Because this category may include illiquid investments made through closed end investment partnerships, it may take a period of time to reach and maintain the target allocation of 5%. Assets will be invested in the total equity asset class when the opportunity/alternative allocation is below its long-term target of 5%. The benchmark for the category will be a weighted average of the benchmarks of the underlying strategies.
2. The goal of the credit, global macro, and other liquid alternative investments shall be to achieve a total rate of return that will exceed, net of all fees and costs, the return of the appropriate institutional quality hedge fund index over a full market cycle (approximately five

years). Appropriate benchmarks will be determined as investments are added to the portfolio.

#### J. Real Assets

1. The Real Asset category may include real estate, timber, agriculture, and infrastructure. While no fixed targets are set, the following general parameters have been identified:

- 10% Real Estate
- 2% Timber
- 1% Agriculture
- 2% Infrastructure

The total target of the asset class will be 15%. Because this category may include illiquid investments made through closed end investment partnerships, it will take a period of time to reach these targets. Assets will be invested in the U.S. equity asset class until the total target is attained.

The System may initiate investments in real estate as governed by the Real Asset Statement of Investment Policy. The System's goal for real estate is to not materially exceed the System's approved target asset allocation for total real estate investments as determined by the Board at the beginning of each fiscal year. Should the real estate target asset allocation be exceeded, the Executive Director, working with the Real Estate Consultant, shall develop a pacing and strategy plan to address the over allocation.

ATRS' Real Estate portfolio is benchmarked on a net of fee basis against the NCREIF Fund Index Open-end Diversified Core Equity Index ("NFIODCE"). Once ATRS' Real Estate portfolio reaches its full target allocation for a five year period, it is expected to meet or exceed the NFIODCE over rolling five year periods.

The System may initiate direct ownership in timberland or indirect investments in fund of funds, partnerships, corporations, or real estate investment trusts ("REITs") investing in investment grade properties of like kind.

2. The goal of the timberland investments shall be to achieve a total rate of return that will exceed, net of all fees and costs, the return of the NCREIF Timberland Property Index ("NTPI") over a five year rolling period weighted according to ATRS' regional exposure based on Net Asset Value.

The goal of the agriculture investments shall be to achieve a total rate

of return that will exceed, net of all fees and costs, the return of the NCREIF Farmland Index ("NFI") over a five year rolling period weighted according to ATRS' regional and crop type exposure based on Net Asset Value.

The goal of the infrastructure investments shall be to achieve a total rate of return that will exceed, net of all fees and costs, the return of the Consumer Price Index (CPI) plus 5 percentage points over a full market cycle (approximately ten years). The Consumer Price Index plus 5 percentage points will be used as the benchmark to reflect the opportunity cost of investing in infrastructure. Similar infrastructure programs of institutional investors will also be used as a secondary benchmark to the extent such data is made available.

The ATRS Total Real Asset Benchmark is weighted by the allocations based on Net Asset Values across the various sub-categories, and thus defined as Real Estate benchmark, Timber benchmark, Agriculture benchmark and Infrastructure benchmark. The net of fee return for ATRS' Total Real Asset Portfolio is expected to meet or exceed the Total Real Asset Benchmark over rolling five year periods.

#### K. Private Equity

1. The System may initiate investments in private equity as governed by the Private Equity Statement of Investment Policy. Private equity investments may include domestic and foreign private equity partnerships, venture capital, and mezzanine financing partnerships that are intended to diversify the assets and reduce the likelihood of material losses in any individual investment classification. The investment consultant responsible for private equity shall advise the Executive Director and Board on the Private Equity Statement of Investment Policy and the structure of private equity investments best suited for the System.
2. The System's goal for private equity investments is to achieve a total rate of return that will exceed, net of all costs and fees, the return of the public equity markets, as measured by the Dow Jones U.S. Total Stock Market Index, plus a liquidity premium of 2 percentage points per year over a full market cycle for private equity (approximately ten years).

#### L. Cash Equivalents

1. The System may hold direct ownership in short-term investments or may permit or require managers to hold cash or cash equivalents to meet liquidity needs of the investment manager or of the System.
2. The System's cash management goal shall be to preserve capital and

maintain liquidity.

#### M. Arkansas-Related Investments

1. The System may initiate Arkansas-related mortgage loans, promissory notes, direct real estate investments, or purchase insured certificates of deposit or short term securities of Arkansas financial institutions to meet the goals of the mandated requirements. Arkansas-related investments are categorized according to the appropriate asset class for each investment. In addition, Arkansas related investments include, but are not limited to, investments managed by an Arkansas related manager, Arkansas related investments held by other fund managers, Arkansas timberland, partnerships based in Arkansas, and partnerships holding Arkansas properties.

#### N. Commingled or Mutual Funds

1. If a commingled fund or mutual fund is utilized, the portfolio will be governed by the prospectus or similar document for the fund. In those cases, the System will utilize the prudent investor rule and advice of the investment consultant in selecting and evaluating funds initially and in monitoring them on an on-going basis.

#### O. Derivatives

1. Derivatives may be used to reduce the risk in a portfolio and provide desired market and security level positions as an alternative to purchasing cash securities. Excessive leverage shall not be created through the use of derivatives in a manner that substantially increases the System's portfolio risk. Each investment manager's derivative usage shall be specified in the investment management agreement or specific guidelines.
2. The use of futures and options shall be matched by cash or cash equivalent securities, and all short futures positions shall be matched by equivalent long security positions, unless otherwise stated in the investment manager guidelines or authorizing fund documents.

#### P. Loaning of Securities

1. The lending agent will evaluate the credit-worthiness of potential borrowers of securities, and will loan securities only to financially sound borrowers. The lending agent will maintain a diversified list of such borrowers in order to mitigate the counterparty risk that is inherent in securities lending.
2. Collateral levels should be based on the nature of the loaned security and will generally be between 102% and 105% of the market value of the borrowed security. Marking to market will be performed every

business day subject to de minimis rules of change in value, and borrowers will be required to deliver additional assets as necessary to maintain overcollateralization of securities loans.

#### Q. Securities Lending Reinvestment Guidelines

1. The cash collateral portfolio will be managed on an amortized cost basis (maintain a \$1 net asset value) and have investment guidelines that are 2a-7-like in nature (money market fund guidelines) to ensure that only a moderate amount of risk is taken on the reinvestment of the cash collateral. This will control the amount of credit and duration risk that can be taken by the short duration fixed income manager, which will help to mitigate losses due to insufficient collateral relative to the amount on loan. In addition, guidelines for the cash collateral portfolio will be created in conjunction with the lending strategy and with input from the securities lending agent.
2. The collateral pool should also maintain a reasonable level of overnight liquidity in order to allow for the smooth recall of securities over time.

#### R. Investment Manager Reporting

1. The System will require all investment managers, managing partners, and general partners to provide on at least a quarterly and an annual basis, reporting appropriate for the investment.

#### S. Roles

1. The Executive Director and investment consultant are jointly responsible for the initial selection of investment managers and any increase or decrease in an investment manager's funding. The Executive Director and investment consultant are jointly responsible for monitoring existing investment managers on performance, stability, and compliance. The Executive Director and investment consultant may also recommend termination of an investment manager when circumstances justify termination. Reasons for termination include, but are not limited to, relative performance, relative stability, costs, strategic allocation of assets, or other relevant factors that a prudent investor would use.

#### T. Proxies

1. The System authorizes the investment manager to vote all proxies related to stocks in which it invests the System's assets. The System expects the investment manager to cast votes solely in the best interest of plan beneficiaries.

#### [U. Soft Dollars](#)

1. Commissions paid by investment managers for the purchase of equity securities are System assets and must be used for the sole benefit of the System members. Whenever possible, investment managers should seek to execute trades at the lowest possible commission rate but not to the detriment of best execution, which can result in a higher cost to the System. So that the Board may fulfill its obligation to ensure that System assets are being used appropriately, relevant equity investment managers shall provide periodic reports to the general investment consultant on brokerage activity, commissions, services, and such other information as may be requested by the investment consultant or Board. The investment consultant shall provide a periodic report to the Board summarizing such equity investment managers' reports and highlighting any questionable or problem areas.

## **HISTORY**

Amended: October 4, 2010

Amended: February 7, 2011

Amended: June 3, 2013

Amended: October 7, 2013

Amended: February 17, 2014

Amended: June 1, 2015

Amended: April 21, 2016

Amended: November 13, 2017

Amended: April 1, 2019

# **ATRS Board Policy 5**

## **PRIVATE EQUITY INVESTMENT POLICIES**

A.C.A. § 24-7-305

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### **I. Board – Investment Policies and Procedures**

#### **A. Private Equity Investment Policies**

1. The following private equity investment policy ("the Policy") serve to provide direction to Arkansas Teacher Retirement System ("ATRS"), its Investment Committee, its Board, its pension staff and its advisors in the investment and management of its private equity portfolio. This policy is to be considered an extension of ATRS' general Statement of Investment Policy.
2. ATRS has engaged an advisor as a consultant, with specialization in the field of private equity to perform due diligence, select investments, assist in negotiation of business terms and conditions, and monitor the portfolio of private equity investments.

#### **B. Rationale for Development of the Private Equity Program ("the Program")**

1. The private equity asset class offers the potential for significantly greater returns than those available in traditional public equity and debt security markets. The potential returns are commensurate with the higher risks of this asset class, such as illiquidity, limited regulatory oversight or reporting standards.

#### **C. Formal Definition of Private Equity**

1. ATRS generally makes private equity investments through private placements of limited partnership interests or similar vehicles. These partnerships, in turn, make privately negotiated direct investments in operating companies whose securities are generally not publicly traded on organized exchanges.
2. Private equity direct investments may involve the financing of new or emerging businesses, as well as corporate restructurings of established companies, through the financing of acquisitions, spin-offs or mergers. Private equity investments are accomplished almost exclusively through private offerings of debt or equity interests in operating companies.
3. Within this asset class, the following categories of private equity strategies shall be eligible for investment by ATRS:

Venture capital funds;

Buyout and growth capital funds;

Mezzanine debt funds;

Distressed debt and turnaround funds; and

Any other private investment strategy approved by ATRS.

#### D. Allocation to the Asset Class

1. ATRS' Board, in conjunction with the most recent asset allocation review performed by its general investment consultant, has specified a target allocation of ~~12~~14% of total assets for private equity. This target allocation may be reviewed from time to time to determine its appropriateness in light of current market conditions, changes in ATRS' investment return objectives and liquidity requirements, and other relevant factors.

#### E. Investment Objectives

1. The primary investment objective for ATRS' private equity portfolio is to maximize total risk-adjusted return. For purposes of this Policy, short term fluctuations in value will be considered to be secondary to the attainment of long-term investment returns with safeguards against the loss of capital.

2. The private equity portfolio shall be managed to achieve:

A long-term return net of fees and expenses equal to or greater than the 10-year compound total annual return of the Dow Jones U.S. Total Stock Market index plus a spread of 200 basis points;

A consistent flow of qualified investment opportunities that represent the most attractive investment vehicles currently available in the marketplace; and

A diversified and balanced portfolio so that the risks inherent in these illiquid and long-lived assets may be minimized.

3. The determination of the target expected rate of return on any individual investment shall be based upon the particular investment strategy employed:

For equity oriented investments, the expected long-term return should equal or exceed 20% per annum, net of fees.

For debt oriented investments, the expected long-term return should equal or exceed 15% per annum, net of fees.

4. Additionally, investments should comply with all applicable laws, regulations and policies with respect to investment of ATRS' assets.

5. ATRS may waive any of the foregoing criteria, provided that sufficient security provisions can be demonstrated.

F. Diversification Guidelines

1. Portfolio Diversification. While manager selection takes precedence in the investment process, the private equity portfolio should be prudently diversified among private equity strategies. In order to achieve a diversified private equity portfolio, the following sub-allocations shall be used as an overall target for commitment levels within the portfolio:

<b>Segment</b>	<b>Long-Term Allocation Ranges</b>
Corporate Finance*	80% - 100%
Venture Capital	0% - 20%

\* Includes buyout, turnaround and debt related strategies

<b>Region</b>	<b>Long-Term Allocation Ranges</b>
U.S. and Western Europe	80% - 100%
Other	0% - 20%

Appropriate consideration should be given to prevailing market conditions or other circumstances which may warrant a temporary departure for the recommended ranges.

2. Restricted Activities. Investments which shall not be eligible for initial evaluation or potential funding commitments are:

Investments representing direct equity ownership in individual companies or other business entities, without the benefit of an intermediate partnership or other indirect ownership structure. However, this exception shall not include direct equity ownership which results from the distribution of securities from partnerships to ATRS; and

Investments which would violate resolutions passed by ATRS' Board

3. ATRS may elect to waive certain of the foregoing prohibitions, provided that sufficient security provisions or other mitigating factors can be demonstrated. Such waivers shall be contingent upon full review and approval by ATRS.

G. Private Equity Investment Process

In order to achieve the investment objectives described above, a consistent investment evaluation process will be applied to all investment opportunities for the Program. This process will be executed by the consultant and shall include the following components:

1. Prudent, formalized investment due diligence. Comprehensive due diligence is essential to screening and selecting investments suitable

for the private equity portfolio. Criteria to be considered during the due diligence process will consist of:

- a. Relevant experience of the investment sponsor or principals. In particular, the investment sponsor or principals must demonstrate:
    - The requisite skills to be able to successfully execute the proposed investment strategy, including evidence of their ability to work together cohesively;
    - Independence from other interests which may conflict with representation of the investors; and
    - Successful investment results in applicable prior project(s).
  - b. Adequacy and depth of the investment sponsor's organization and resources to execute the stated investment strategy, including back office and fund reporting and administration infrastructure;
  - c. Professional reference and background checks to confirm the integrity and character of the principals;
  - d. Viability of the investment premise and strategy, including analysis of, and market research covering, the general investment environment related to the proposed strategy;
  - e. Assessment of historical and projected investment returns, risk factors and exit strategies; and
  - f. Assessment of compliance with all federal, state and local regulatory/legal requirements.
2. Review and negotiation of key investment terms and provisions in order to provide maximum investor protection and value.

The agreements governing a private equity investment shall feature acceptable provisions concerning termination of commitments, winding-up procedures, responsibilities of management, the determination of distributions of earnings and capital to investors and the investment sponsor, management fees, carried interest and other fees, freedom from potential conflicts of interest, co-investment policies and tax considerations. Procedures to be employed by the consultant and ATRS will comprise:

- a. In-depth review of all investment offering documents for identification of key investment terms and provisions offering the opportunity for improved investor protection;
- b. Evaluation of the terms of the offering document which govern all remuneration, payment of investment returns, and return of capital to the principals, sponsors, or general partners in comparison to

- limited partners or financial investors;
  - c. Comparison of remuneration of the sponsor's principals or general partner with those of similar parties in comparable investments;
  - d. Comparison of distribution policies of the investment with those of other private equity funds; and
  - e. Direct negotiation with investment sponsors for amendments/enhancements to investment structure and terms.
3. **Portfolio Suitability.** The prospective investment should be compatible with other private equity investments held by ATRS in order to achieve appropriate diversification in terms of investment strategy, industry focus, stage of development of portfolio companies, and geographical focus.
  4. **Investment Size.** ATRS shall, in general, make commitments of at least \$10 million. In general, ATRS shall not make commitments to primary funds which exceed an amount equal to 15% of the total amount raised for a proposed fund, but in no event shall investments exceed 35% of the amount raised for a primary fund. Additionally, ATRS shall limit aggregate new commitments to a single investment sponsor to 35% of total Program allocation.

#### H. Risk Guidelines for Investment Opportunities

The private equity asset class carries a higher degree of potential investment risks. Investment risks shall be assessed by ATRS and the consultant for each private equity investment opportunity. Each investment shall be reviewed concerning the following risk categories and risk factors:

1. **Investment Risks Pertaining to the Specific Investment Opportunity.**
  - a. Events which could cause an investment to fail to meet expected levels of return or to return original commitments and lead to loss of capital;
  - b. Events which could lead to illiquidity of underlying assets or ineffectiveness of the exit strategies;
  - c. Characteristics of the investment which might lead to imprudent diversification within the partnership itself, or the expected diversification that an investment is expected to afford the overall private equity portfolio; and
  - d. Changes in circumstances, including investment sponsor management, which could lead to the possibility that the execution of an investment fund's strategy could be jeopardized.
2. **Risks Pertaining to the Structure of the Overall Portfolio.**

- a. Consistent with the sub-allocations guidelines discussed above, ATRS shall avoid imprudent concentration of the private equity portfolio in any single investment strategy, industry or geographical region.

#### I. Portfolio Monitoring Guidelines

ATRS will follow procedures to minimize the inherent risks associated with this asset class. Certain of the principal risks have been enumerated in the risk guidelines set out in Section VIII. In addition, all phases of investment monitoring shall conform in their entirety to the "prudent investor" rule. These procedures shall be the responsibility of the consultant and shall include:

1. Periodic communication with investment sponsors, in order to obtain timely information on investment performance;
2. Quarterly and annual reporting to ATRS on investment performance and valuations, including summaries of material investment activities, key issues, economic outlooks, and other factors affecting the investment;
3. Analysis of special situations or circumstances requiring decision-making by ATRS, as required, including legal amendments and special investment opportunities.;
4. Where requested by ATRS, attendance at investor meetings on its behalf;

#### J. Authority to Make Investments

The final authority to make investment commitments under the private equity asset allocation shall be vested solely with the Board. No other party shall have discretionary control to commit new funds in this class.

#### K. Review and Modification of Private Equity Policy

This policy shall be reviewed periodically by the ATRS staff, the general consultant and the private equity consultant, to determine any additions or modifications that may be required.

### **HISTORY**

Adopted: December 3, 2007

Amended: October 4, 2010

# ATRS Board Policy 6

## REAL ASSETS INVESTMENT POLICIES

A.C.A. § 24-7-305

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### I. Board - Investment Policies and Procedures

#### A. Real Assets Investment Policies

##### 1. Scope

This policy applies to the Real Asset category ("Real Assets") of the Arkansas Teacher Retirement System's ("ATRS") investment portfolio. This policy governs the private market investments and not the public real asset securities exposure within the Domestic Equity or Global Equity asset classes.

##### 2. Purpose and Objectives

The purpose of this statement of investment policy is to formalize the ATRS' Board of Trustees' (the "Board") investment objectives, policies, and procedures, with respect to Real Assets, and to define the duties and responsibilities of the various entities involved in the Real Assets investment process. This statement is to be considered an extension of ATRS' general Statement of Investment Policy.

#### B. Investment Philosophy

1. ATRS allocates a portion of its total assets to Real Assets. ATRS defines Real Assets as investments relating to the ownership, financing, or operation of real estate, timber, agriculture, and infrastructure assets. ATRS allocates capital to Real Assets with the following goals:

##### a. *Diversification with Other Asset Classes*

Real Asset returns have historically performed differently than the returns of other asset classes in which ATRS invests. ATRS believes that Real Asset returns will continue to perform differently than those of other asset classes, allowing ATRS to lower the risk of its overall portfolio through diversification by allocating to the asset class.

##### b. *Potential Inflation Hedge*

Real Asset returns have historically shown the ability to provide a hedge against rising inflation. By allocating a portion of its investments to an asset class with these characteristics the overall risk of rising inflation to the ATRS portfolio is reduced.

### C. Allocation

1. ATRS controls allocation risk at the total fund level. The allocation establishes a 15% target for the Real Asset class. As provided in ATRS' general Statement of Investment Policy, a range of minimum and maximum relative to the target has not been set as it is not prudent to set rebalancing ranges for the real asset classes due to their illiquid nature. This target allocation is to be reached and maintained over a reasonable period of time using a pacing schedule established by the joint effort of the Executive Director and Real Asset Consultant. There will be no fixed targets for the Real Assets subasset classes but the following general parameters have been identified for the Real Asset subasset classes:

- 10% Real Estate
- 2% Timber
- 1% Agriculture
- 2% Infrastructure

### D. Performance Benchmark

1. ATRS' Real Asset portfolio is benchmarked on a net of fee basis against the following sub-asset class benchmarks over rolling five year periods.

- a. Real Estate Benchmark: The net return for ATRS' real estate investments is expected to meet or exceed the net NCREIF Fund Index Open-end Diversified Core Equity Index ("NFI-ODCE") over five year rolling period.
- b. Timber Benchmark: The net return for ATRS' timber investments is expected to meet or exceed the NCREIF Timberland Property Index ("NTPI") over a five year rolling period weighted according to ATRS' regional exposure based on Net Asset Value.
  - Given the highly concentrated nature of the NTPI, it is advised that an additional performance measurement tool be utilized in order to gauge the timber portfolio's performance compared to the opportunity cost of investing in timber. The Consumer Price Index plus 500 basis points will be used for measurement.
- c. Agriculture Benchmark: The net return for ATRS' agriculture investments is expected to meet or exceed the NCREIF Farmland Index ("NFI") over a five year rolling period weighted according to ATRS' regional and crop type exposure based on Net Asset Value.
  - Much like NTPI, NFI also has a concentrated nature and it is

advised that an additional performance measurement tool be utilized in order to gauge the agriculture portfolio's performance compared to the opportunity cost of investing in agriculture. The Consumer Price Index plus 500 basis points will be used for measurement.

d. Infrastructure Benchmark: Over the long term (10 years or longer), the infrastructure portfolio is expected to generate a minimum internal rate of return ("IRR") equal to the Consumer Price Index plus 500 basis points, net of all investment management fees and expenses. The Consumer Price Index plus 500 basis points will be used as the benchmark to reflect the opportunity cost of investing in infrastructure.

2. The ATRS Total Real Asset Benchmark is weighted by the allocations based on Net Asset Values across the various sub-categories, and thus defined as Real Estate benchmark, Timber benchmark, Agriculture benchmark, and Infrastructure benchmark. The net of fee return for ATRS' Total Real Asset Portfolio is expected to meet or exceed the Total Real Asset Benchmark over rolling five year periods.

#### E. Portfolio Composition

1. The majority of the Real Asset class investments should consist of equity ownership of privately-held institutional real estate, timber, agriculture, and infrastructure investments.

2. This policy authorizes the use of all types of investment structures including, but not limited to:

- Separate Accounts
- Co-investments
- Joint ventures
- Open and closed-end funds
- Partnerships
- Private and public Real Estate Investment Trusts ("REITs") and Real Estate Operating Companies ("REOCs")
- Listed or publicly traded infrastructure

#### F. Risk Management

1. For ATRS' Real Asset investments, the following sections identify the most significant risks and the method of control. Compliance with the following risk parameters shall be based on the percentage of ATRS' Real Asset portfolio's Net Asset Value at Fair Value at the end of each

quarter.

a. *Investment Manager Diversification*

Investment manager risk consists of two elements: the exposure to an investment manager and the number of investment managers in ATRS' Real Asset portfolio. To control investment manager exposure, the allocation to a single Real Asset manager is limited to 30% of ATRS' Real Asset target allocation.

b. *Individual Investment Diversification*

In order to mitigate the risk of large losses, ATRS will diversify its Real Asset investments across many different individual investments. Individual investments, measured by gross asset value, shall not exceed 10% of the overall Real Asset target allocation. For Real Estate, the 10% individual investment limitation will apply to Core properties, but Non-Core properties will be limited to 5%. Core properties are defined as industrial, apartment, retail, and office portfolios that are at least 80% leased, located in major metropolitan areas, and use no more than 50% leverage. Non-core is defined as the remainder of the Real Estate property opportunity set.

c. *Liquidity*

The majority of Real Assets are illiquid. As such, ATRS understands and recognizes that the Real Asset class will not be structured in a way to provide liquidity. Should market values for the Real Asset class change such that the asset class falls outside of these and the below risk management parameters, the Executive Director and Real Asset Consultant will determine the most effective solution and timeframe to bring the Real Asset exposure into compliance.

2. Additional risk parameters at the subasset class level are defined below and compliance shall be based on the percentage of each subasset class' Net Asset Value at Fair Value at the end of each quarter:

a. Real Estate:

*Property Diversification* - ATRS seeks to minimize the risk of its Real Estate portfolio by allocating its assets across the spectrum of property types, with the majority of its investments allocated to the primary sectors of the NFI-ODCE. No single traditional property type shall account for greater than 50% of the portfolio. In addition, the allowable range of property type allocations will be 0.5x - 1.5x the NFI-ODCE's weight in each property type.

*Geographic Diversification* - The Plan seeks to minimize the risk of its real estate portfolio by allocating its investments across the geographic spectrum. Within the United States, the allowable range of geographic allocations will be 0.5x - 1.5x the NFI-ODCE weight in each region. With respect to non-U.S. investing, no more than 40% of the portfolio may be invested outside of the U.S. ATRS may initiate Arkansas-related mortgage loans and direct Real Estate investments to meet the goal of investing in quality Arkansas related investments. The Executive Director and Real Estate Consultant will monitor the Arkansas-related Real Estate holdings to protect against excessive risk due to sector or geographic exposure. The goal of Arkansas-related investments shall be to achieve a total rate of return, net of all fees and costs that will exceed the real estate performance benchmark over time.

*Leverage* - ATRS allows some of its investment managers the ability to use modest amounts of leverage in their investment strategy as a means of enhancing the overall risk-adjusted returns available to ATRS. In keeping with its goal of risk mitigation, leverage at the total asset class level will be kept below a 50% loan-to-value ratio.

*Life Cycle* - ATRS will endeavor to invest the majority of its assets in fully established, income-producing Real Estate, commonly referred to as Core Real Estate. As defined above, the ATRS goal will be to have between 50% and 70% of its Real Estate asset class in Core investments. Non-Core opportunities, such as Value Added and Opportunistic real estate strategies, may provide better alpha generation but will be viewed tactically and have an operating allocation range of 30% to 50% of the real estate portfolio.

b. Timber:

*Geographic Diversification* - The Plan seeks to minimize the risk of its timber portfolio by allocating its investments across the geographic spectrum. Within the United States, the allowable range of geographic allocations will be 0.5x - 1.5x the NCREIF timberland index weight in each region.

c. Agriculture:

*Crop Diversification* - The majority of the portfolio will be comprised of existing crop properties. With the exception of the portfolio creation stage, no crop shall comprise in excess of 50% of the agriculture portfolio.

*Geographic Diversification* - Investments will be primarily located within the continental United States. Properties located within the

state of Arkansas are preferred within a prudent range of exposure for the total portfolio. It is desired that the investments will have attractive locations with good market access. No region, as defined by the NCREIF Farm Index regional definitions, will comprise more than 50% of the agriculture portfolio.

*Leverage* - The agriculture portfolio will remain unlevered unless approved by ATRS.

- d. Infrastructure: ATRS will use diversification of its infrastructure portfolio as a risk mitigation tactic. Relevant risk factors considered are strategy, manager, firm, vintage year, asset type, geographic and liquidity issues. However, initial allocations during early implementation may result in temporary variances.

*Strategy* - The portfolio should be appropriately diversified across infrastructure asset classes and vehicles due to various risk/return characteristics.

*Manager* - Manager risk consists of two elements, the exposure within an investment vehicle, and the number of managers (general partners) in a given infrastructure fund. The exposure to a specific manager within an investment vehicle is controlled by limiting its commitment size. The cohesion of the general partners and the vesting rights to interest carry are important elements of insuring a successfully performing general partnership as are the past success of the business model employed and the length of time the team has remained stable.

*Vintage* - Vintage reflects the year of first capital draw and vintage risk refers to the variability of infrastructure commitments over time. Commitments to partnership investments will be staged over time such that the infrastructure portfolio invests over business cycles and insulates the portfolio from event risk.

*Asset Type* - Typically, infrastructure partnerships are permitted to invest in assets in a wide variety of industries (Transportation, Energy/Utility and Other) with limited controls. Risk from investing in assets with different return characteristics is controlled primarily through appropriate diversification across business sectors and sub-sectors. No infrastructure asset class shall account for more than 70% of the portfolio.

*Geographic* - Over the long-term, the infrastructure portfolio should seek diversification with regard to major regional areas both domestically and internationally. The infrastructure portfolio will accept the currency risks consistent with the geographic constraints. Infrastructure partnerships generally do not hedge

currency risk, though with increasing globalization, one can see this practice increasing. With respect to non-U.S. investing, no more than 50% of the portfolio may be invested outside of the U.S.

#### G. Distinction of Responsibilities

1. The Board, as Trustees, is responsible for approving the Real Asset Statement of Investment Policy.
2. ATRS' Board of Trustees is responsible for selecting the investment managers used to implement the Real Asset Statement of Investment Policy.
3. ATRS' Investment Staff and the Real Asset Consultant are jointly responsible for recommending the Investment Managers to the Board, as well as managing the Real Asset class, as described by the Real Asset Statement of Investment Policy, on an on-going basis, including monitoring the investment managers.
4. The Real Asset Consultant will assist ATRS' Investment Staff in recommending investment managers to the Board, monitoring investment managers, presenting Real Asset class performance to the Board, and will assist Investment Staff in developing and recommending the Real Asset Statement of Investment Policy and any changes to this document.
5. Investment Managers are utilized by ATRS to implement the specific investment strategies selected by ATRS.

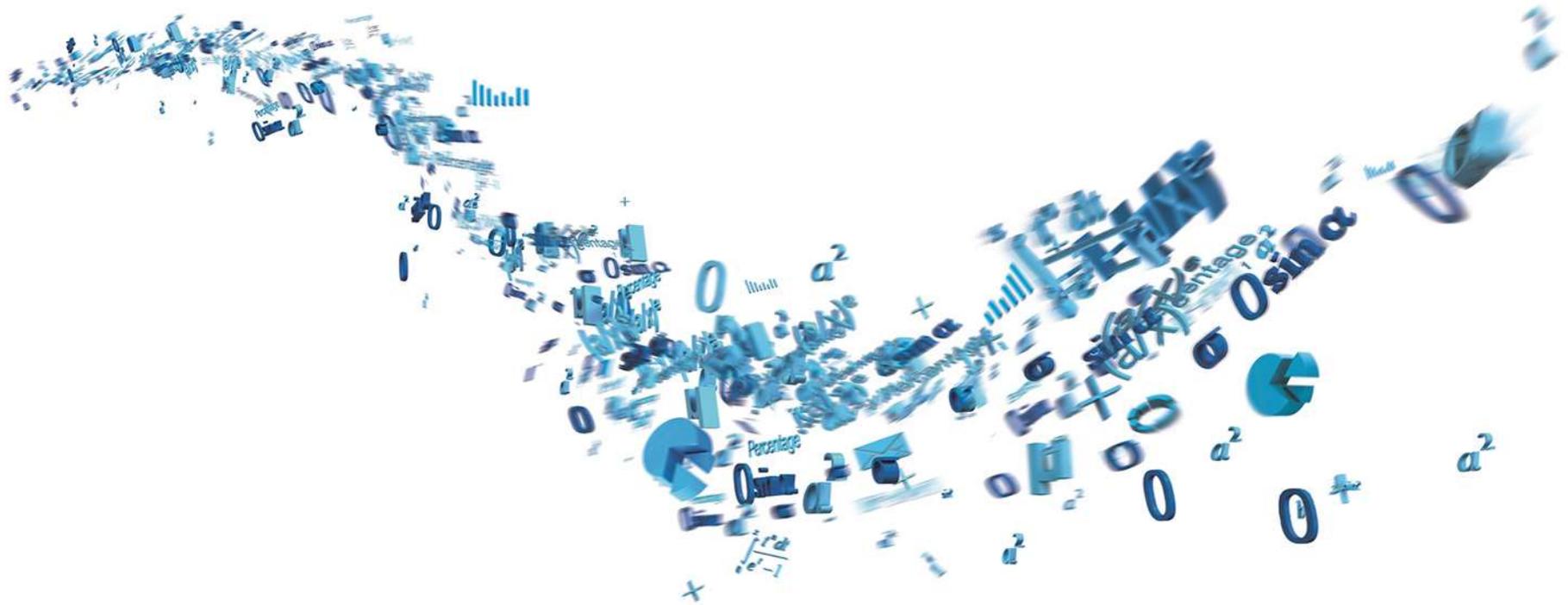
#### H. Reporting and Monitoring

1. The Investment Staff and the Real Asset Consultant will monitor performance on a quarterly basis, providing a quarterly report to the Board. The report will provide a comprehensive review of the Real Asset portfolio in a form approved by ATRS' Investment Staff and the Real Asset Consultant.

#### **HISTORY**

Adopted October 7, 2013

Adopted October 5, 2015



Arkansas Teacher Retirement System | Fourth Quarter 2019

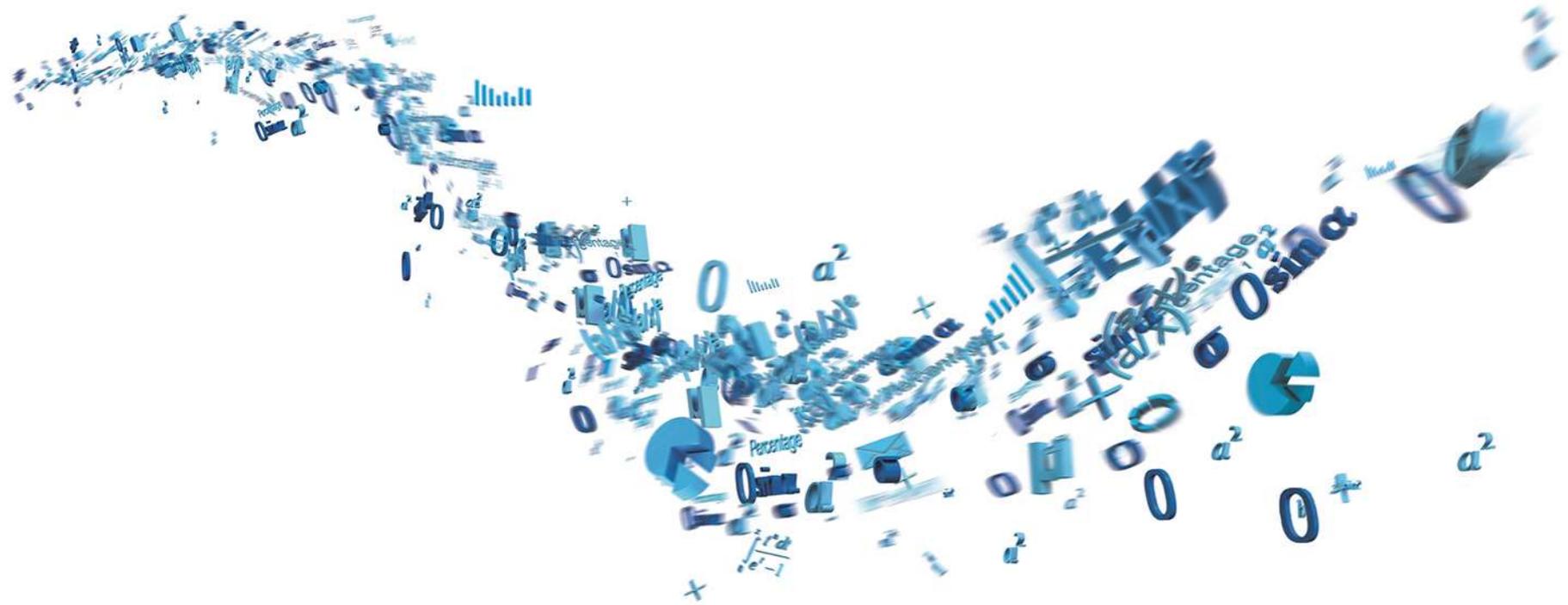
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## Quarterly Investment Review

Visit the *Retirement and Investments Thought Leadership Site* (<https://retirement-investment-insights.aon.com>); sharing our best thinking.

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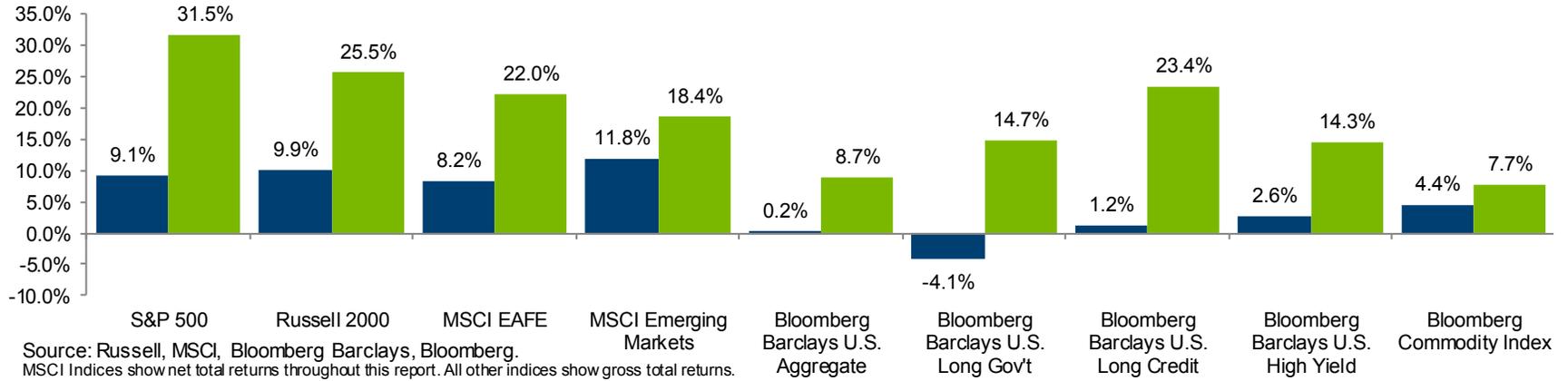
# Executive Summary

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# Market Highlights

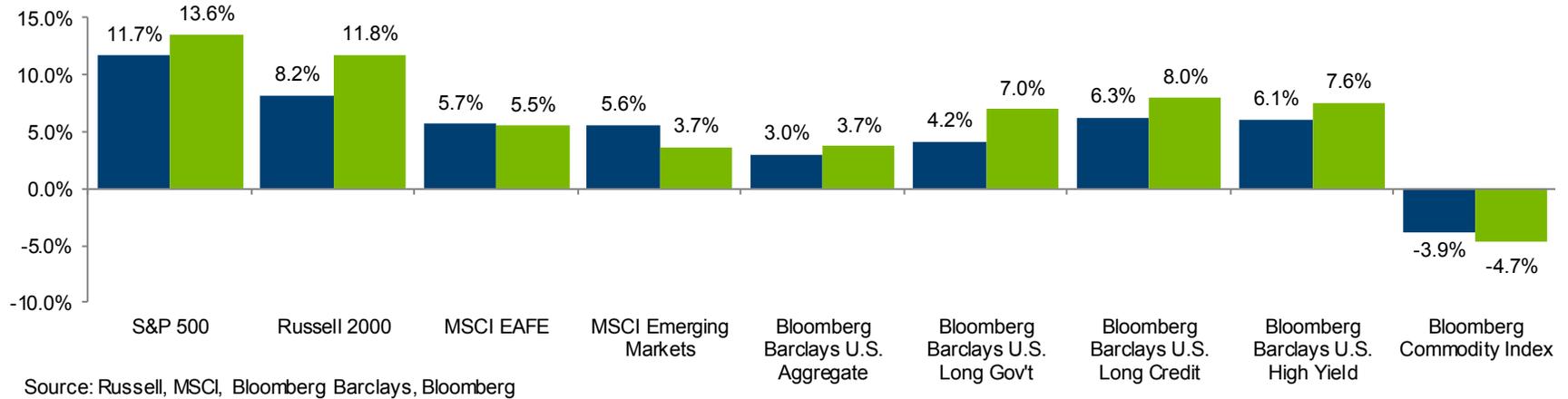
## SHORT TERM RETURNS AS OF 12/31/2019

■ Fourth Quarter 2019 ■ One-Year



## LONG TERM ANNUALIZED RETURNS AS OF 12/31/2019

■ Five-Year ■ Ten-Year



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# Market Highlights

Returns of the Major Capital Markets					
Period Ending 12/31/2019					
	Fourth Quarter	1-Year	3-Year <sup>1</sup>	5-Year <sup>1</sup>	10-Year <sup>1</sup>
<b>Equity</b>					
MSCI All Country World IMI	9.05%	26.35%	12.09%	8.34%	8.91%
MSCI All Country World	8.95%	26.60%	12.44%	8.41%	8.79%
Dow Jones U.S. Total Stock Market	9.04%	30.90%	14.52%	11.18%	13.43%
Russell 3000	9.10%	31.02%	14.57%	11.24%	13.42%
S&P 500	9.07%	31.49%	15.27%	11.70%	13.56%
Russell 2000	9.94%	25.52%	8.59%	8.23%	11.83%
MSCI All Country World ex-U.S. IMI	9.20%	21.63%	9.84%	5.71%	5.21%
MSCI All Country World ex-U.S.	8.92%	21.51%	9.87%	5.51%	4.97%
MSCI EAFE	8.17%	22.01%	9.56%	5.67%	5.50%
MSCI EAFE (Local Currency)	5.19%	21.67%	7.66%	6.73%	7.24%
MSCI Emerging Markets	11.84%	18.42%	11.57%	5.61%	3.68%
<b>Fixed Income</b>					
Bloomberg Barclays Global Aggregate	0.49%	6.84%	4.27%	2.31%	2.48%
Bloomberg Barclays U.S. Aggregate	0.18%	8.72%	4.03%	3.05%	3.75%
Bloomberg Barclays U.S. Long Gov't	-4.06%	14.75%	6.95%	4.16%	6.97%
Bloomberg Barclays U.S. Long Credit	1.18%	23.36%	8.88%	6.31%	7.99%
Bloomberg Barclays U.S. Long Gov't/Credit	-1.12%	19.59%	8.07%	5.42%	7.59%
Bloomberg Barclays U.S. TIPS	0.79%	8.43%	3.32%	2.62%	3.36%
Bloomberg Barclays U.S. High Yield	2.61%	14.32%	6.37%	6.13%	7.57%
Bloomberg Barclays Global Treasury ex U.S.	-0.02%	5.04%	4.40%	1.98%	1.49%
JP Morgan EMBI Global (Emerging Markets)	2.09%	14.42%	6.06%	5.88%	6.57%
<b>Commodities</b>					
Bloomberg Commodity Index	4.42%	7.69%	-0.94%	-3.92%	-4.73%
Goldman Sachs Commodity Index	8.31%	17.63%	2.35%	-4.32%	-5.44%
<b>Hedge Funds</b>					
HFRF Fund-Weighted Composite <sup>2</sup>	3.50%	10.38%	4.52%	3.55%	4.04%
HFRF Fund of Funds <sup>2</sup>	3.04%	8.34%	3.87%	2.36%	2.83%
<b>Real Estate</b>					
NAREIT U.S. Equity REITS	-0.76%	26.00%	8.14%	7.21%	11.94%
NCREIF NFI - ODCE	1.52%	5.35%	7.10%	8.97%	11.42%
FTSE Global Core Infrastructure Index	3.75%	26.26%	13.50%	8.12%	10.74%
<b>Private Equity</b>					
Burgiss Private iQ Global Private Equity <sup>3</sup>		11.61%	14.89%	11.58%	13.92%

MSCI Indices show net total returns throughout this report. All other indices show gross total returns.

<sup>1</sup> Periods are annualized.

<sup>2</sup> Latest 5 months of HFR data are estimated by HFR and may change in the future.

<sup>3</sup> Burgiss Private iQ Global Private Equity data is as at June 30, 2019

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
			REITs 35.8							EM 55.8	REITs 30.4	EM 34.0				EM 78.5	Sm Growth 28.0		REITs 19.7			Sm Value 31.7	EM 37.3		Lg Growth 36.4	
		Lg Value 38.4	Cmnty 33.9							Sm Growth 48.5	EM 25.6	Cmnty 25.6	REITs 34.0			High Yield 58.2	REITs 27.6		EM 18.2			Lg Value 17.3	Lg Growth 30.2		Sm Growth 28.5	
		Lg Growth 37.2	Lg Growth 23.1	Lg Value 35.2						Sm Value 46.0	Sm Value 22.3	EAFE 13.5	EM 32.2			Lg Growth 37.2	Sm Value 24.7		Sm Value 18.0			High Yield 17.1	EAFE 25.0		REITs 28.2	
		Sm Growth 31.0	Lg Value 21.6	Sm Value 31.8			EM 66.0			EAFE 38.6	EAFE 20.2	REITs 8.3	EAFE 26.3	EM 39.4		Sm Growth 34.5	EM 18.9		Lg Value 17.5	Sm Growth 43.3	REITs 27.2		Cmnty 11.4	Sm Growth 22.2	Lg Value 26.5	
		Sm Value 25.8	Sm Value 21.4	Lg Growth 30.5			Sm Growth 43.1			REITs 38.5	Cmnty 17.3	HFOF 7.5	Sm Value 23.5	Cmnty 32.7		EAFE 31.8	High Yield 15.1		EAFE 17.3	Sm Value 34.5	Lg Value 13.5		Sm Growth 11.3	Lg Value 13.7	Sm Value 22.4	
		Cmnty 20.3	HFOF 14.4	REITs 18.9	Lg Growth 38.7	Cmnty 40.9	Cmnty 49.7			Lg Value 30.0	Lg Value 16.5	Lg Value 7.1	Sm Growth 22.2	Lg Growth 11.8		REITs 27.8	Lg Value 15.1		High Yield 15.8	Lg Growth 33.5	Lg Growth 13.1		EM 11.2	REITs 9.3	EAFE 22.0	
		High Yield 19.2	High Yield 11.4	HFOF 16.2	EAFE 20.0	Lg Growth 33.1	REITs 25.9	REITs 15.5		Lg Growth 29.8	Sm Growth 14.3	Lg Growth 5.3	Sm Growth 13.4	EAFE 11.2		Sm Value 20.6	Lg Growth 15.1	Bonds 7.8	High Yield 15.3	Lg Growth 32.5	Bonds 6.0		REITs 9.4	Sm Value 7.8	EM 18.4	
	EAFE 7.8	Bonds 18.5	Sm Growth 11.3	Sm Growth 12.9	Lg Value 15.6	EAFE 27.0	Sm Value 22.8	Sm Value 14.0	Cmnty 32.1	High Yield 29.0	High Yield 11.1	Sm Value 4.7	High Yield 11.8	HFOF 10.3		Lg Value 19.7	Cmnty 9.0	REITs 7.3	Sm Growth 14.6	EAFE 22.8	Sm Growth 5.6		Lg Growth 7.1	HFOF 7.8	Cmnty 17.6	
	Cmnty 5.3	REITs 18.3	EAFE 6.0	High Yield 12.8	Bonds 8.7	HFOF 26.5	Bonds 11.6	Bonds 8.4	Bonds 10.3	Cmnty 20.7	HFOF 6.9	Sm Growth 4.1	HFOF 10.4	Sm Growth 7.0		Cmnty 13.5	EAFE 7.8	High Yield 5.0	HFOF 4.8	HFOF 9.0	Sm Value 4.2	Lg Growth 5.7	Bonds 2.6	High Yield 7.5	High Yield 14.3	
	Lg Growth 2.7	EAFE 11.2	EM 5.7	Bonds 9.7	High Yield 1.9	Lg Value 7.3	Lg Value 7.0	High Yield 5.3	REITs 5.2	HFOF 11.6	Lg Growth 6.3	High Yield 2.7	Lg Growth 9.1	Bonds 7.0		HFOF 11.5	Bonds 6.5	Lg Growth 2.6	Bonds 4.2	High Yield 7.4	HFOF 3.4	REITs 2.1	EAFE 1.0	Cmnty 5.8	Bonds 8.7	
	REITs 0.8	HFOF 11.1	Bonds 3.6	EAFE 1.8	Sm Growth 1.2	High Yield 2.4	HFOF 4.1	HFOF 2.8	HFOF 1.0	Bonds 4.1	Bonds 4.3	Bonds 2.4	Bonds 4.3	High Yield 1.9	Bonds 5.2	Bonds 5.9	HFOF 5.7	Lg Value 0.4	Cmnty 0.1	REITs 2.3	High Yield 2.5	Bonds 0.5	HFOF 0.5	Bonds 3.5	Bonds 0.0	HFOF 7.8
	High Yield -1.0	EM -5.5		EM -11.8	HFOF -5.1	Bonds -0.8	High Yield -5.9	EM -2.6	High Yield -1.4				Cmnty -15.1	Lg Value -0.2	HFOF -21.4			Cmnty -1.2		Cmnty -1.2	EM -2.2	HFOF -0.3			Lg Growth -1.5	
	Sm Value -1.6			Cmnty -14.1	Sm Value -6.5	Sm Value -1.5	EAFE -14.2	Lg Value -5.6	EM -6.2					Sm Value -9.8	High Yield -26.2			Sm Growth -2.9		Bonds -2.0	EAFE -4.9	EAFE -0.8			High Yield -2.1	
	Lg Value -2.0				REITs -18.8	REITs -6.5	Lg Growth -22.4	Sm Growth -9.2	Sm Value -11.4					REITs -17.8	Sm Value -28.9			Sm Value -5.5		EM -2.6	Cmnty -33.1	Sm Growth -1.4			REITs -3.9	
	Sm Growth -2.4				EM -25.6		Sm Growth -22.4	Lg Growth -20.4	Lg Value -15.5						Lg Value -36.8			HFOF -5.7			Lg Value -3.8				HFOF -4.0	
	Bonds -2.9				Cmnty -35.7		EM -30.8	EAFE -21.4	EAFE -15.9						REITs -37.8			EAFE -12.1			High Yield -4.5				Lg Growth -8.3	
	HFOF -3.5							Cmnty -31.9	Lg Growth -27.9						Lg Growth -38.4			EM -18.4			Sm Value -7.5				Sm Growth -9.3	
	EM -7.6								Sm Growth -30.3						Sm Growth -38.5						EM -14.9				Sm Value -12.9	
															EAFE -43.4						Cmnty -32.9				EAFE -13.8	
															Cmnty -46.5										Cmnty -13.8	
															EM -53.3											EM -14.6

\*Large Growth – Russell 1000 Growth; Large Value – Russell 1000 Value; Small Growth – Russell 2000 Growth; Small Value – Russell 2000 Value; EAFE – MSCI EAFE; EM – MSCI EM; REITs – NAREIT; Bonds – BC Aggregate; High Yield – BC High Yield; Cmnty – GSCI; HFOF – HFR FOF

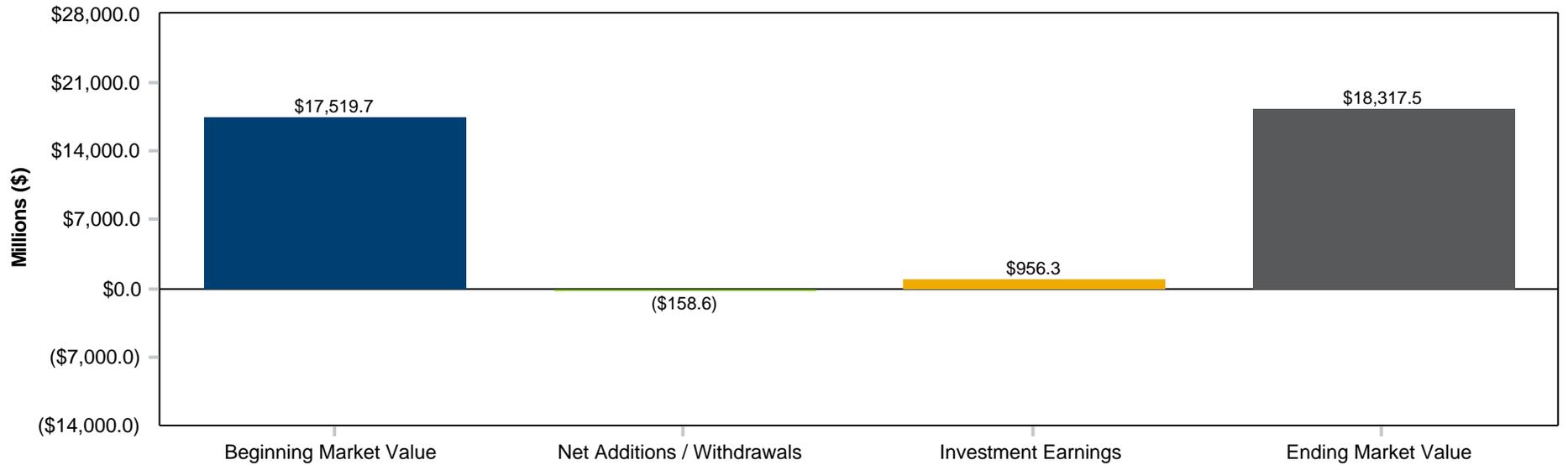


## Total Fund

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**Total Plan Asset Summary**

**Change in Market Value  
From October 1, 2019 to December 31, 2019**

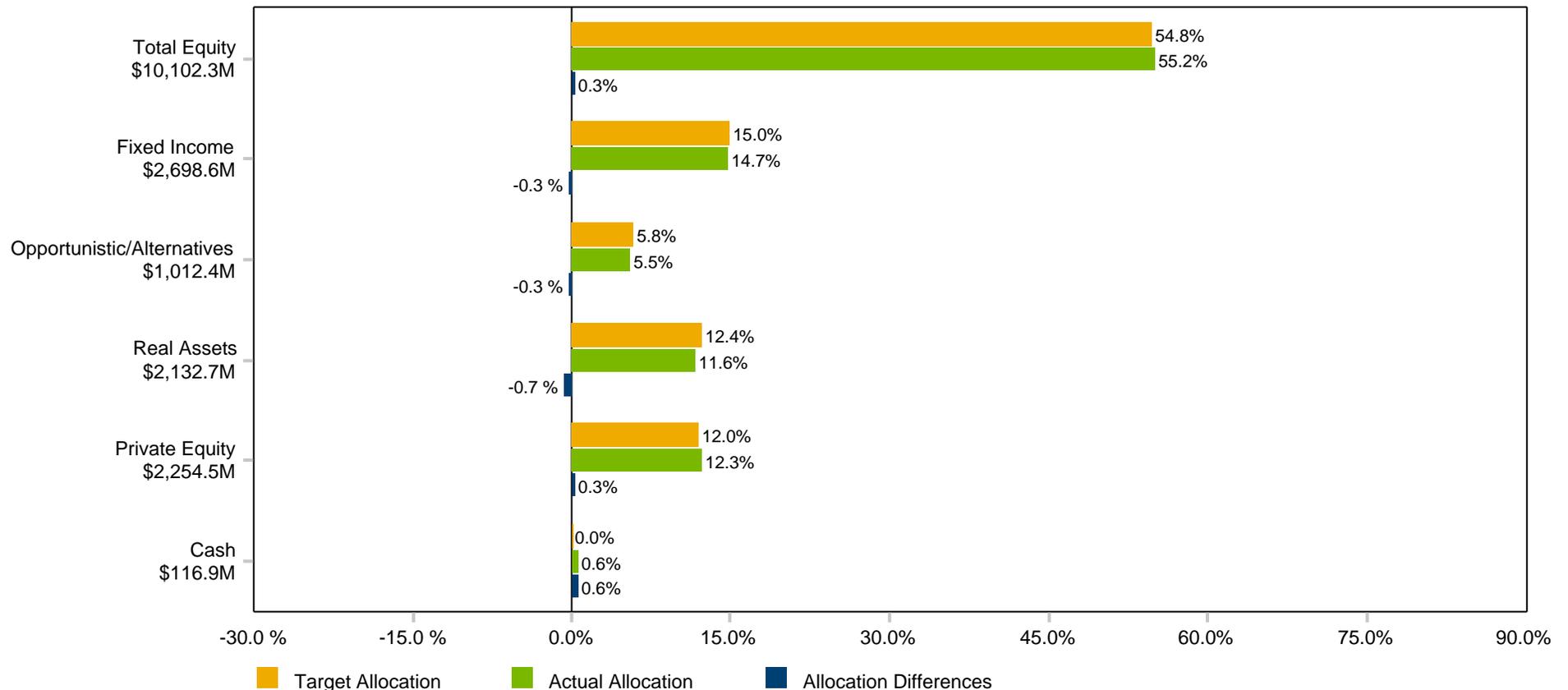


**Summary of Cash Flow**

	1 Quarter	Fiscal YTD	1 Year
<b>Total Fund</b>			
Beginning Market Value	17,519,721,882	17,586,476,970	16,047,375,068
+ Additions / Withdrawals	-158,578,506	-413,208,559	-650,953,595
+ Investment Earnings	956,310,906	1,144,185,872	2,921,032,809
<b>= Ending Market Value</b>	<b>18,317,454,282</b>	<b>18,317,454,282</b>	<b>18,317,454,282</b>

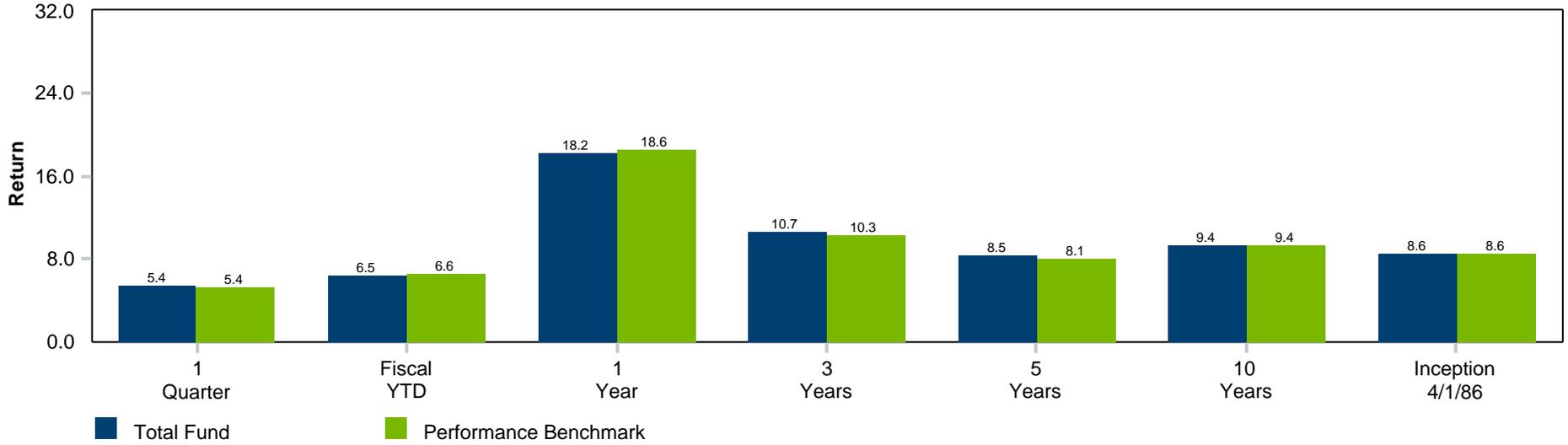
Asset Allocation Compliance

	Market Value (\$M)	Current Allocation (%)	Target Allocation (%)	Minimum Allocation (%)	Maximum Allocation (%)
Total Fund	18,317.5	100.00	100.00	N/A	N/A
Total Equity	10,102.3	55.15	54.83	50.00	60.00
Fixed Income	2,698.6	14.73	15.00	13.00	17.00
Opportunistic/Alternatives	1,012.4	5.53	5.79	0.00	7.00
Real Assets	2,132.7	11.64	12.38	10.00	15.00
Private Equity	2,254.5	12.31	12.00	9.50	14.50
Cash	116.9	0.64	0.00	0.00	5.00

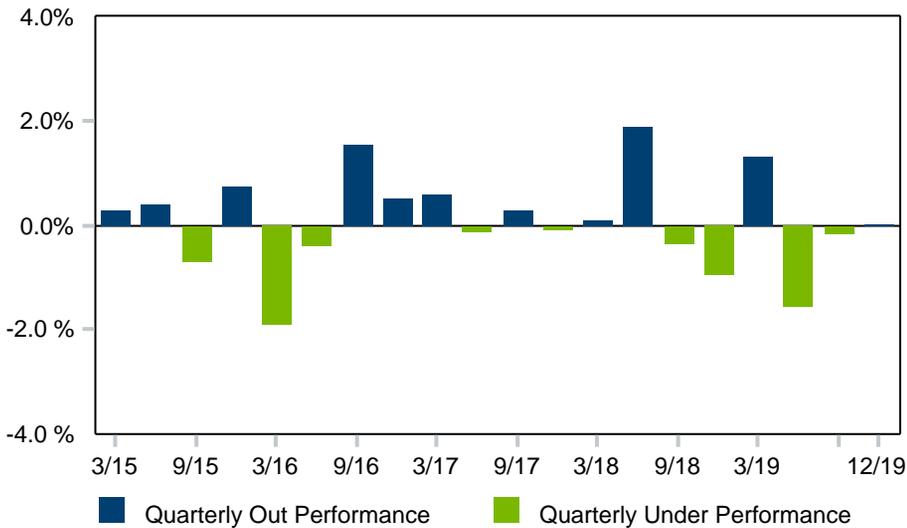


Total Plan Performance Summary

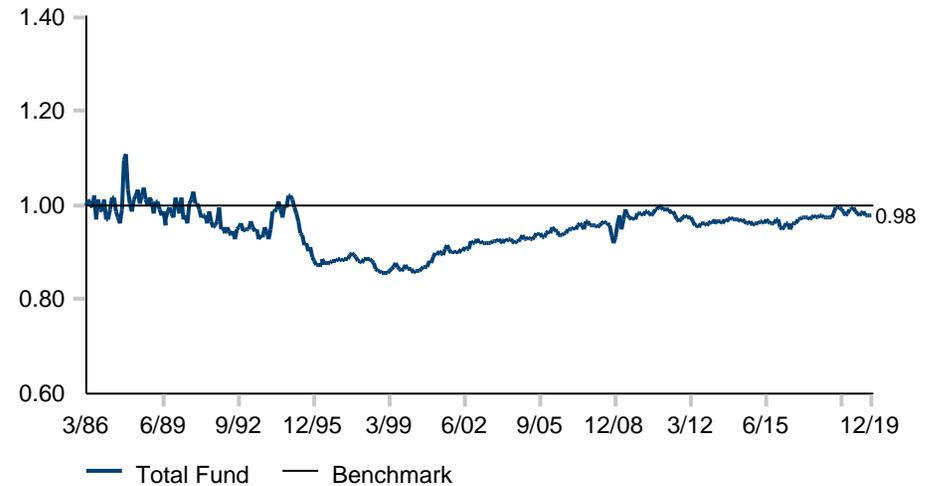
Return Summary



Quarterly Excess Performance



Ratio of Cumulative Wealth - Since Inception



As of December 31, 2019

## Asset Allocation & Performance

	Allocation			Performance(%)							
	Market Value (\$)	%	Policy(%)	1 Quarter	Fiscal YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Total Fund	18,317,454,282	100.0	100.0	5.4	6.5	18.2	10.7	8.5	9.4	8.6	04/01/1986
<i>Performance Benchmark</i>				5.4	6.6	18.6	10.3	8.1	9.4	8.6	
Total Equity	10,102,339,389	55.2	54.8	9.2	9.1	29.0	12.7	9.3	10.5	9.4	07/01/2015
<i>Total Equity Performance Benchmark</i>				9.0	9.3	27.8	12.8	9.3	10.7	9.8	
Fixed Income	2,698,633,236	14.7	15.0	0.6	2.2	7.6	5.2	3.8	4.7	5.4	07/01/1992
<i>Performance Benchmark</i>				0.5	2.6	9.3	4.3	3.4	4.1	5.6	
Opportunistic/Alternatives	1,012,429,890	5.5	5.8	0.2	1.4	5.0	0.8	1.9		3.6	05/01/2011
<i>Custom Alternatives Benchmark</i>				1.3	1.9	6.8	2.9	1.4		1.9	
Real Assets	2,132,680,407	11.6	12.4	1.1	2.8	5.3	7.4	8.2		8.5	07/01/2013
<i>Total Real Assets Benchmark</i>				1.1	2.1	4.6	5.7	7.4		8.2	
Real Estate	1,331,758,196	7.3		0.7	1.3	3.8	7.1	8.8	9.3	8.9	12/01/1998
<i>NFI-ODCE (Net)</i>				1.1	1.9	4.6	6.3	8.4	9.8	9.0	
Timber	298,793,760	1.6		2.6	10.5	8.5	5.0	4.8	3.6	7.2	06/01/1998
<i>Timberland Property Benchmark</i>				0.9	2.0	2.1	2.2	3.8	2.6		
Agriculture	199,238,441	1.1		0.9	1.9	3.5	3.7	4.7		5.7	09/01/2011
<i>Agriculture Benchmark</i>				1.0	1.4	4.5	4.2	4.7			
Infrastructure	302,890,010	1.7		1.6	4.5	11.0				12.7	07/01/2018
<i>CPI + 5%</i>				1.3	2.8	7.4				6.4	
Private Equity	2,254,497,424	12.3	12.0	2.3	6.8	10.3	15.9	14.1	13.9	12.4	03/01/1997
<i>Private Equity Policy</i>				1.6	6.3	4.9	15.0	12.6	15.3	10.5	
Cash	116,873,935	0.6	0.0								

\*The Real Assets and Private Equity market values, returns and their benchmark returns are shown on a one-quarter lag. Market values have been adjusted for current quarter cash flows.

\*The inception of the Total Equity asset class was July 1, 2015. Performance prior to July 2015 represents the weighted average of the U.S. Equity and Global Equity asset class monthly returns.

For historical performance of the U.S. Equity and Global Equity asset classes please see page 141 of this report.

\*The inception date above for infrastructure reflects the inception date for the calculation and reporting of time-weighted returns. The Infrastructure program began in July 2014 and the full history of Infrastructure returns are included in Total Real Assets and Total Fund performance.

\*Market values and allocation percentages may not add to the sum total due to rounding.

As of December 31, 2019

## Asset Allocation & Performance

	Allocation		Performance(%)								Inception Date
	Market Value (\$)	%	1 Quarter	Fiscal YTD	1 Year	3 Years	5 Years	10 Years	Since Inception		
Total Fund	18,317,454,282	100.0	5.4	6.5	18.2	10.7	8.5	9.4	8.6	04/01/1986	
Performance Benchmark			5.4	6.6	18.6	10.3	8.1	9.4	8.6		
Total Equity	10,102,339,389	55.2	9.2 (35)	9.1 (30)	29.0 (34)	12.7 (41)	9.3 (33)	10.5 (33)	9.4 (34)	07/01/2015	
Total Equity Performance Benchmark			9.0 (39)	9.3 (27)	27.8 (41)	12.8 (39)	9.3 (33)	10.7 (29)	9.8 (30)		
Jacobs Levy 130/30	682,001,967	3.7	8.1 (48)	10.1 (21)	30.2 (32)	14.3 (31)	14.8 (4)	16.3 (2)	10.5 (12)	01/01/2008	
Russell 3000 Index			9.1 (28)	10.4 (17)	31.0 (26)	14.6 (29)	11.2 (23)	13.4 (25)	9.1 (35)		
Allianz Structured Alpha U.S. 250	198,135,442	1.1	9.9 (19)	12.3 (5)	36.4 (9)	16.7 (18)	13.6 (8)	15.8 (4)	18.4 (3)	05/01/2009	
S&P 500 Index			9.1 (29)	10.9 (11)	31.5 (24)	15.3 (25)	11.7 (19)	13.6 (23)	15.4 (25)		
Allianz Structured Alpha Global 500	929,320,618	5.1	10.7 (17)	11.6 (5)	35.5 (6)	15.1 (22)			15.7 (7)	10/01/2015	
MSCI AC World IMI (Net)			9.0 (39)	8.9 (34)	26.4 (49)	12.1 (48)			11.7 (39)		
Allianz Structured Alpha Global 350	489,934,923	2.7	10.4 (20)	10.8 (10)	32.8 (13)	14.4 (25)			14.8 (25)	12/01/2016	
MSCI AC World IMI (Net)			9.0 (39)	8.9 (34)	26.4 (49)	12.1 (48)			12.5 (48)		
Kennedy Capital Management	576,241,420	3.1	9.3 (19)	8.2 (36)	25.9 (29)	4.8 (49)	6.4 (55)	11.8 (27)	12.2 (5)	01/01/1994	
Russell 2000 Value Index			8.5 (33)	7.9 (39)	22.4 (67)	4.8 (49)	7.0 (39)	10.6 (69)	9.7 (92)		
Stephens	431,496,259	2.4	5.8 (89)	0.0 (89)	23.2 (74)	15.1 (45)	10.0 (55)	13.0 (61)	9.8 (52)	08/01/2006	
Russell 2000 Growth Index			11.4 (21)	6.7 (20)	28.5 (42)	12.5 (64)	9.3 (65)	13.0 (61)	9.5 (58)		
Voya Absolute Return	593,406,843	3.2	9.3 (33)	9.0 (31)	26.0 (52)	11.9 (49)	9.0 (38)	12.4 (11)	10.7 (20)	10/01/2008	
Performance Benchmark			9.0 (39)	8.9 (34)	26.6 (47)	12.4 (45)	9.2 (35)	12.3 (11)	10.7 (20)		
Allianz (Nicholas Applegate)	643,162,135	3.5	7.8 (53)	7.7 (55)	27.0 (53)	15.0 (26)	10.1 (36)	11.2 (73)	10.1 (33)	12/01/1998	
Performance Benchmark			7.4 (62)	7.5 (57)	23.0 (77)	11.9 (46)	8.4 (57)	10.1 (88)	7.8 (67)		
Pershing Square International	95,482,428	0.5	1.2 (98)	5.8 (77)	43.5 (2)	12.2 (44)	1.2 (98)	8.8 (95)	9.4 (60)	07/01/2008	
Dow Jones U.S. Total Stock Market Index			9.0 (30)	10.3 (18)	30.9 (27)	14.5 (29)	11.2 (23)	13.4 (25)	10.6 (31)		
Pershing Square Holdings	136,823,606	0.7	0.2 (99)	10.2 (19)	51.3 (1)	10.4 (54)	-3.9 (99)		2.0 (99)	01/01/2013	
Dow Jones U.S. Total Stock Market Index			9.0 (30)	10.3 (18)	30.9 (27)	14.5 (29)	11.2 (23)		14.3 (22)		
Triam Partners	72,891,291	0.4	5.6	9.1	29.4	9.0			9.5	11/01/2015	
S&P 500 Index			9.1	10.9	31.5	15.3			13.5		
Triam Co-Investments	76,925,997	0.4	8.2	16.8	38.2	7.9			7.9	01/01/2017	
S&P 500 Index			9.1	10.9	31.5	15.3			15.3		
SSgA Global Index	967,350,105	5.3	9.1 (38)	9.0 (31)	26.8 (46)	12.4 (45)	8.7 (40)	9.3 (57)	6.6 (54)	04/01/2008	
MSCI AC World IMI (Net)			9.0 (39)	8.9 (34)	26.4 (49)	12.1 (48)	8.3 (48)	8.9 (65)	6.2 (64)		

As of December 31, 2019

## Asset Allocation & Performance

	Allocation		Performance(%)								Inception Date
	Market Value (\$)	%	1 Quarter	Fiscal YTD	1 Year	3 Years	5 Years	10 Years	Since Inception		
BlackRock MSCI ACWI IMI Fund	347,324,484	1.9	9.1 (37)	9.0 (30)	26.3 (49)	12.3 (45)	8.6 (42)			8.6 (58)	07/01/2011
<i>MSCI AC World IMI (Net)</i>			9.0 (39)	8.9 (34)	26.4 (49)	12.1 (48)	8.3 (48)			8.2 (62)	
Wellington Global Perspectives	569,135,320	3.1	8.1 (57)	7.0 (70)	21.9 (76)	10.6 (63)	8.3 (48)	11.4 (18)	13.8 (12)		07/01/2009
<i>Performance Benchmark</i>			9.7 (25)	8.4 (47)	24.7 (62)	9.7 (70)	7.8 (55)	9.5 (54)	11.5 (44)		
T. Rowe Price Global Equity	997,675,842	5.4	12.2 (8)	11.1 (8)	35.2 (8)	20.2 (6)	14.7 (3)	12.8 (9)	13.4 (10)		09/01/2009
<i>MSCI AC World Index (Net)</i>			9.0 (39)	8.9 (34)	26.6 (47)	12.4 (45)	8.4 (47)	8.8 (68)	9.4 (67)		
<i>MSCI AC World Index Growth (net)</i>			10.2 (22)	10.5 (12)	32.7 (14)	16.6 (17)	10.7 (22)	10.4 (35)	11.2 (34)		
Lazard	604,042,771	3.3	9.6 (28)	7.9 (55)	25.7 (54)	13.4 (31)	7.9 (54)	8.7 (69)	9.5 (66)		09/01/2009
<i>MSCI AC World Index (Net)</i>			9.0 (39)	8.9 (34)	26.6 (47)	12.4 (45)	8.4 (47)	8.8 (68)	9.4 (67)		
D.E. Shaw	749,252,450	4.1	8.6 (47)	8.6 (43)	24.2 (65)	12.7 (41)	10.0 (27)	10.7 (29)	11.3 (32)		09/01/2009
<i>MSCI World Index (Net)</i>			8.6 (48)	9.1 (29)	27.7 (41)	12.6 (43)	8.7 (40)	9.5 (54)	10.0 (59)		
GMO Global All Country Equity	452,512,294	2.5	10.6 (18)	10.1 (18)	25.8 (53)	11.4 (58)	7.0 (67)		4.9 (81)		07/01/2014
<i>MSCI AC World Index (Net)</i>			9.0 (39)	8.9 (34)	26.6 (47)	12.4 (45)	8.4 (47)		7.2 (47)		
<i>MSCI AC World Index Value (Net)</i>			7.6 (66)	7.3 (66)	20.6 (81)	8.4 (82)	6.1 (80)		4.8 (82)		
Harris Global Equity	489,151,762	2.7	11.3 (13)	10.7 (10)	28.9 (34)	9.3 (75)	7.1 (67)		6.1 (70)		06/01/2014
<i>MSCI World Index (Net)</i>			8.6 (48)	9.1 (29)	27.7 (41)	12.6 (43)	8.7 (40)		7.9 (40)		
<i>MSCI World Value (Net)</i>			7.3 (70)	7.9 (56)	21.7 (76)	8.3 (83)	6.3 (77)		5.4 (78)		
Fixed Income	2,698,633,236	14.7	0.6	2.2	7.6	5.2	3.8	4.7	5.4		07/01/1992
<i>Performance Benchmark</i>			0.5	2.6	9.3	4.3	3.4	4.1	5.6		
BlackRock	416,341,878	2.3	0.4 (68)	2.5 (41)	9.2 (39)	4.2 (42)	3.3 (44)	4.4 (40)	4.6 (36)		10/01/2003
<i>Performance Benchmark</i>			0.5 (61)	2.6 (37)	9.3 (37)	4.3 (39)	3.4 (39)	4.1 (45)	4.4 (42)		
Loomis Sayles	435,781,423	2.4	1.5 (18)	2.7 (32)	10.0 (30)	5.8 (22)	4.6 (24)	6.9 (16)	8.2 (8)		09/01/2008
<i>Performance Benchmark</i>			0.9 (29)	3.1 (26)	11.4 (24)	5.1 (26)	4.3 (27)	5.3 (27)	5.8 (24)		
Putnam	381,300,000	2.1	1.9 (43)	3.6 (32)	9.0 (31)	4.8 (31)	3.1 (31)	2.9	3.3		08/01/2008
<i>LIBOR</i>			0.5 (74)	1.2 (70)	2.6 (84)	1.9 (77)	1.3 (68)	0.8	0.9		
SSgA Aggregate Bond Index	489,695,456	2.7	0.2 (83)	2.4 (43)	8.7 (45)	4.0 (48)	3.1 (51)		3.5 (55)		06/01/2010
<i>Barclays Aggregate Index</i>			0.2 (82)	2.5 (43)	8.7 (45)	4.0 (48)	3.0 (52)		3.5 (55)		
Wellington Global Total Return	343,309,267	1.9	0.1 (82)	1.0 (71)	3.7 (83)	3.8 (44)	2.4 (52)		2.1 (63)		05/01/2014
<i>BofA Merrill Lynch 3 Month US T-Bill</i>			0.5 (75)	1.0 (71)	2.3 (84)	1.7 (78)	1.1 (69)		1.0 (79)		
Reams Core Plus Bond Fund	363,173,605	2.0	0.1 (87)	2.3 (50)	8.6 (46)	4.3 (39)	3.5 (38)		3.2 (49)		05/01/2014
<i>Barclays Aggregate Index</i>			0.2 (82)	2.5 (43)	8.7 (45)	4.0 (48)	3.0 (52)		3.3 (48)		
BRS Recycling Tax Credit	192,000,000	1.0									
BRS Recycling Tax Credit Phase 2	77,031,608	0.4									

As of December 31, 2019

## Asset Allocation & Performance

	Allocation		Performance(%)							Inception Date
	Market Value (\$)	%	1 Quarter	Fiscal YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	
Opportunistic/Alternatives	1,012,429,890	5.5	0.2	1.4	5.0	0.8	1.9		3.6	05/01/2011
<i>Custom Alternatives Benchmark</i>			1.3	1.9	6.8	2.9	1.4		1.9	
Anchorage	74,469,036	0.4	0.1	-3.8	-1.5	2.0	1.8		4.8	05/01/2011
<i>Credit Suisse Event Driven</i>			2.2	0.7	8.2	3.4	1.2		2.2	
York	59,056,318	0.3	-8.6	-14.6	-12.8	-1.7	-1.9		1.9	05/01/2011
<i>Credit Suisse Event Driven</i>			2.2	0.7	8.2	3.4	1.2		2.2	
Capula	84,551,048	0.5	3.4	4.3	8.4	5.6	6.5		6.1	05/01/2011
<i>HFR1 Macro (Total) Index</i>			-0.5	1.2	6.2	1.3	0.8		0.3	
Graham	62,959,679	0.3	2.3	4.2	15.7	0.9	2.0		2.5	05/01/2011
<i>HFR1 Macro (Total) Index</i>			-0.5	1.2	6.2	1.3	0.8		0.3	
Circumference Group Core Value	28,725,688	0.2	-0.7	1.3	8.1	9.4			8.3	08/01/2015
<i>Russell 2000 Index</i>			9.9	7.3	25.5	8.6			8.5	
Aeolus Keystone Fund	286,278,069	1.6	1.7	5.2	4.7	-6.2			-1.6	12/01/2015
<i>Citigroup 3 Month T-Bill</i>			0.5	1.0	2.3	1.7			1.3	
<i>Eurekahedge ILS Advisers Index</i>			0.4	2.3	1.2	-2.8			-0.8	
Nephila Rubik Holdings	44,391,884	0.2	-2.4	1.0	3.5	-4.4			-3.3	06/01/2016
<i>Citigroup 3 Month T-Bill</i>			0.5	1.0	2.3	1.7			1.4	
<i>Eurekahedge ILS Advisers Index</i>			0.4	2.3	1.2	-2.8			-1.4	
Parametric Global Defensive Equity Fund	174,712,998	1.0	4.8	5.4	14.2				5.9	05/01/2017
<i>Performance Benchmark</i>			4.7	5.1	14.4				6.1	
<i>MSCI AC World Index</i>			9.1	9.2	27.3				11.2	
Man Alternative Risk Premia	98,605,267	0.5	-3.5	-0.3	3.9				-0.4	06/01/2018
<i>SG Multi Alternative Risk Premia Index</i>			-0.9	1.1	3.8				0.6	
CFM ISD Fund 1.5x	98,679,904	0.5	-4.2	-2.6	1.2				0.1	07/01/2018
<i>SG Multi Alternative Risk Premia Index</i>			-0.9	1.1	3.8				1.0	

As of December 31, 2019

## Asset Allocation & Performance

	Allocation		Performance(%)							Inception Date
	Market Value (\$)	%	1 Quarter	Fiscal YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	
Real Assets	2,132,680,407	11.6	1.1	2.8	5.3	7.4	8.2		8.5	07/01/2013
<i>Total Real Assets Benchmark</i>			1.1	2.1	4.6	5.7	7.4		8.2	
Real Estate	1,331,758,196	7.3	0.7	1.3	3.8	7.1	8.8	9.3	8.9	12/01/1998
<i>NFI-ODCE (Net)</i>			1.1	1.9	4.6	6.3	8.4	9.8	9.0	
Timber	298,793,760	1.6	2.6	10.5	8.5	5.0	4.8	3.6	7.2	06/01/1998
<i>Timberland Property Benchmark</i>			0.9	2.0	2.1	2.2	3.8	2.6		
RMK Timberland I	298,793,760	1.6								
Agriculture	199,238,441	1.1	0.9	1.9	3.5	3.7	4.7		5.7	09/01/2011
<i>Agriculture Benchmark</i>			1.0	1.4	4.5	4.2	4.7			
HFMS Farmland	144,748,471	0.8	0.9	2.0	3.6	3.5	4.7		5.7	09/01/2011
<i>HFMS custom NCREIF Farmland Index</i>			0.5	1.9	4.9	3.6	4.1			
UBS Agrivest Core Farmland Fund	54,489,970	0.3	1.0	1.6	3.2	4.3			4.7	07/01/2015
<i>UBS Agrivest custom NCREIF Farmland Index</i>			0.5	2.1	5.4	5.4			6.0	
Infrastructure	302,890,010	1.7	1.6	4.5	11.0				12.7	07/01/2018
<i>CPI + 5%</i>			1.3	2.8	7.4				6.4	
Private Equity	2,254,497,424	12.3	2.3	6.8	10.3	15.9	14.1	13.9	12.5	04/01/1997
<i>Private Equity Policy</i>			1.6	6.3	4.9	15.0	12.6	15.3	10.6	
Cash	116,873,935	0.6								

\*The Real Assets and Private Equity market values, returns and their benchmark returns are shown on a one-quarter lag. Market values have been adjusted for current quarter cash flows.

\*The inception of the Total Equity asset class was July 1, 2015. Performance prior to July 2015 represents the weighted average of the U.S. Equity and Global Equity asset class monthly returns. For historical performance of the U.S. Equity and Global Equity asset classes please see page 141 of this report.

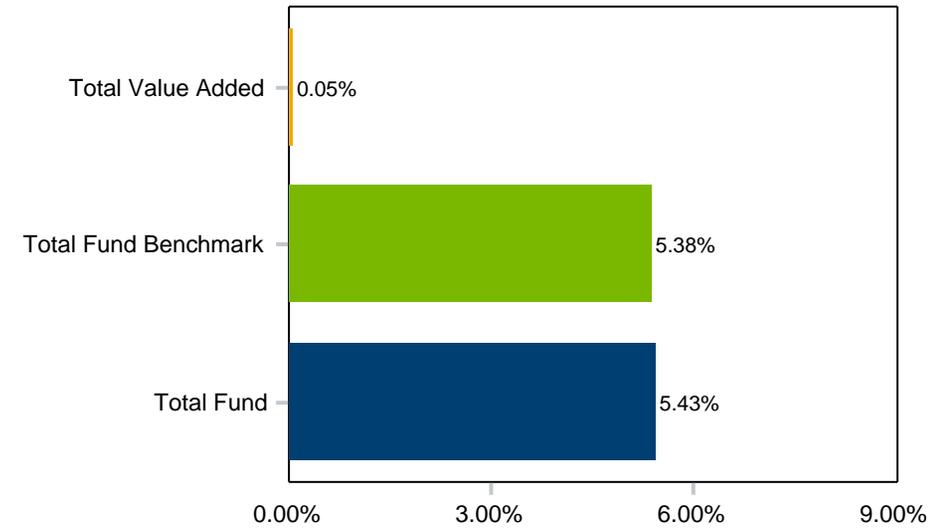
\*The inception date above for infrastructure reflects the inception date for the calculation and reporting of time-weighted returns. The Infrastructure program began in July 2014 and the full history of Infrastructure returns are included in Total Real Assets and Total Fund performance.

\*The BRS Recycling Tax Credit represents an annual income stream of \$16 million dollars over the next 14 years, which ATRS purchased for approximately \$162 million. This represents an approximate 9.9% yield for the 2017 fiscal year. The value shown above represents the year-end market value in accordance with GASB Statement 72, representing the 14 years of annual income, and has been incorporated into Total Fixed Income and Total Fund performance.

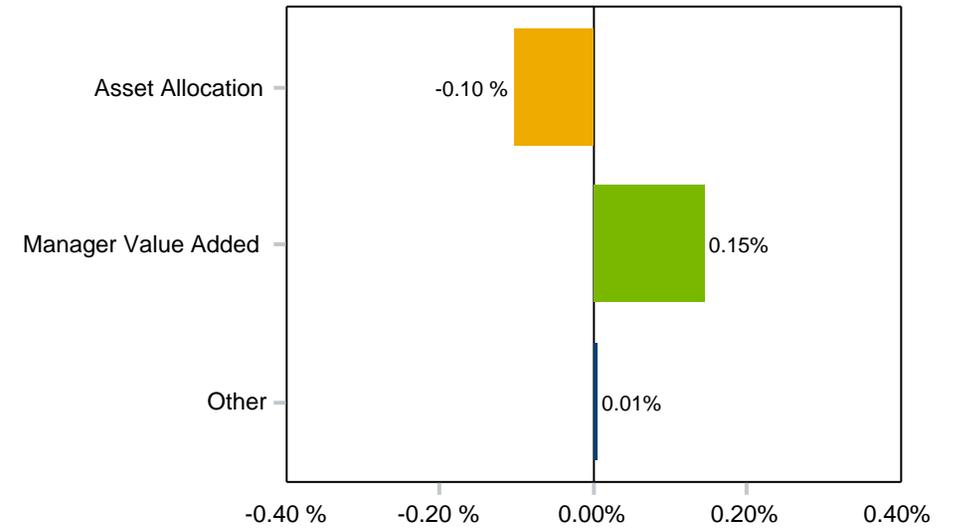
\*ATRS made a total commitment of \$100 million to the Trian Co-Investments Fund. As of 12/31/2019, there was an unfunded commitment value equal to 37,016,515.

Total Fund Attribution

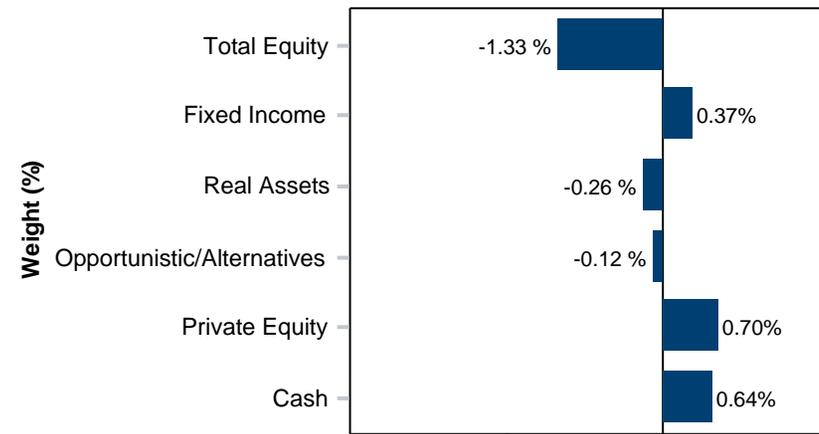
Total Fund Performance



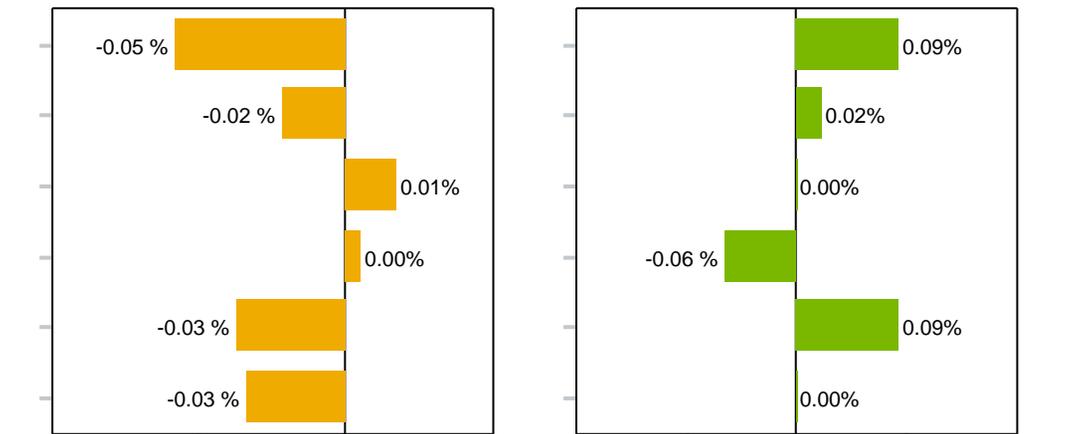
Total Value Added:0.05%



Total Asset Allocation:-0.10 %



Total Manager Value Added:0.15%



Weight (%)

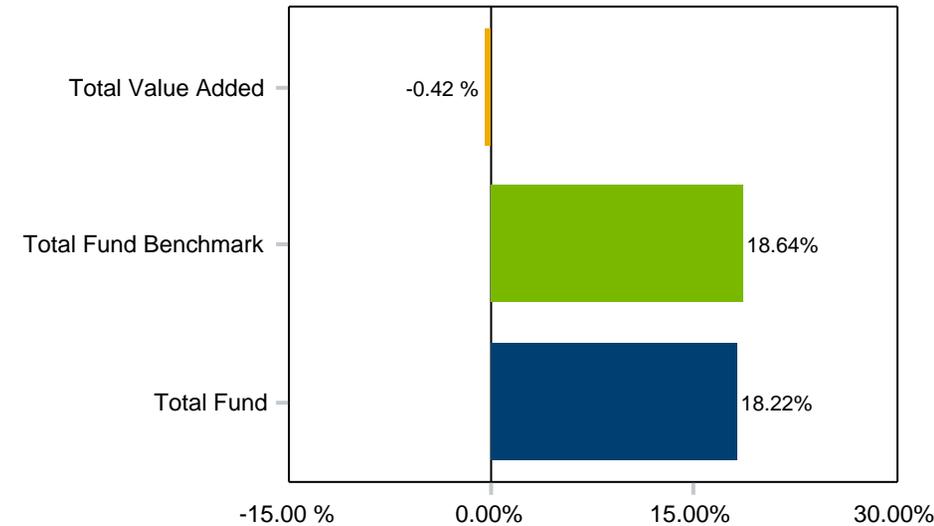
Average Active Weight

Asset Allocation Value Added

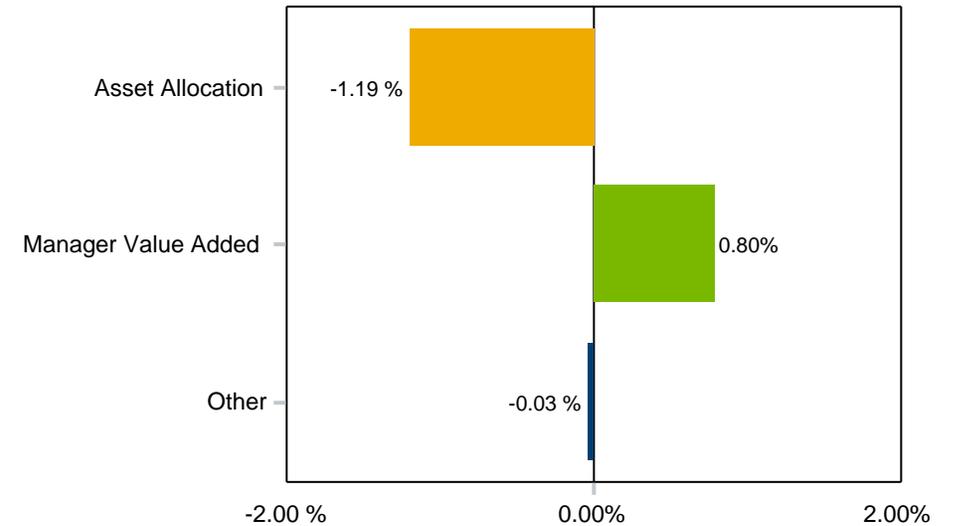
Manager Value Added

Total Fund Attribution

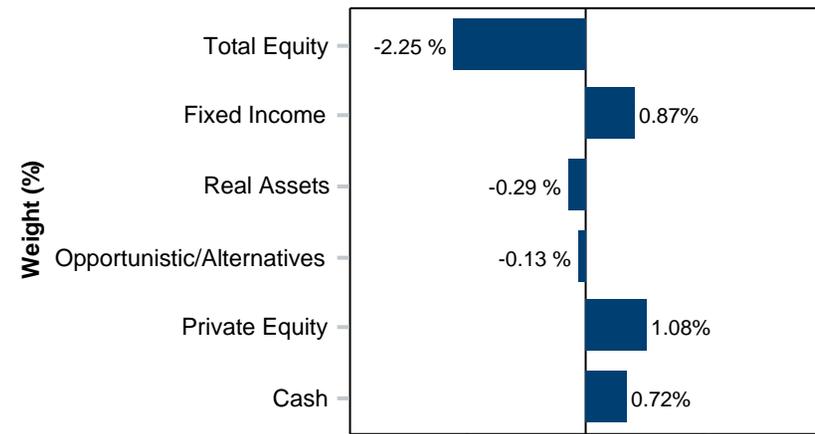
Total Fund Performance



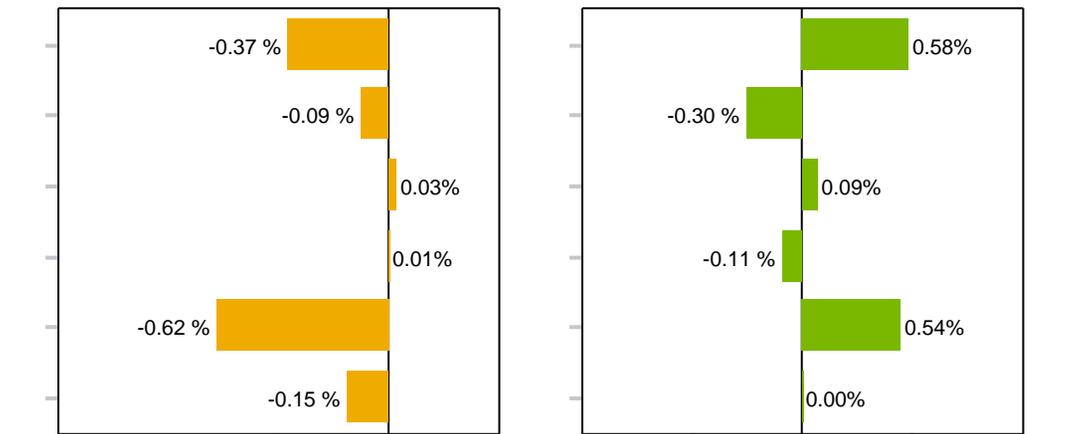
Total Value Added:-0.42 %



Total Asset Allocation:-1.19 %



Total Manager Value Added:0.80%



Weight (%)

Average Active Weight

Asset Allocation Value Added

Manager Value Added

As of December 31, 2019

## Calendar Year Performance

	Performance(%)									
	Fiscal Year 2019	Fiscal Year 2018	Fiscal Year 2017	Fiscal Year 2016	Fiscal Year 2015	Fiscal Year 2014	Fiscal Year 2013	Fiscal Year 2012	Fiscal Year 2011	Fiscal Year 2010
Total Fund	5.3 (66)	11.7 (1)	16.1 (1)	-0.5 (70)	5.2 (1)	19.0 (3)	14.3 (3)	-1.0 (100)	22.4 (28)	13.5 (39)
Performance Benchmark	7.0 (16)	9.2 (18)	13.2 (27)	1.8 (10)	5.2 (1)	18.3 (10)	13.5 (9)	2.1 (25)	21.9 (42)	13.1 (58)
Total Equity	4.1 (57)	13.4 (28)	22.1 (26)	-4.8 (58)	4.1 (31)	25.5 (34)	20.3 (34)	-6.3 (54)	31.5 (42)	17.1 (22)
Total Equity Performance Benchmark	5.9 (46)	12.2 (34)	19.0 (47)	-1.5 (38)	3.6 (35)	23.9 (46)	18.9 (48)	-1.8 (25)	31.2 (46)	13.6 (38)
Jacobs Levy 130/30	5.5 (49)	19.9 (21)	24.6 (16)	8.3 (4)	14.2 (6)	24.3 (53)	22.4 (48)	1.4 (41)	43.2 (15)	15.2 (57)
Russell 3000 Index	9.0 (30)	14.8 (43)	18.5 (54)	2.1 (22)	7.3 (43)	25.2 (43)	21.5 (54)	3.8 (24)	32.4 (54)	15.7 (53)
Allianz Structured Alpha U.S. 250	10.9 (19)	15.7 (38)	20.4 (40)	6.0 (7)	10.7 (20)	28.1 (20)	23.7 (40)	3.7 (25)	42.6 (16)	17.0 (48)
S&P 500 Index	10.4 (22)	14.4 (46)	17.9 (58)	4.0 (12)	7.4 (41)	24.6 (49)	20.6 (60)	5.4 (14)	30.7 (66)	14.4 (63)
Allianz Structured Alpha Global 500	6.1 (44)	13.7 (26)	23.8 (17)							
MSCI AC World IMI (Net)	4.6 (54)	11.1 (42)	19.0 (47)							
Daruma Asset Management	-14.6 (100)	11.7 (86)	20.7 (68)	-8.7 (82)	-2.4 (98)	21.5 (81)	32.9 (5)	-13.6 (100)	46.3 (8)	28.6 (11)
Russell 2000 Index	-3.3 (50)	17.6 (38)	24.6 (30)	-6.7 (64)	6.5 (55)	23.6 (61)	24.2 (58)	-2.1 (45)	37.4 (71)	21.5 (54)
Kennedy Capital Management	-7.8 (67)	12.2 (50)	24.2 (30)	-4.9 (62)	2.7 (51)	29.4 (10)	34.4 (6)	-4.2 (66)	33.9 (52)	34.5 (10)
Russell 2000 Value Index	-6.2 (55)	13.1 (39)	24.9 (23)	-2.6 (41)	0.8 (67)	22.5 (69)	24.8 (59)	-1.4 (34)	31.4 (72)	25.1 (48)
Stephens	8.4 (29)	29.5 (21)	18.3 (81)	-7.8 (41)	5.1 (89)	18.4 (80)	18.7 (83)	3.0 (8)	46.7 (32)	18.9 (54)
Russell 2000 Growth Index	-0.5 (72)	21.9 (57)	24.4 (41)	-10.8 (57)	12.3 (33)	24.7 (40)	23.7 (53)	-2.7 (39)	43.5 (55)	18.0 (58)
Voya Absolute Return	4.0 (57)	9.9 (52)	20.3 (37)	1.9 (21)	7.8 (12)	26.9 (23)	19.7 (40)	6.0 (6)	30.5 (51)	14.9 (31)
Performance Benchmark	5.7 (46)	10.7 (45)	18.8 (49)	1.1 (24)	7.4 (13)	24.6 (40)	20.6 (33)	5.4 (6)	30.7 (49)	14.4 (34)
Allianz (Nicholas Applegate)	12.5 (14)	16.4 (34)	15.9 (74)	-7.1 (79)	4.4 (68)	23.1 (66)	19.4 (70)	-2.4 (65)	29.7 (72)	18.6 (40)
Performance Benchmark	7.8 (37)	12.0 (63)	16.8 (68)	-4.7 (66)	3.5 (74)	24.4 (51)	18.6 (76)	-3.2 (72)	22.5 (96)	22.6 (23)
Pershing Square International	30.7 (1)	2.8 (97)	8.2 (95)	-33.2 (100)	12.9 (10)	29.1 (15)	17.3 (81)	0.8 (45)	26.8 (87)	31.6 (6)
Dow Jones U.S. Total Stock Market Index	8.9 (31)	14.8 (43)	18.5 (54)	2.0 (23)	7.2 (44)	25.0 (45)	21.5 (54)	4.0 (23)	32.4 (54)	16.1 (51)
Pershing Square Holdings	21.7 (2)	-2.7 (100)	8.3 (95)	-49.1 (100)	15.2 (5)	30.4 (10)				
Dow Jones U.S. Total Stock Market Index	8.9 (31)	14.8 (43)	18.5 (54)	2.0 (23)	7.2 (44)	25.0 (45)				
Trian Partners	13.1	2.8	9.5							
S&P 500 Index	10.4	14.4	17.9							
SSgA Global Index	4.8 (51)	11.4 (41)	19.4 (43)	-3.4 (49)	1.2 (56)	23.8 (47)	17.5 (57)	-6.6 (56)	31.4 (43)	13.4 (40)
MSCI AC World IMI (Net)	4.6 (54)	11.1 (42)	19.0 (47)	-3.9 (53)	0.8 (59)	23.4 (50)	17.1 (60)	-6.9 (57)	31.0 (48)	13.1 (41)

As of December 31, 2019

## Calendar Year Performance

	Performance(%)									
	Fiscal Year 2019	Fiscal Year 2018	Fiscal Year 2017	Fiscal Year 2016	Fiscal Year 2015	Fiscal Year 2014	Fiscal Year 2013	Fiscal Year 2012	Fiscal Year 2011	Fiscal Year 2010
BlackRock MSCI ACWI IMI Fund	4.5 (54)	11.4 (41)	19.1 (46)	-3.4 (49)	1.2 (56)	23.9 (47)	17.7 (56)	-6.6 (56)		
<i>MSCI AC World IMI (Net)</i>	4.6 (54)	11.1 (42)	19.0 (47)	-3.9 (53)	0.8 (59)	23.4 (50)	17.1 (60)	-6.9 (57)		
Wellington Global Perspectives	-3.8 (90)	15.7 (18)	24.8 (14)	-4.2 (54)	-1.4 (73)	33.1 (4)	30.7 (5)	-9.1 (71)	45.8 (3)	20.1 (16)
<i>Performance Benchmark</i>	-3.0 (87)	13.8 (26)	20.5 (36)	-4.7 (58)	1.5 (54)	26.0 (29)	20.6 (33)	-9.9 (76)	35.8 (19)	20.6 (14)
T. Rowe Price Global Equity	8.0 (31)	21.3 (6)	28.8 (6)	-0.6 (32)	7.5 (13)	32.0 (5)	18.2 (52)	-7.7 (62)	28.2 (68)	
<i>MSCI AC World Index (Net)</i>	5.7 (46)	10.7 (45)	18.8 (49)	-3.7 (51)	0.7 (59)	22.9 (55)	16.6 (64)	-6.5 (55)	30.1 (54)	
<i>MSCI AC World Index Growth (net)</i>	7.2 (37)	16.1 (17)	18.6 (50)	-2.7 (45)	4.9 (25)	23.1 (54)	15.4 (71)	-5.3 (47)	32.0 (37)	
Lazard	2.7 (66)	9.8 (52)	26.2 (11)	-10.7 (89)	7.3 (13)	23.3 (51)	15.8 (69)	-11.4 (82)	29.6 (58)	
<i>MSCI AC World Index (Net)</i>	5.7 (46)	10.7 (45)	18.8 (49)	-3.7 (51)	0.7 (59)	22.9 (55)	16.6 (64)	-6.5 (55)	30.1 (54)	
D.E. Shaw	2.6 (68)	15.8 (18)	19.2 (45)	0.0 (28)	3.9 (33)	25.6 (33)	19.3 (44)	-1.9 (26)	31.1 (47)	
<i>MSCI World Index (Net)</i>	6.3 (43)	11.1 (43)	18.2 (53)	-2.8 (45)	1.4 (55)	24.0 (46)	18.6 (49)	-5.0 (45)	30.5 (51)	
GMO Global All Country Equity	3.5	6.8	20.0	-6.5	-4.5					
<i>MSCI AC World Index (Net)</i>	5.7	10.7	18.8	-3.7	0.7					
<i>MSCI AC World Index Value (Net)</i>	4.3	5.4	19.0	-4.8	-3.4					
Harris Global Equity	-2.0	5.0	38.9	-12.8	0.7					
<i>MSCI World Index (Net)</i>	6.3	11.1	18.2	-2.8	1.4					
<i>MSCI World Value (Net)</i>	4.2	5.6	18.7	-3.7	-2.9					

As of December 31, 2019

## Calendar Year Performance

	Performance(%)									
	Fiscal Year 2019	Fiscal Year 2018	Fiscal Year 2017	Fiscal Year 2016	Fiscal Year 2015	Fiscal Year 2014	Fiscal Year 2013	Fiscal Year 2012	Fiscal Year 2011	Fiscal Year 2010
Fixed Income	6.4 (68)	1.3 (18)	5.2 (6)	3.5 (85)	1.0 (64)	6.1 (45)	3.8 (13)	5.2 (95)	7.3 (35)	17.4 (22)
Performance Benchmark	8.1 (13)	-0.3 (82)	0.9 (62)	5.8 (30)	1.6 (41)	5.2 (76)	0.2 (60)	7.4 (80)	4.8 (87)	10.6 (90)
BlackRock	8.0 (27)	-0.3 (74)	0.3 (64)	6.0 (23)	2.4 (16)	5.2 (51)	0.3 (60)	8.0 (32)	6.3 (36)	13.7 (37)
Performance Benchmark	8.1 (25)	-0.3 (72)	0.9 (51)	5.8 (26)	1.6 (39)	5.2 (50)	0.2 (62)	7.4 (41)	4.8 (50)	10.6 (54)
Loomis Sayles	7.4 (40)	1.8 (25)	8.1 (16)	1.9 (72)	1.1 (59)	12.0 (11)	10.7 (7)	4.4 (75)	15.7 (10)	26.0 (6)
Performance Benchmark	8.2 (23)	0.5 (46)	4.0 (26)	5.0 (37)	1.0 (64)	6.8 (34)	2.8 (29)	8.4 (26)	7.8 (27)	15.5 (32)
Putnam	3.7 (32)	4.1 (36)	7.9 (29)	-3.6 (70)	-0.7 (53)	3.7 (71)	5.5 (29)	-1.8 (62)	4.6 (55)	16.9 (7)
LIBOR	2.6 (41)	1.5 (59)	0.8 (83)	0.4 (42)	0.2 (42)	0.3 (85)	0.4 (83)	0.4 (49)	0.4 (88)	0.4 (82)
SSgA Aggregate Bond Index	7.9 (30)	-0.4 (76)	-0.3 (80)	6.0 (23)	1.9 (28)	4.3 (62)	-0.6 (81)	7.4 (39)	3.9 (64)	
Barclays Aggregate Index	7.9 (30)	-0.4 (76)	-0.3 (82)	6.0 (23)	1.9 (29)	4.4 (61)	-0.7 (83)	7.5 (39)	3.9 (64)	
Wellington Global Total Return	5.3 (14)	5.1 (32)	-0.7 (85)	1.3 (32)	0.5 (38)					
BofA Merrill Lynch 3 Month US T-Bill	2.3 (45)	1.4 (60)	0.5 (83)	0.2 (42)	0.0 (45)					
Reams Core Plus Bond Fund	8.6	0.0	0.0	6.1	1.5					
Barclays Aggregate Index	7.9	-0.4	-0.3	6.0	1.9					
BRS Recycling Tax Credit										
BRS Recycling Tax Credit Phase 2										
Opportunistic/Alternatives	-0.2	0.6	6.8	-1.7	5.8	10.2	12.9	-1.0		
Custom Alternatives Benchmark	2.1	3.5	2.8	-3.7	1.7	6.3	7.1	-3.9		
Anchorage	1.4	6.2	5.9	-3.9	3.8	18.9	19.4	-1.0		
Credit Suisse Event Driven	1.9	3.8	9.3	-10.4	-2.0	14.1	14.5	-7.2		
York	-5.9	12.2	14.3	-12.9	-7.2	22.4	19.4	-0.8		
Credit Suisse Event Driven	1.9	3.8	9.3	-10.4	-2.0	14.1	14.5	-7.2		
Capula	6.3	3.8	7.8	6.1	8.9	7.9	4.0	3.4		
HFR1 Macro (Total) Index	2.4	1.1	-2.4	1.8	4.2	1.5	-0.1	-2.8		
Graham	2.1	6.5	-3.2	-1.0	23.9	2.7	5.9	-8.3		
HFR1 Macro (Total) Index	2.4	1.1	-2.4	1.8	4.2	1.5	-0.1	-2.8		
Circumference Group Core Value	2.7	15.9	14.0							
Russell 2000 Index	-3.3	17.6	24.6							
Aeolus Keystone Fund	-5.8	-17.9	11.2							
Citigroup 3 Month T-Bill	2.3	1.3	0.5							
Eurekahedge ILS Advisers Index	-5.5	-6.6	5.0							
Nephila Rubik Holdings	-6.9	-7.7	2.2							
Citigroup 3 Month T-Bill	2.3	1.3	0.5							
Eurekahedge ILS Advisers Index	-5.5	-6.6	5.0							
Parametric Global Defensive Equity Fund	3.9	5.8								
Performance Benchmark	4.7	6.3								
MSCI AC World Index	6.3	11.3								
Man Alternative Risk Premia	1.8									
SG Multi Alternative Risk Premia Index	0.4									

As of December 31, 2019

## Calendar Year Performance

	Performance(%)									
	Fiscal Year 2019	Fiscal Year 2018	Fiscal Year 2017	Fiscal Year 2016	Fiscal Year 2015	Fiscal Year 2014	Fiscal Year 2013	Fiscal Year 2012	Fiscal Year 2011	Fiscal Year 2010
CFM ISD Fund 1.5x	2.8									
<i>SG Multi Alternative Risk Premia Index</i>	0.4									
Real Assets	5.6	9.4	7.5	9.5	11.7	9.0				
<i>Total Real Assets Benchmark</i>	5.7	6.2	6.6	10.0	11.5	11.4				
Real Estate	5.7	11.1	6.9	12.0	13.4	12.1	7.9	9.8	17.7	-11.4
<i>NFI-ODCE (Net)</i>	6.5	7.1	7.4	12.6	12.4	12.7	10.5	13.4	16.0	-9.6
Timber	-0.3	1.2	8.0	0.4	9.4	-1.1	6.8	-5.3	4.8	-3.0
<i>Timberland Property Benchmark</i>	0.1	2.6	3.7	2.5	10.5	7.7	6.9	-2.9	-0.4	-6.0
RMK Timberland I										
Agriculture	3.5	3.3	4.3	9.8	2.5	11.0	11.5			
<i>Agriculture Benchmark</i>	5.4	3.5	4.5	5.6	6.5	12.8	20.9			
HFMS Farmland	3.4	2.9	3.9	10.7	2.5	11.0	11.5			
<i>HFMS custom NCREIF Farmland Index</i>	4.9	2.0	4.0	4.8	6.5	12.8	20.9			
UBS Agrivest Core Farmland Fund	4.0	4.5	5.0	6.2						
<i>UBS Agrivest custom NCREIF Farmland Index</i>	6.2	5.0	5.5	8.4						
Infrastructure	14.6									
<i>CPI + 5%</i>	6.7									
Private Equity	12.8	22.3	16.7	7.7	11.9	20.6	12.5	12.5	16.0	4.5
<i>Private Equity Policy</i>	10.8	16.1	20.4	1.6	14.5	25.0	16.8	9.4	20.1	55.6
Cash	6.5	1.2	5.0	3.2						

\*The Real Assets and Private Equity returns and their benchmark returns are shown on a one-quarter lag.

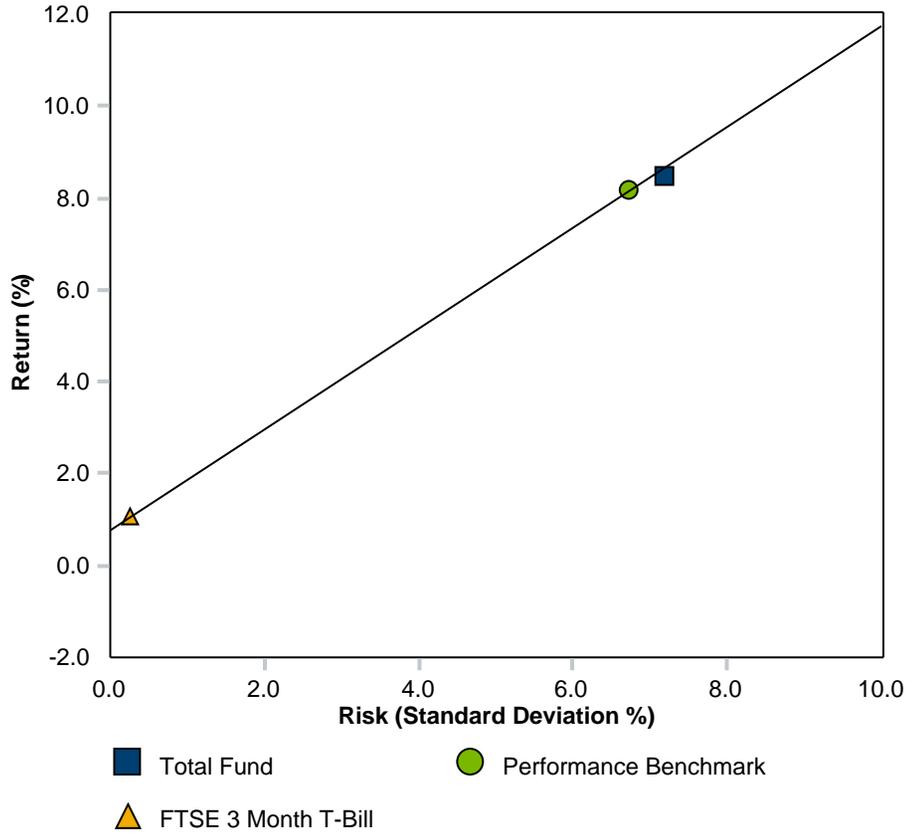
\*The inception of the Total Equity asset class was July 1, 2015. Performance prior to July 2015 represents the weighted average of the U.S. Equity and Global Equity asset class monthly returns. For historical performance of the U.S. Equity and Global Equity asset classes please see page 141 of this report.

\*The inception date above for infrastructure reflects the inception date for the calculation and reporting of time-weighted returns. The Infrastructure program began in July 2014 and the full history of Infrastructure returns are included in Total Real Assets and Total Fund performance.

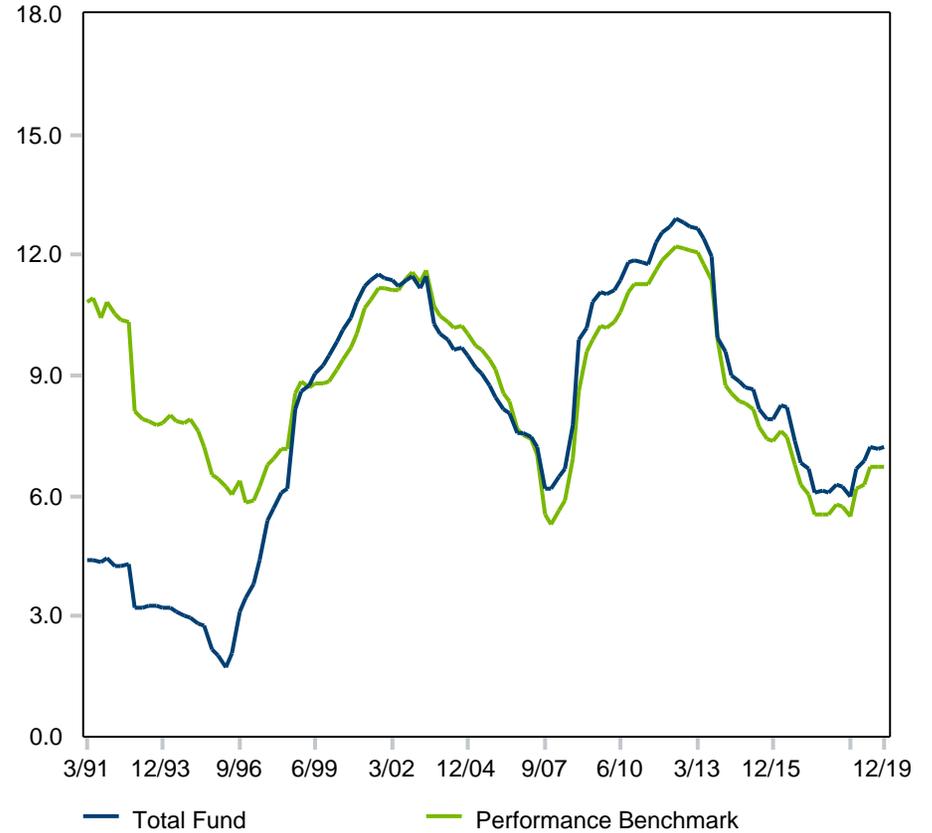
\*The BRS Recycling Tax Credit represents an annual income stream of \$16 million dollars over the next 14 years, which ATRS purchased for approximately \$162 million. This represents an approximate 9.9% yield for the 2017 fiscal year. The value shown above represents the year-end market value in accordance with GASB Statement 72, representing the 14 years of annual income, and has been incorporated into Total Fixed Income and Total Fund performance.

**Total Fund Risk Profile**

**Annualized Return vs. Annualized Standard Deviation  
5 Years**



**Rolling 5 Years Standard Deviation**

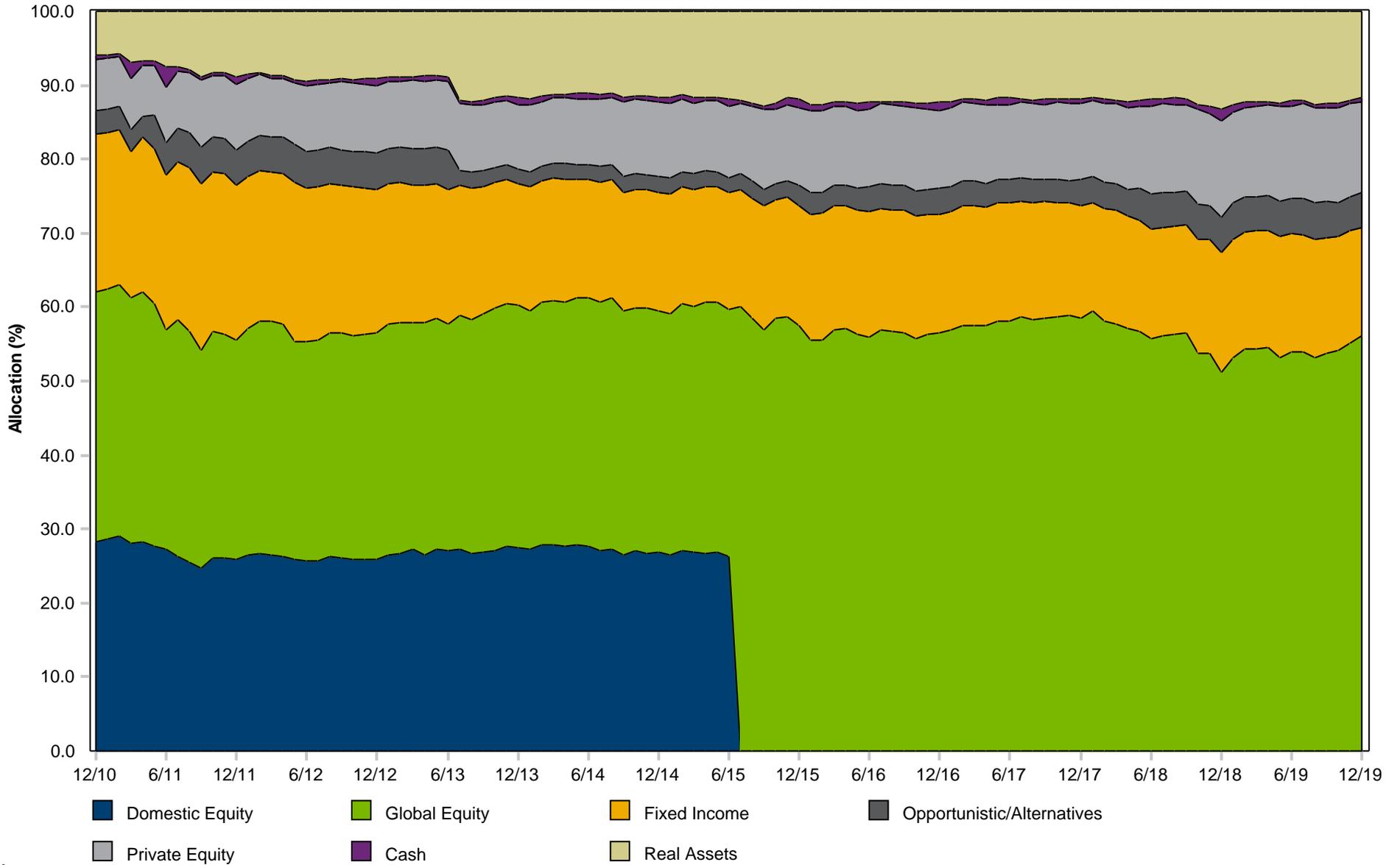


**5 Years Historical Statistics**

	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Total Fund	0.33	1.91	0.17	0.93	1.02	0.07	1.03	8.46	7.20	0.96
Performance Benchmark	0.00	0.00	N/A	1.00	1.05	0.00	1.00	8.14	6.72	1.00
FTSE 3 Month T-Bill	-7.03	6.72	-1.05	0.00	N/A	1.04	0.00	1.05	0.26	0.04

Historical Asset Allocation by Segment

Total Fund



Asset Allocation as of 12/31/2019	Values in \$1,000								
	Total Equity	U.S. Bond	Real Estate	Private Equity	Cash	Total	Percent of Total	Interim Policy	Long-Term Target
Jacobs Levy 130/30	\$682,002.0	--	--	--	--	\$682,002.0	3.72%		
Allianz Structured Alpha U.S. 250	\$198,135.4	--	--	--	--	\$198,135.4	1.08%		
Allianz Structured Alpha Global 500	\$929,320.6	--	--	--	--	\$929,320.6	5.07%		
Allianz Structured Alpha Global 350	\$489,934.9	--	--	--	--	\$489,934.9	2.67%		
Kennedy Capital Management	\$576,241.4	--	--	--	--	\$576,241.4	3.15%		
Stephens	\$431,496.3	--	--	--	--	\$431,496.3	2.36%		
Voya Absolute Return	\$593,406.8	--	--	--	--	\$593,406.8	3.24%		
Allianz (Nicholas Applegate)	\$643,162.1	--	--	--	--	\$643,162.1	3.51%		
Pershing Square International	\$95,482.4	--	--	--	--	\$95,482.4	0.52%		
Pershing Square Holdings	\$136,823.6	--	--	--	--	\$136,823.6	0.75%		
SSgA Global Index	\$967,350.1	--	--	--	--	\$967,350.1	5.28%		
BlackRock MSCI ACWI IMI Fund	\$347,324.5	--	--	--	--	\$347,324.5	1.90%		
Wellington Global Perspectives	\$569,135.3	--	--	--	--	\$569,135.3	3.11%		
T. Rowe Price Global Equity	\$997,675.8	--	--	--	--	\$997,675.8	5.45%		
Lazard	\$604,042.8	--	--	--	--	\$604,042.8	3.30%		
D.E. Shaw	\$749,252.5	--	--	--	--	\$749,252.5	4.09%		
GMO Global All Country Equity	\$452,512.3	--	--	--	--	\$452,512.3	2.47%		
Harris Global Equity	\$489,151.8	--	--	--	--	\$489,151.8	2.67%		
Triam Partners	\$72,891.3	--	--	--	--	\$72,891.3	0.40%		
Triam Partners Co-Investments	\$76,926.0	--	--	--	--	\$76,926.0	0.42%		
Capital Guardian & Knight Vinke	\$71.4	--	--	--	--	\$71.4	0.00%		
<b>Total Equity</b>						\$10,102,339.4	55.15%	54.83%	53.00%
BlackRock	--	\$416,341.9	--	--	--	\$416,341.9	2.27%		
Loomis Sayles	--	\$435,781.4	--	--	--	\$435,781.4	2.38%		
Putnam	--	\$381,300.0	--	--	--	\$381,300.0	2.08%		
SSgA Aggregate Bond Index	--	\$489,695.5	--	--	--	\$489,695.5	2.67%		
Wellington Global Total Return	--	\$343,309.3	--	--	--	\$343,309.3	1.87%		
Reams Core Plus Bond Fund	--	\$363,173.6	--	--	--	\$363,173.6	1.98%		
BRS Recycling Tax Credit	--	\$192,000.0	--	--	--	\$192,000.0	1.05%		
BRS Recycling Tax Credit Phase 2	--	\$77,031.6	--	--	--	\$77,031.6	0.42%		
<b>Total Fixed Income</b>						\$2,698,633.2	14.73%	15.00%	15.00%
Anchorage	--	--	--	\$74,469.0	--	\$74,469.0	0.41%		
Capula	--	--	--	\$84,551.0	--	\$84,551.0	0.46%		
Graham	--	--	--	\$62,959.7	--	\$62,959.7	0.34%		
York	--	--	--	\$59,056.3	--	\$59,056.3	0.32%		
Circumference Group Core Value	--	--	--	\$28,725.7	--	\$28,725.7	0.16%		
Aeolus Keystone Fund	--	--	--	\$286,278.1	--	\$286,278.1	1.56%		
Nephila Rubik Holdings	--	--	--	\$44,391.9	--	\$44,391.9	0.24%		
Parametric Global Defensive Equity	--	--	--	\$174,713.0	--	\$174,713.0	0.95%		
Man Alternative Risk Premia	--	--	--	\$98,605.3	--	\$98,605.3	0.54%		
CFM ISD Fund 1.5x	--	--	--	\$98,679.9	--	\$98,679.9	0.54%		
<b>Total Opportunistic/Alternatives</b>						\$1,012,429.9	5.53%	5.79%	5.00%
<b>Real Estate</b>			\$1,331,758.2			\$1,331,758.2	7.27%		
<b>Timber</b>			\$298,793.8			\$298,793.8	1.63%		
<b>Agriculture</b>			\$199,238.4			\$199,238.4	1.09%		
<b>Infrastructure</b>			\$302,890.0			\$302,890.0	1.65%		
<b>Total Real Assets</b>						\$2,132,680.4	11.64%	12.38%	15.00%
<b>Total Private Equity</b>				\$2,254,497.4		\$2,254,497.4	12.31%	12.00%	12.00%
<b>Total Cash</b>					\$116,873.9	\$116,873.9	0.64%	0.00%	0.00%
<b>Total Fund</b>	<b>\$10,102,339.4</b>	<b>\$2,698,633.2</b>	<b>\$2,132,680.4</b>	<b>\$3,266,927.3</b>	<b>\$116,873.9</b>	<b>\$18,317,454.3</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>

\*Note: The market values for the Real Assets and Private Equity investments shown above are lagged one quarter and adjusted for the current quarter's cash flows. Market values and allocation percentages may not add to the sum total due to rounding.

Asset Allocation as of 12/31/2019				Values in \$1,000			
	Real Estate	Percent of Real Estate	Percent of Total Fund		Real Estate	Percent of Real Estate	Percent of Total Fund
Almanac Realty Securities Fund V	\$462.4	0.03%	0.00%	LaSalle Income & Growth Fund VI	\$6,791.9	0.51%	0.04%
Almanac Realty Securities Fund VI	\$5,383.7	0.40%	0.03%	LaSalle Income & Growth Fund VII	\$13,498.5	1.01%	0.07%
Almanac Realty Securities Fund VII	\$12,024.5	0.90%	0.07%	Lone Star Real Estate Fund IV	\$8,979.8	0.67%	0.05%
Almanac Realty Securities Fund VIII	\$2,513.0	0.19%	0.01%	Long Wharf Real Estate Partners V	\$24,349.1	1.83%	0.13%
American Center	\$48,842.3	3.67%	0.27%	Metropolitan RE Co-Investments	\$12,394.0	0.93%	0.07%
AR Insurance	\$2,203.6	0.17%	0.01%	Met Life Commercial Mtg Inc Fund	\$49,340.8	3.70%	0.27%
AR Teachers Retirement Building	\$5,177.6	0.39%	0.03%	New Boston Fund VII	\$100.1	0.01%	0.00%
Blackstone Real Estate Partners VII	\$24,499.6	1.84%	0.13%	O'Connor NAPP II	\$9,984.2	0.75%	0.05%
Blackstone RE Europe VI	\$1,505.6	0.11%	0.01%	Olympus	\$355.4	0.03%	0.00%
Carlyle Realty Partners VII	\$13,471.7	1.01%	0.07%	PRISA	\$273,340.4	20.52%	1.49%
Carlyle Realty VIII	\$5,255.0	0.39%	0.03%	Recoveries Land	\$70.0	0.01%	0.00%
CBREI SP U.S. Opportunity V	\$9,734.5	0.73%	0.05%	Rockwood Capital RE Partners IX	\$7,973.2	0.60%	0.04%
CBREI SP VIII	\$22,617.8	1.70%	0.12%	Rockwood Capital RE XI	\$264.6	0.02%	0.00%
Cerberus Institutional RE Partners III	\$14,247.9	1.07%	0.08%	Rose Law Firm	\$4,337.8	0.33%	0.02%
Chenal Retirement Village	\$1,900.0	0.14%	0.01%	Texarkana DHS	\$1,639.7	0.12%	0.01%
Calmwater	\$23,175.5	1.74%	0.13%	Torchlight Debt Opportunity Fund IV	\$5,083.0	0.38%	0.03%
Fletcher Properties	\$1,160.9	0.09%	0.01%	Torchlight Debt Opportunity Fund V	\$8,418.1	0.63%	0.05%
FPA Core Plus IV	\$18,039.9	1.35%	0.10%	Torchlight Debt Opportunity Fund VI	\$9,596.5	0.72%	0.05%
Harbert European Real Estate	\$22,440.5	1.69%	0.12%	UBS Trumbull Property Fund	\$221,458.0	16.63%	1.21%
Heitman European Property IV	\$2,515.9	0.19%	0.01%	UBS Trumbull Property Income Fund	\$52,870.3	3.97%	0.29%
JP Morgan Strategic Property Fund	\$281,217.3	21.12%	1.54%	Victory	\$32,899.9	2.47%	0.18%
Kayne Anderson V	\$14,227.8	1.07%	0.08%	Walton Street Real Estate Debt II	\$1,973.8	0.15%	0.01%
Landmark Fund VI	\$2,872.9	0.22%	0.02%	West Mphs. DHS	\$2,323.5	0.17%	0.01%
Landmark Real Estate VIII	\$8,087.9	0.61%	0.04%	Westbrook IX	\$13,354.7	1.00%	0.07%
LaSalle Asia Opportunity Fund IV	\$2,774.4	0.21%	0.02%	Westbrook Real Estate Fund X	\$13,167.2	0.99%	0.07%
LaSalle Asia Opportunity Fund V	\$10,841.8	0.81%	0.06%				
<b>Total Real Estate</b>					<b>\$1,331,758.2</b>	<b>100.00%</b>	<b>7.27%</b>

\*Note: The market values for the real estate investments shown above are lagged one quarter and adjusted for the current quarter's cash flows. Market values and allocation percentages may not add to the sum total due to rounding.

Asset Allocation as of 12/31/2019				Values in \$1,000			
	Private Equity	Percent of Private Equity	Percent of Total Fund		Private Equity	Percent of Private Equity	Percent of Total Fund
Arlington Capital IV	\$26,946.0	1.20%	0.15%	Insight Equity II	\$25,739.3	1.14%	0.14%
Arlington Capital V	\$44.7	0.00%	0.00%	Insight Mezzanine I	\$3,742.2	0.17%	0.02%
Advent GPE VI	\$6,165.8	0.27%	0.03%	JF Lehman III	\$35,529.3	1.58%	0.19%
Altus Capital II	\$9,139.6	0.41%	0.05%	JF Lehman IV	\$30,403.4	1.35%	0.17%
American Industrial Partners VI	\$21,514.8	0.95%	0.12%	KPS III	\$138.2	0.01%	0.00%
American Industrial Partners VII	\$345.3	0.02%	0.00%	KPS IV	\$17,681.7	0.78%	0.10%
Altaris Constellation Partners	\$21,671.9	0.96%	0.12%	Levine Leichtman V	\$17,700.7	0.79%	0.10%
Altaris Health Partners IV	\$13,373.9	0.59%	0.07%	Lime Rock III	\$21,846.0	0.97%	0.12%
Atlas Capital II	\$14,354.4	0.64%	0.08%	LLR III	\$8,966.9	0.40%	0.05%
Audax Mezzanine III	\$4,087.1	0.18%	0.02%	Mason Wells III	\$6,178.0	0.27%	0.03%
Big River - Equity	\$327,000.0	14.50%	1.79%	NGP IX	\$1,084.3	0.05%	0.01%
Big River - Equity (Phase 2)	\$58,295.6	2.59%	0.32%	NGP X	\$9,011.8	0.40%	0.05%
Big River - Holdings Note 2023	\$12,871.4	0.57%	0.07%	NGP XI	\$25,776.8	1.14%	0.14%
Big River - Holdings Note 3/16/23	\$5,397.4	0.24%	0.03%	NGP XII	\$13,917.0	0.62%	0.08%
Bison V	\$15,756.1	0.70%	0.09%	One Rock Capital Partners II	\$23,914.4	1.06%	0.13%
Boston Ventures VII	\$16,742.0	0.74%	0.09%	PineBridge	\$15,099.2	0.67%	0.08%
Boston Ventures IX	\$16,671.4	0.74%	0.09%	Riverside IV	\$2,223.1	0.10%	0.01%
BV VIII	\$19,289.4	0.86%	0.11%	Riverside V	\$21,728.2	0.96%	0.12%
Castlelake II	\$17,033.6	0.76%	0.09%	Riverside VI	\$3,572.1	0.16%	0.02%
Castlelake III	\$17,812.6	0.79%	0.10%	Siris III	\$16,935.8	0.75%	0.09%
Clearlake V	\$27,210.1	1.21%	0.15%	Siris IV	\$14,064.4	0.62%	0.08%
Court Square III	\$41,231.2	1.83%	0.23%	SK Capital V	\$8,018.0	0.36%	0.04%
CSFB-ATRS 2005-1 Series	\$50,424.1	2.24%	0.28%	Sycamore Partners II	\$17,190.8	0.76%	0.09%
CSFB-ATRS 2006-1 Series	\$83,968.6	3.72%	0.46%	Sycamore Partners III	\$2,446.4	0.11%	0.01%
Diamond State Ventures II	\$6,059.9	0.27%	0.03%	TA XI	\$22,541.4	1.00%	0.12%
Doughty Hanson Tech I	\$399.3	0.02%	0.00%	Tennenbaum VI	\$12,181.7	0.54%	0.07%
DW Healthcare III	\$22,974.2	1.02%	0.13%	Thoma Bravo Discover	\$10,930.5	0.48%	0.06%
DW Healthcare IV	\$28,458.6	1.26%	0.16%	Thoma Bravo Discover II	\$8,303.7	0.37%	0.05%
DW Healthcare V	\$3,503.7	0.16%	0.02%	Thoma Bravo XI	\$27,409.1	1.22%	0.15%
EnCap IX	\$13,898.8	0.62%	0.08%	Thoma Bravo XII	\$37,187.4	1.65%	0.20%
EnCap VIII	\$12,860.7	0.57%	0.07%	Thoma Bravo XIII	\$10,685.4	0.47%	0.06%
EnCap X	\$26,636.8	1.18%	0.15%	Vista Equity III	\$4,794.5	0.21%	0.03%
EnCap XI	\$9,024.3	0.40%	0.05%	Vista Foundation II	\$16,067.3	0.71%	0.09%
Franklin Park Series	\$626,418.3	27.79%	3.42%	Vista Foundation III	\$27,719.4	1.23%	0.15%
GCG	\$20,330.8	0.90%	0.11%	Wellspring V	\$18,595.2	0.82%	0.10%
GTLA Holdings	\$20,000.0	0.89%	0.11%	Wicks IV	\$21,519.7	0.95%	0.12%
Highland	\$68,031.8	3.02%	0.37%	WNG II	\$7,709.7	0.34%	0.04%
<b>Total Private Equity</b>					<b>\$2,254,497.4</b>	<b>100.00%</b>	<b>12.31%</b>

\*Note: The market values for the private equity investments shown above are lagged one quarter and adjusted for the current quarter's cash flows.  
Market values and allocation percentages may not add to the sum total due to rounding.



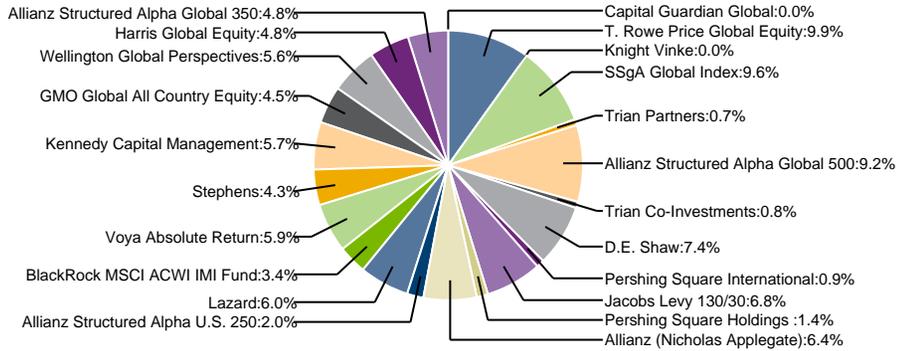
## Total Equity

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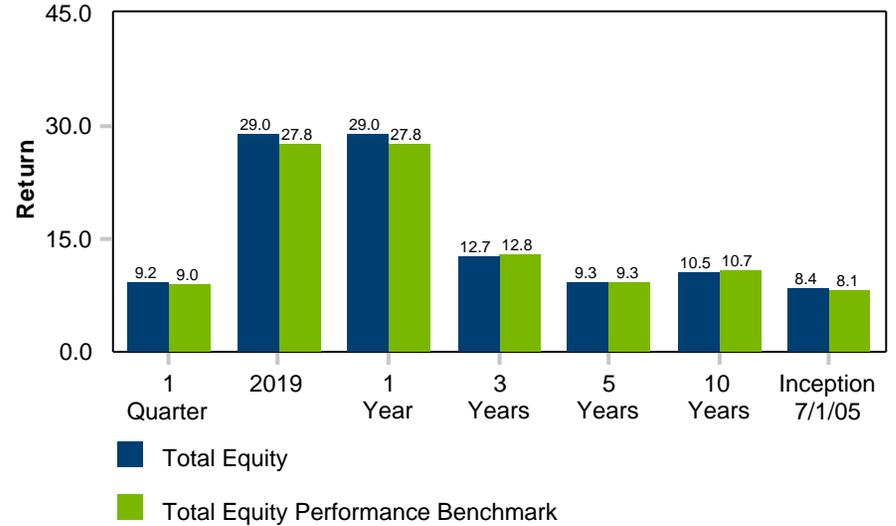
Total Equity Portfolio Overview

Current Allocation

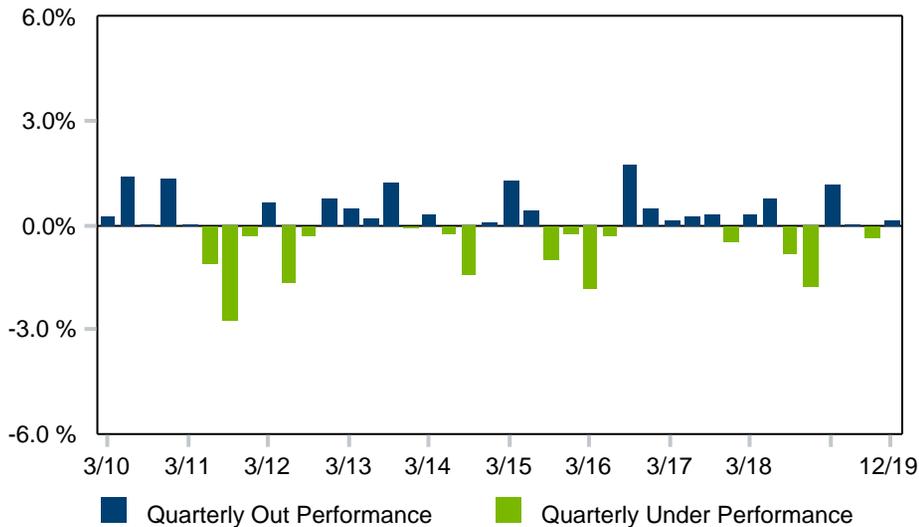
December 31, 2019 : \$10,102M



Return Summary



Quarterly Excess Performance



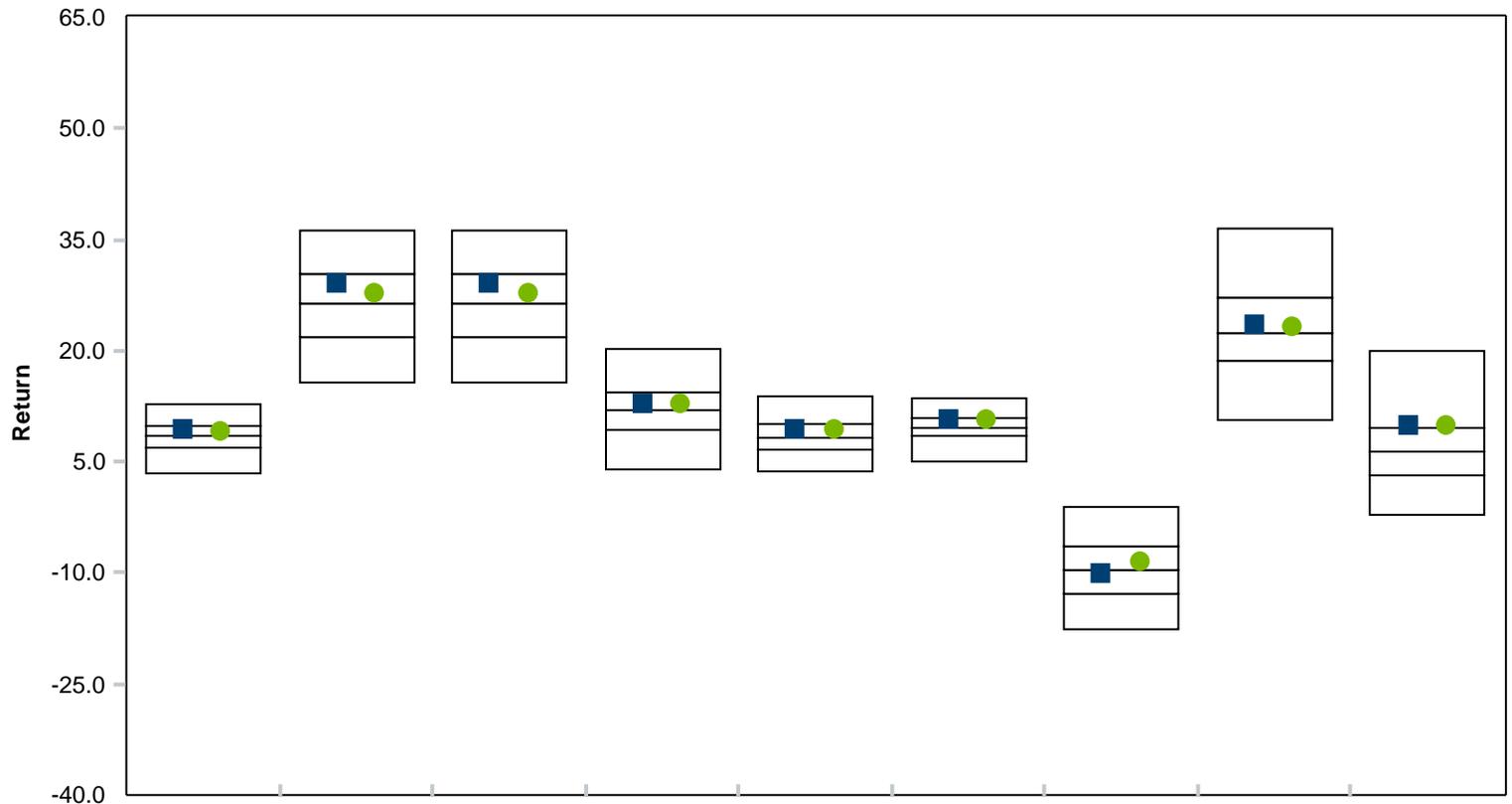
Ratio of Cumulative Wealth - 10 Years



The inception of the Total Equity asset class was July 1, 2015. Performance prior to July 2015 represents the weighted average of the U.S. Equity and Global Equity asset class monthly returns. For historical performance of the U.S. Equity and Global Equity asset classes please see page 141 of this report.

As of December 31, 2019  
Peer Group Analysis

IM Global Equity (SA+CF)

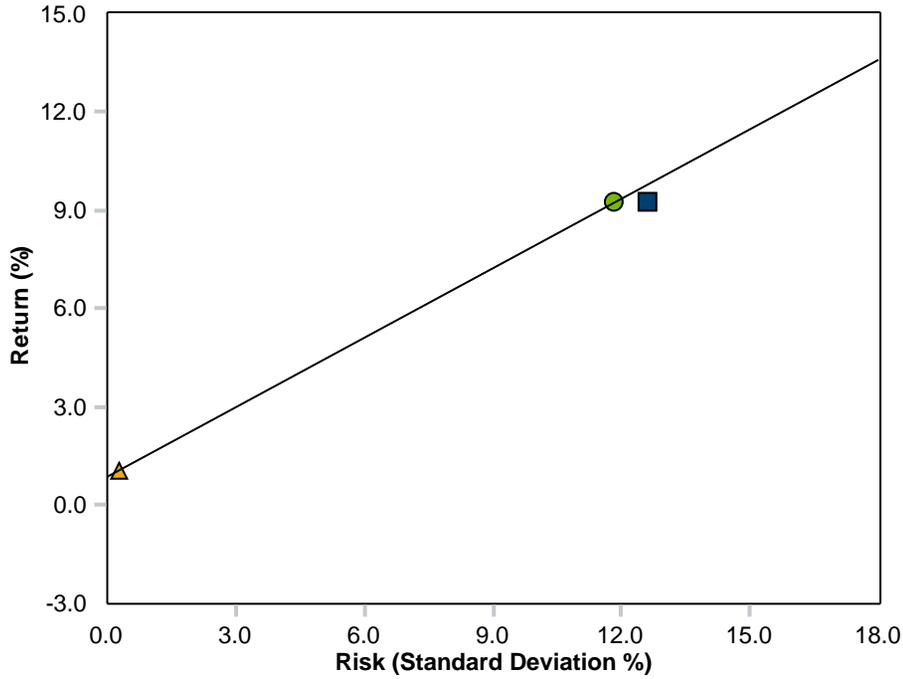


	1 Quarter	2019	1 Year	3 Years	5 Years	10 Years	2018	2017	2016
■ Total Equity	9.2 (35)	29.0 (34)	29.0 (34)	12.7 (41)	9.3 (33)	10.5 (33)	-10.2 (56)	23.5 (45)	9.9 (24)
● Total Equity Performance Benchmark	9.0 (39)	27.8 (41)	27.8 (41)	12.8 (39)	9.3 (33)	10.7 (29)	-8.7 (43)	23.1 (47)	9.8 (24)
5th Percentile	12.8	36.3	36.3	20.3	13.8	13.6	-1.2	36.5	19.8
1st Quartile	9.7	30.3	30.3	14.4	10.2	10.9	-6.4	27.3	9.5
Median	8.4	26.2	26.2	11.9	8.2	9.6	-9.5	22.5	6.3
3rd Quartile	6.9	21.9	21.9	9.2	6.5	8.4	-12.9	18.6	3.1
95th Percentile	3.4	15.6	15.6	4.0	3.8	5.1	-17.7	10.7	-2.2
Population	365	365	365	352	317	197	522	544	569

Parenteses contain percentile rankings.

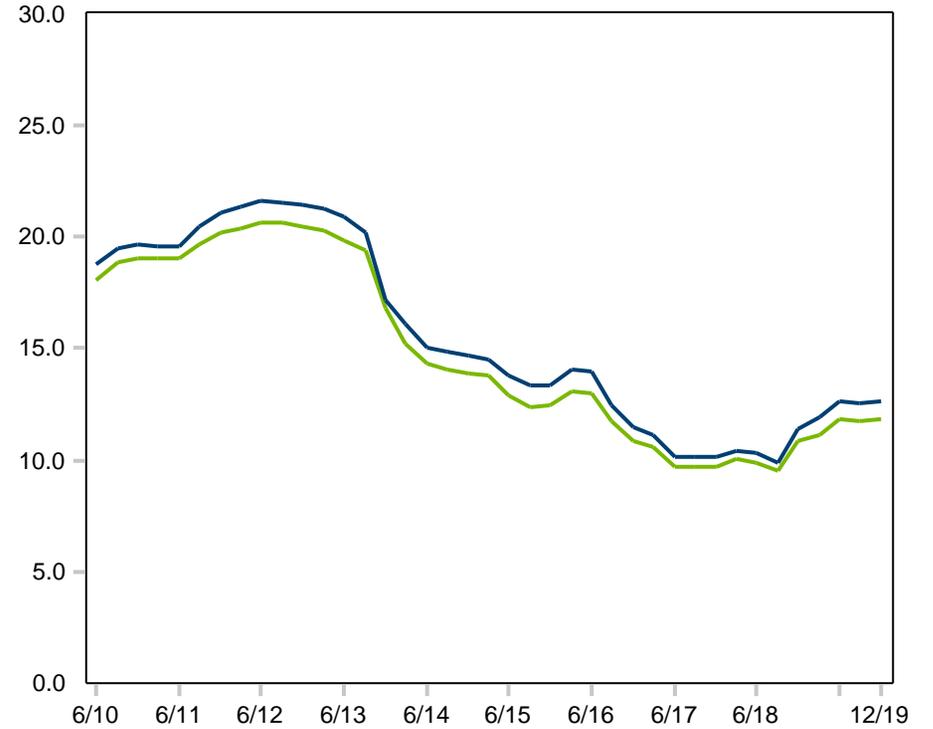
**Total Equity Risk Profile**

**Annualized Return vs. Annualized Standard Deviation  
5 Years**



- Total Equity
- Total Equity Performance Benchmark
- ▲ FTSE 3 Month T-Bill

**Rolling 5 Years Standard Deviation**



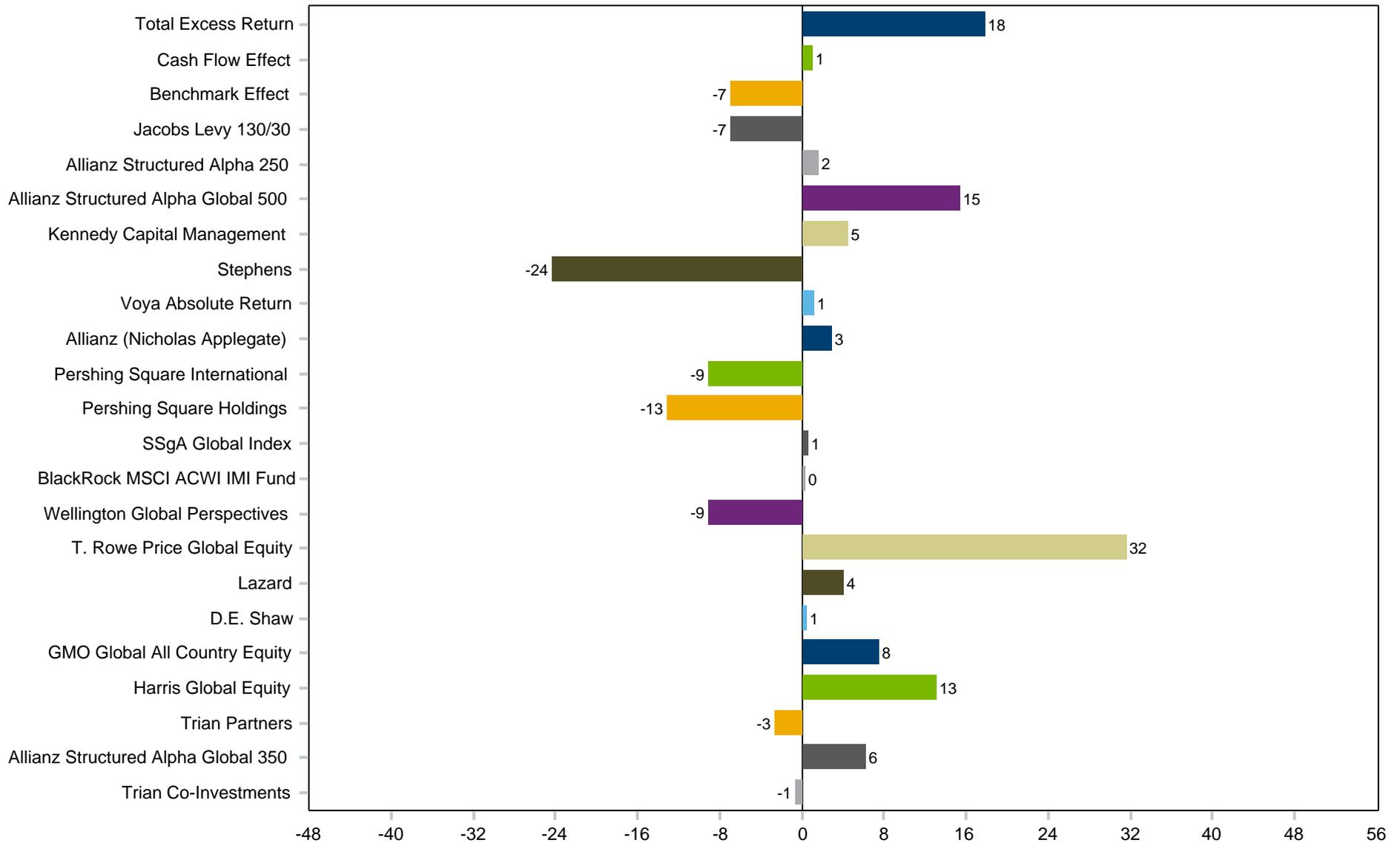
- Total Equity
- Total Equity Performance Benchmark

**5 Years Historical Statistics**

	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Total Equity	0.10	1.83	0.06	0.98	0.69	-0.43	1.06	9.27	12.61	0.99
Total Equity Performance Benchmark	0.00	0.00	N/A	1.00	0.72	0.00	1.00	9.26	11.84	1.00
FTSE 3 Month T-Bill	-8.54	11.84	-0.72	0.00	N/A	1.04	0.00	1.05	0.26	0.03

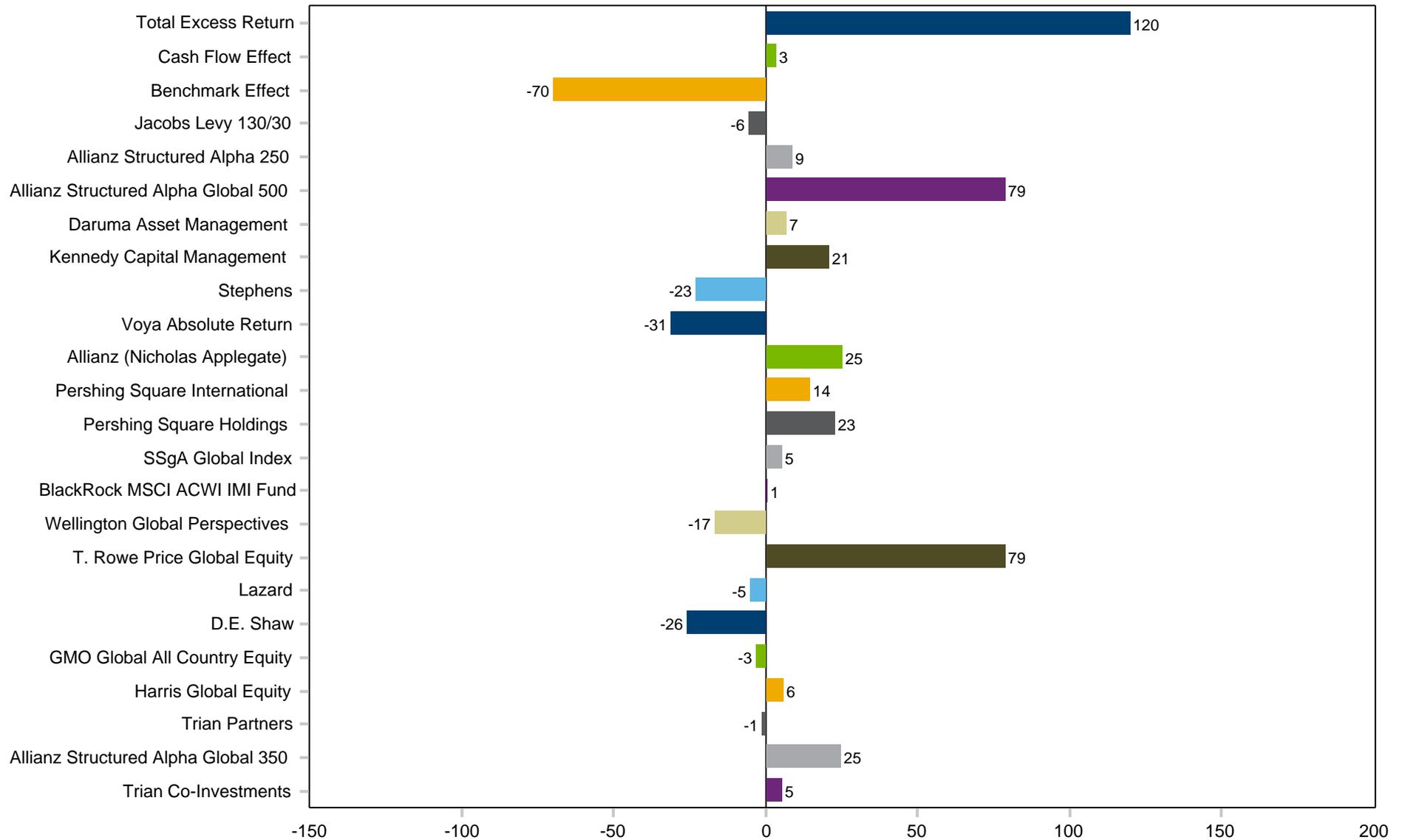
Asset Class Attribution

1 Quarter



Asset Class Attribution

1 Year

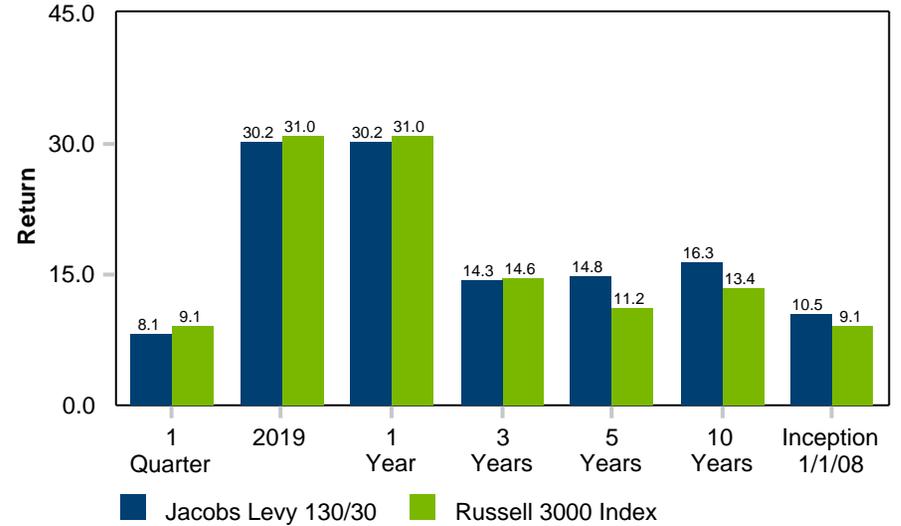


Jacobs Levy 130/30 Performance Summary

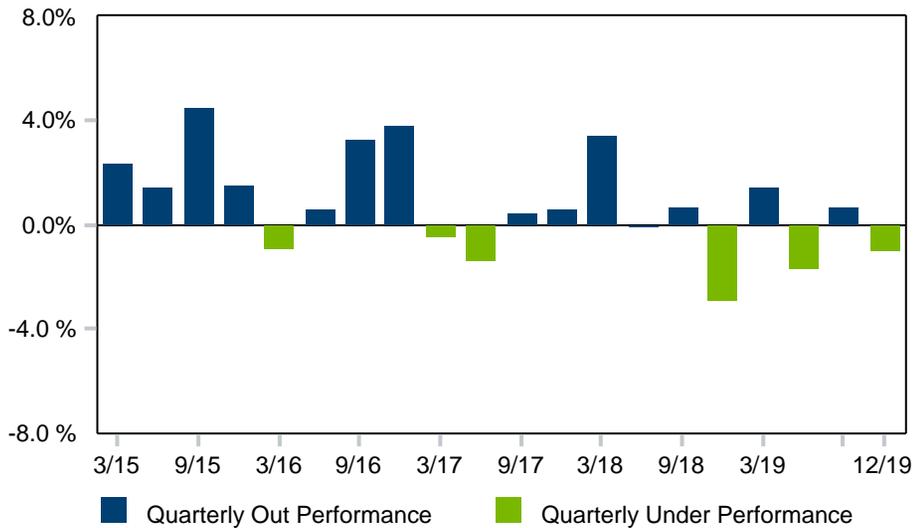
Account Information

Account Name: Jacobs Levy 130/30  
 Inception Date: 12/31/2007  
 Account Structure: Commingled Fund  
 Asset Class: US Equity  
 Benchmark: Russell 3000 Index  
 Peer Group: IM U.S. Equity (SA+CF)

Return Summary



Quarterly Excess Performance

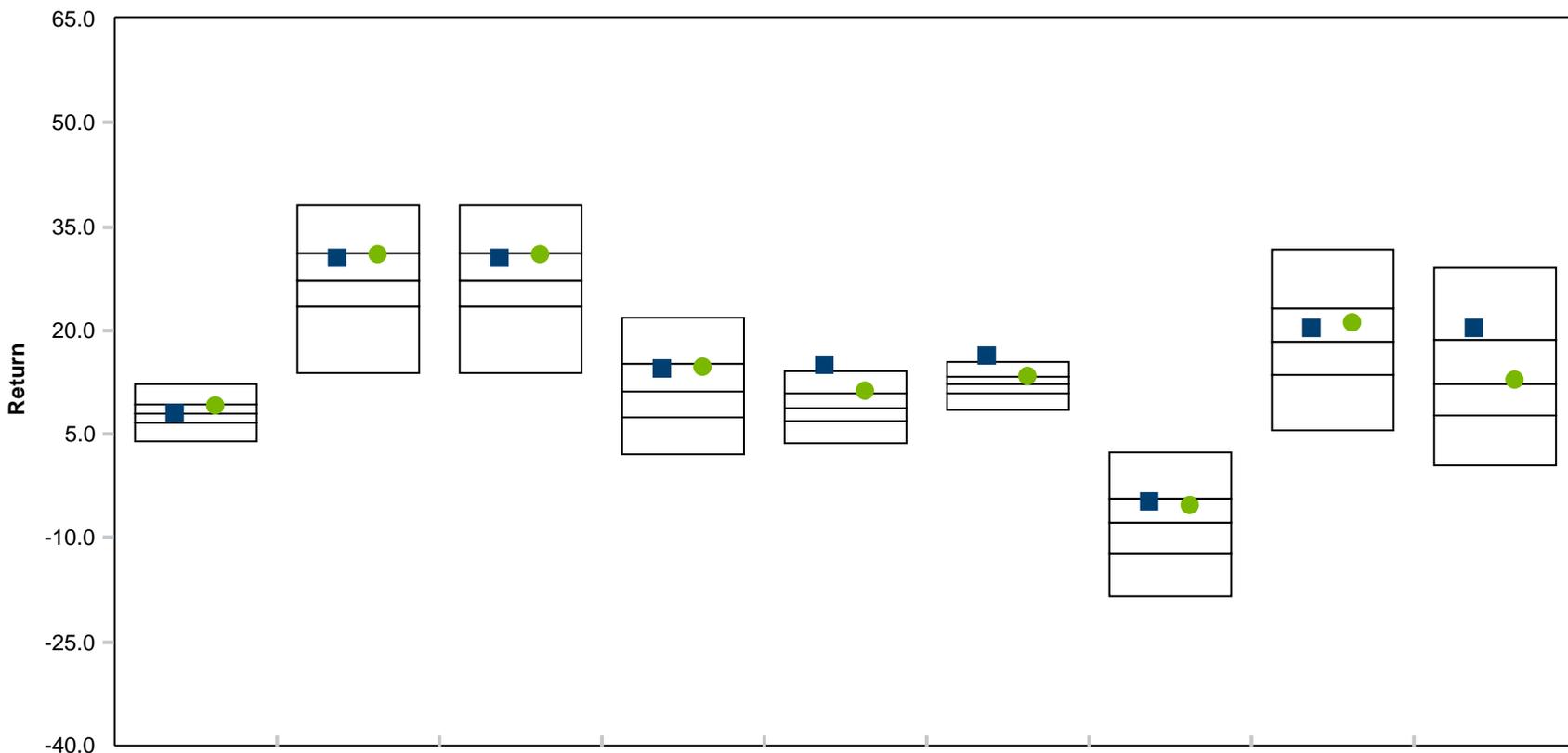


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM U.S. Equity (SA+CF)

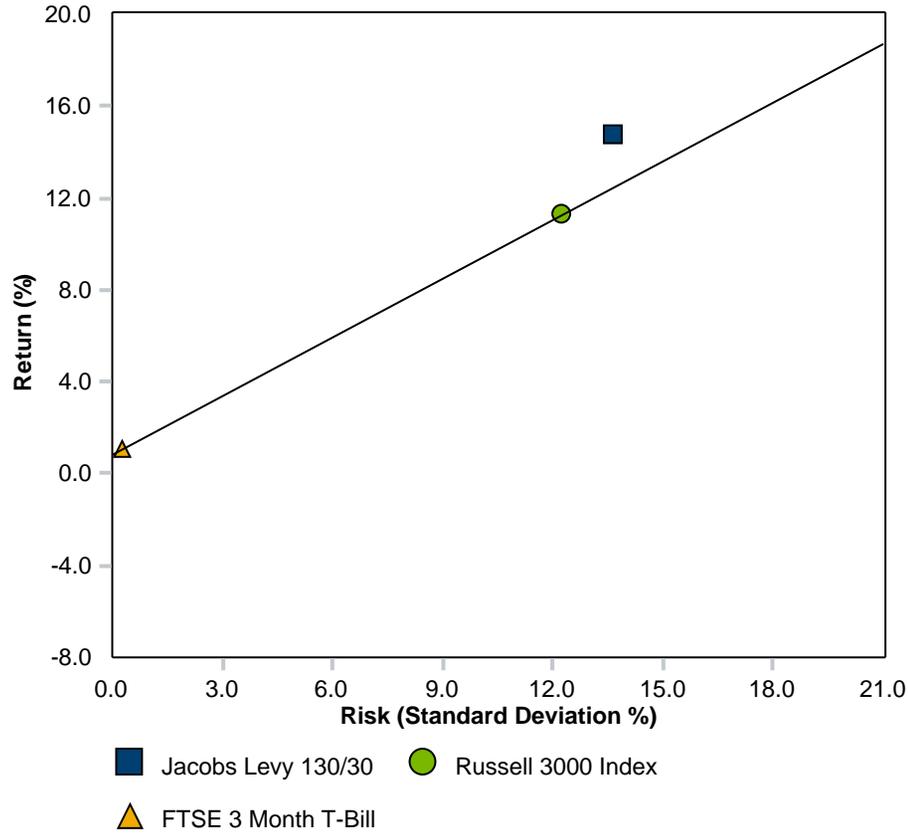


	1 Quarter	2019	1 Year	3 Years	5 Years	10 Years	2018	2017	2016
■ Jacobs Levy 130/30	8.1 (48)	30.2 (32)	30.2 (32)	14.3 (31)	14.8 (4)	16.3 (2)	-4.7 (29)	20.3 (41)	20.2 (20)
● Russell 3000 Index	9.1 (28)	31.0 (26)	31.0 (26)	14.6 (29)	11.2 (23)	13.4 (25)	-5.2 (33)	21.1 (35)	12.7 (48)
5th Percentile	12.1	38.2	38.2	21.8	14.1	15.4	2.3	31.8	29.1
1st Quartile	9.3	31.2	31.2	15.1	10.9	13.4	-4.2	23.2	18.7
Median	8.0	27.3	27.3	11.1	8.9	12.2	-7.8	18.3	12.2
3rd Quartile	6.6	23.3	23.3	7.4	7.0	11.0	-12.4	13.6	7.6
95th Percentile	3.9	13.9	13.9	2.2	3.7	8.6	-18.5	5.6	0.5
Population	1,620	1,616	1,616	1,578	1,510	1,285	2,425	2,542	2,682

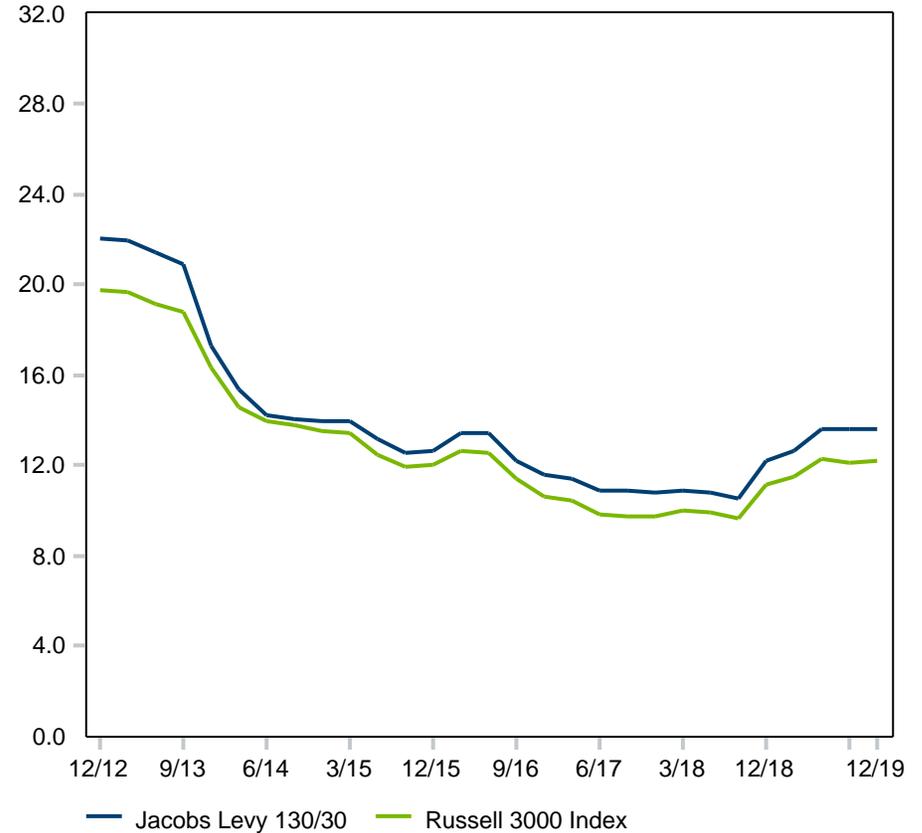
Parenteses contain percentile rankings.

Jacobs Levy 130/30 Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



Rolling 5 Years Standard Deviation



5 Years Historical Statistics

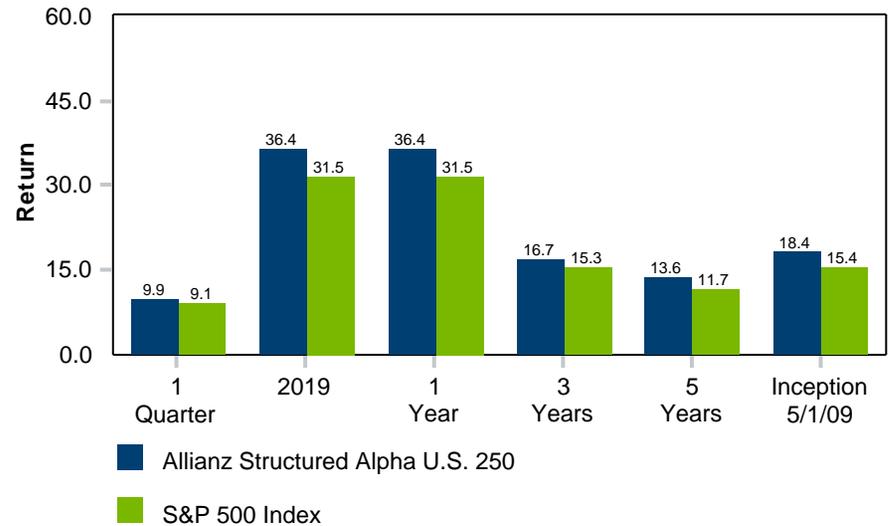
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Jacobs Levy 130/30	3.33	3.89	0.85	0.92	1.01	2.55	1.07	14.77	13.63	0.96
Russell 3000 Index	0.00	0.00	N/A	1.00	0.85	0.00	1.00	11.24	12.23	1.00
FTSE 3 Month T-Bill	-10.40	12.23	-0.85	0.00	N/A	1.04	0.00	1.05	0.26	0.04

Allianz Structured Alpha U.S. 250 Performance Summary

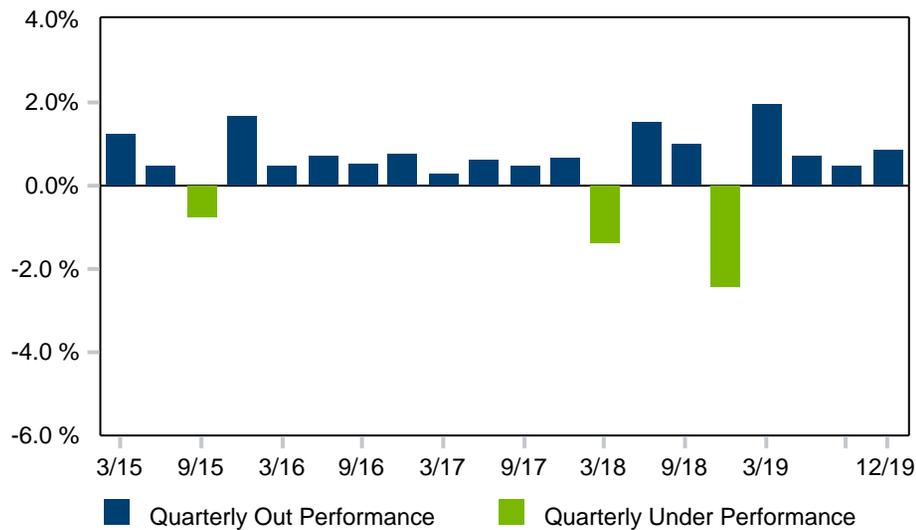
Account Information

Account Name: Allianz Structured Alpha U.S. 250  
 Inception Date: 04/30/2009  
 Account Structure: Commingled Fund  
 Asset Class: US Equity  
 Benchmark: S&P 500 Index  
 Peer Group: IM U.S. Equity (SA+CF)

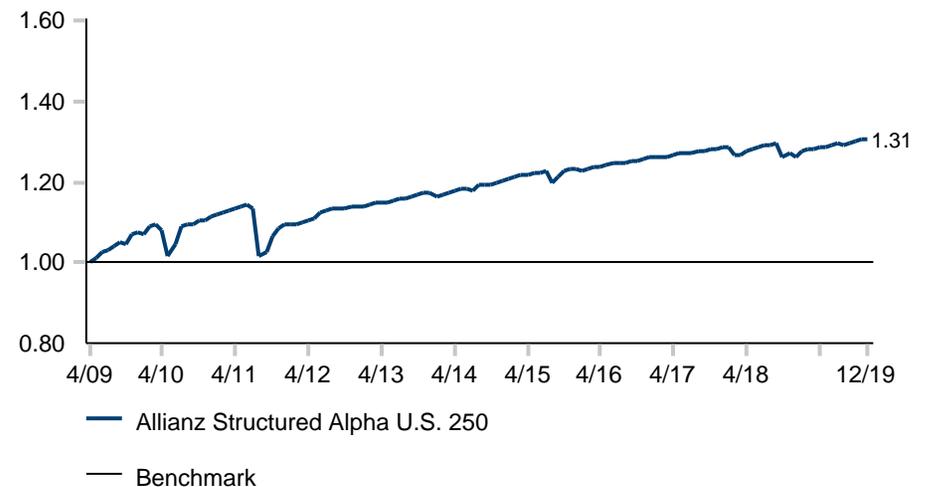
Return Summary



Quarterly Excess Performance

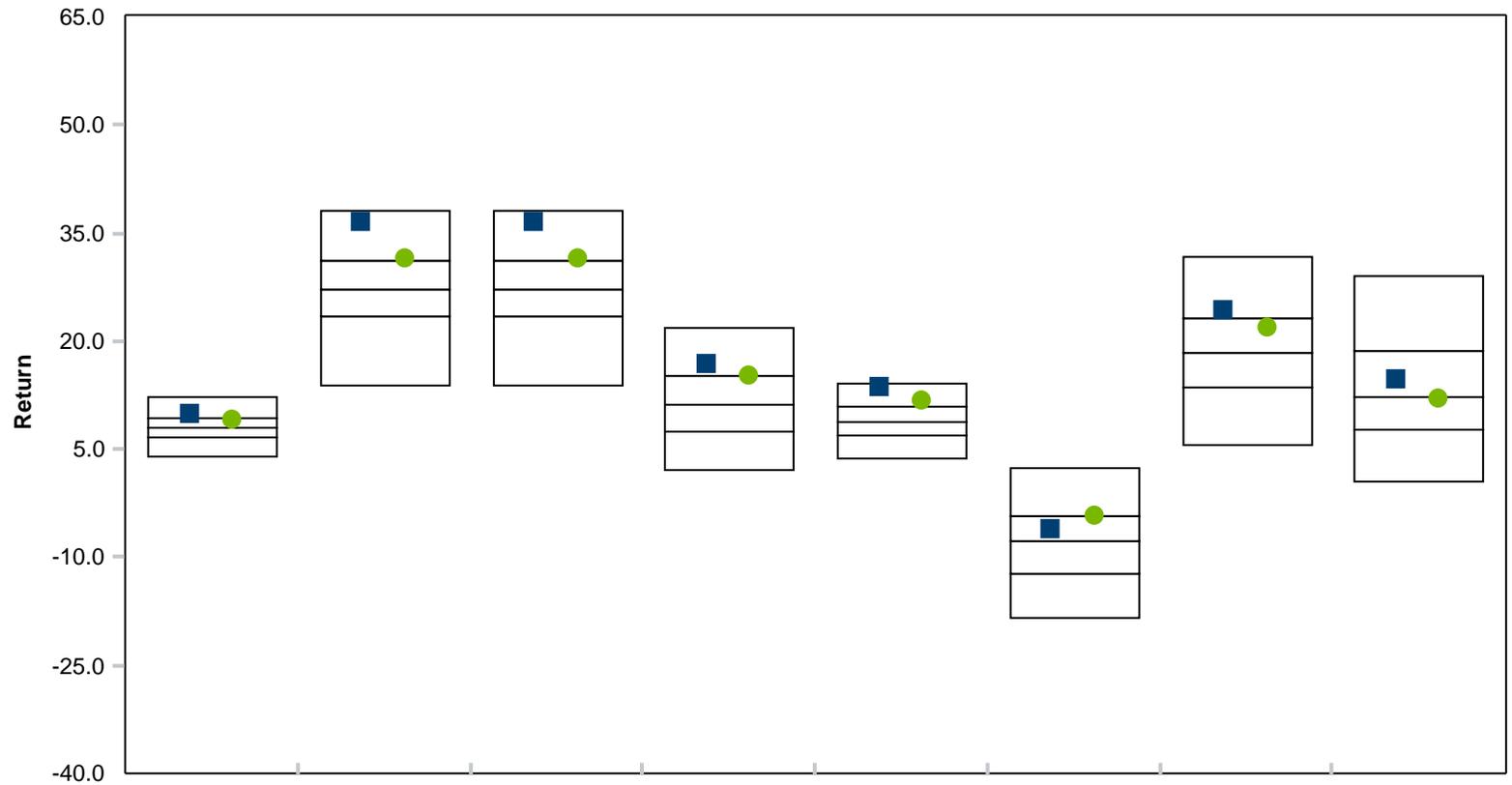


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM U.S. Equity (SA+CF)

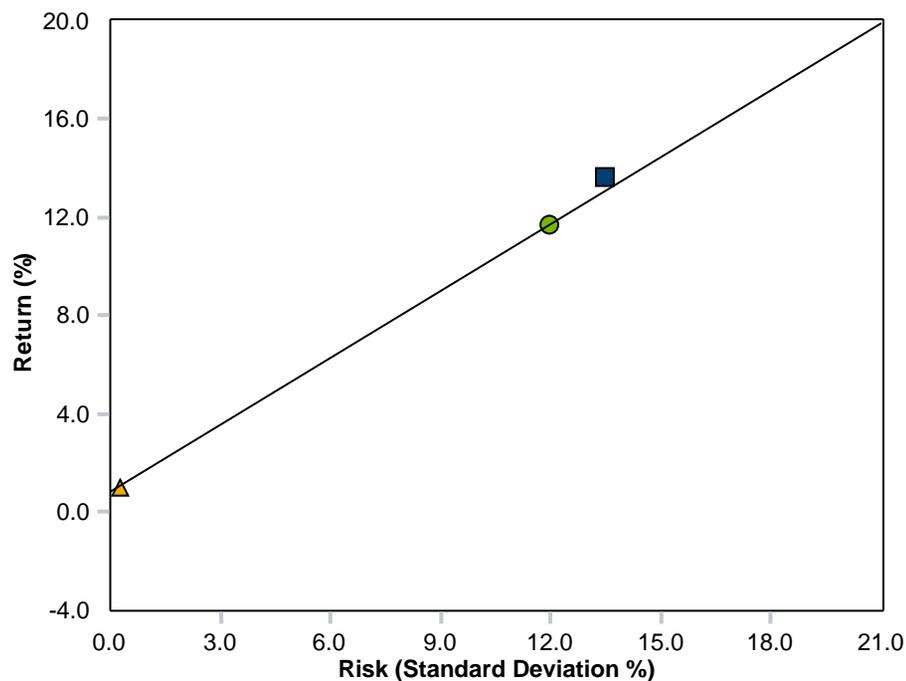


	1 Quarter	2019	1 Year	3 Years	5 Years	2018	2017	2016
■ Allianz Structured Alpha U.S. 250	9.9 (19)	36.4 (9)	36.4 (9)	16.7 (18)	13.6 (8)	-6.2 (40)	24.2 (22)	14.7 (41)
● S&P 500 Index	9.1 (29)	31.5 (24)	31.5 (24)	15.3 (25)	11.7 (19)	-4.4 (27)	21.8 (31)	12.0 (51)
5th Percentile	12.1	38.2	38.2	21.8	14.1	2.3	31.8	29.1
1st Quartile	9.3	31.2	31.2	15.1	10.9	-4.2	23.2	18.7
Median	8.0	27.3	27.3	11.1	8.9	-7.8	18.3	12.2
3rd Quartile	6.6	23.3	23.3	7.4	7.0	-12.4	13.6	7.6
95th Percentile	3.9	13.9	13.9	2.2	3.7	-18.5	5.6	0.5
Population	1,620	1,616	1,616	1,578	1,510	2,425	2,542	2,682

parentheses contain percentile rankings.

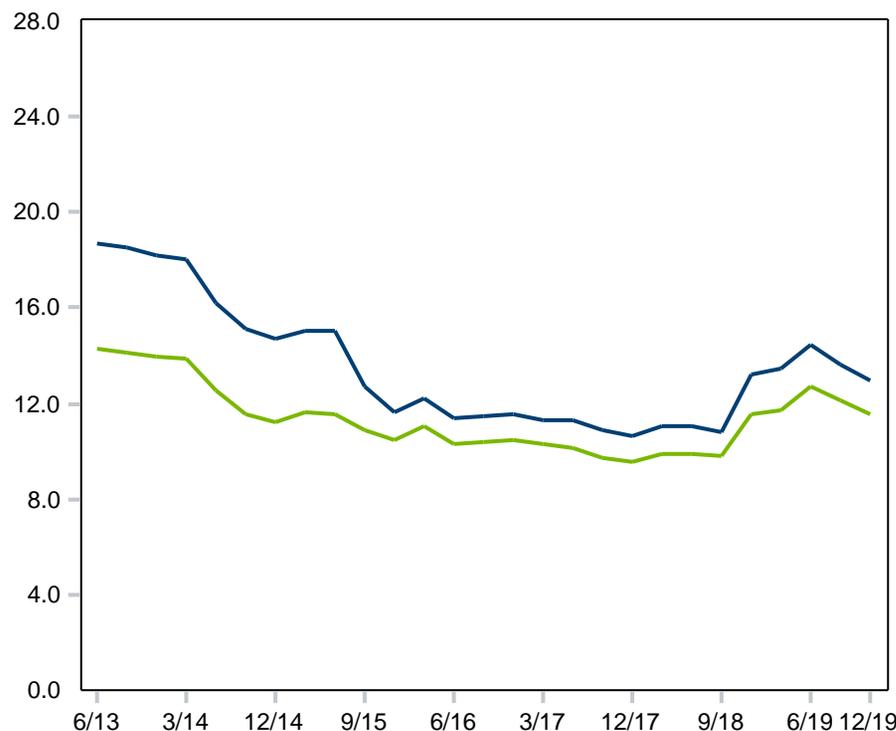
Allianz Structured Alpha U.S. 250 Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



- Allianz Structured Alpha U.S. 250
- S&P 500 Index
- ▲ FTSE 3 Month T-Bill

Rolling 4 Years Standard Deviation



- Allianz Structured Alpha U.S. 250
- S&P 500 Index

5 Years Historical Statistics

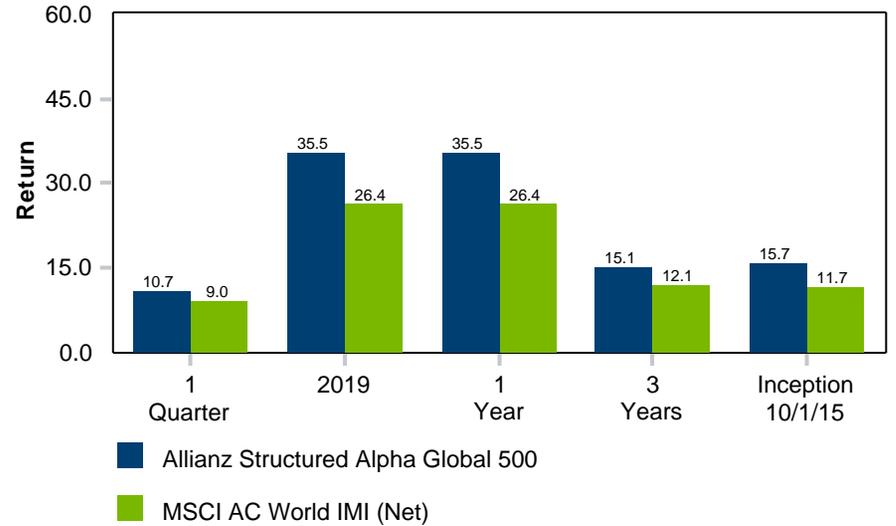
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Allianz Structured Alpha U.S. 250	1.92	2.23	0.86	0.98	0.94	0.51	1.12	13.62	13.52	0.99
S&P 500 Index	0.00	0.00	N/A	1.00	0.90	0.00	1.00	11.70	11.98	1.00
FTSE 3 Month T-Bill	-10.78	11.97	-0.90	0.00	N/A	1.04	0.00	1.05	0.26	0.05

Allianz Structured Alpha Global 500 Performance Summary

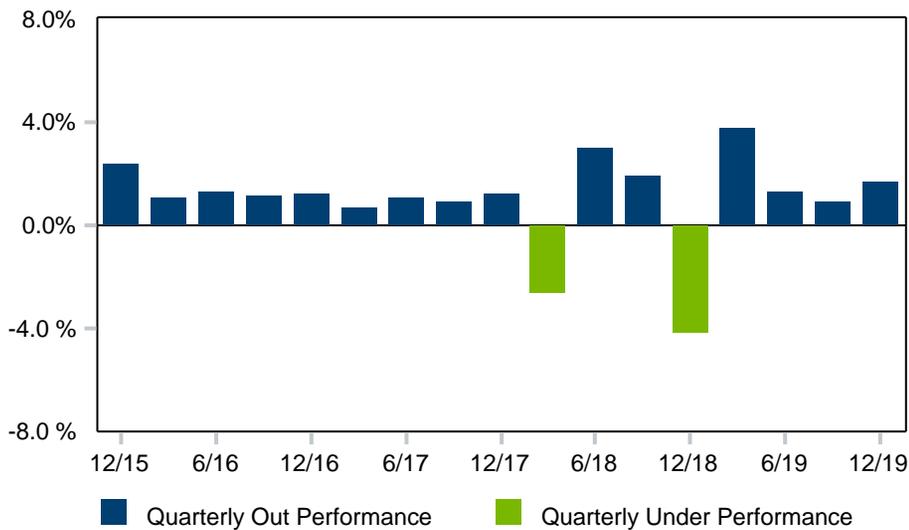
Account Information

Account Name: Allianz Structured Alpha Global 500  
 Inception Date: 10/01/2015  
 Account Structure: Commingled Fund  
 Asset Class: Global Equity  
 Benchmark: MSCI AC World IMI (Net)  
 Peer Group: IM Global Equity (SA+CF)

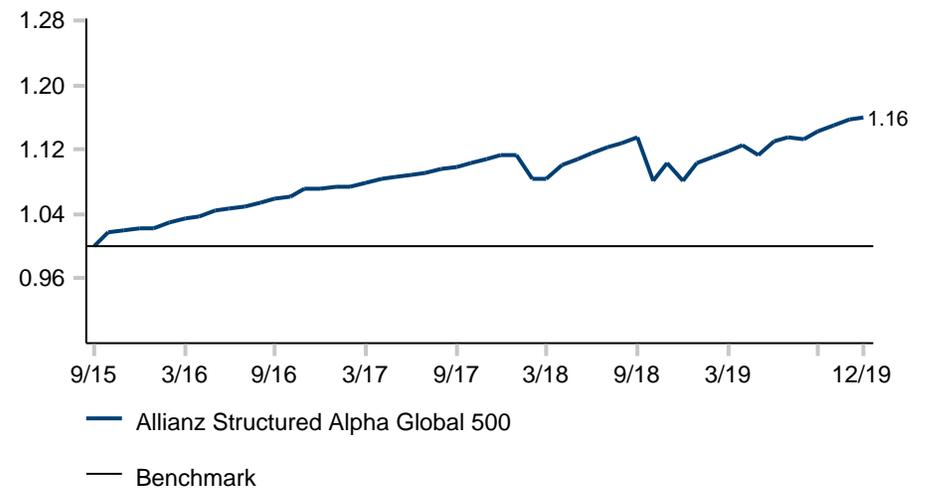
Return Summary



Quarterly Excess Performance



Ratio of Cumulative Wealth - Since Inception

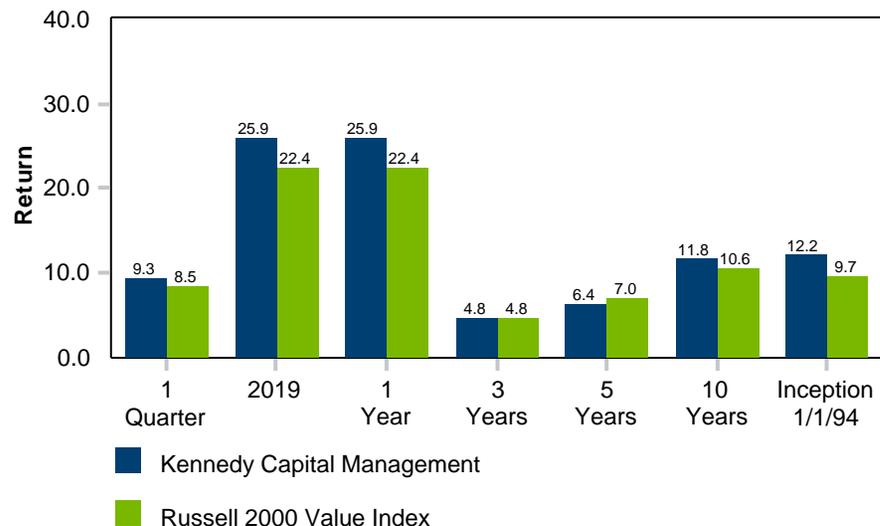


## Kennedy Capital Management Performance Summary

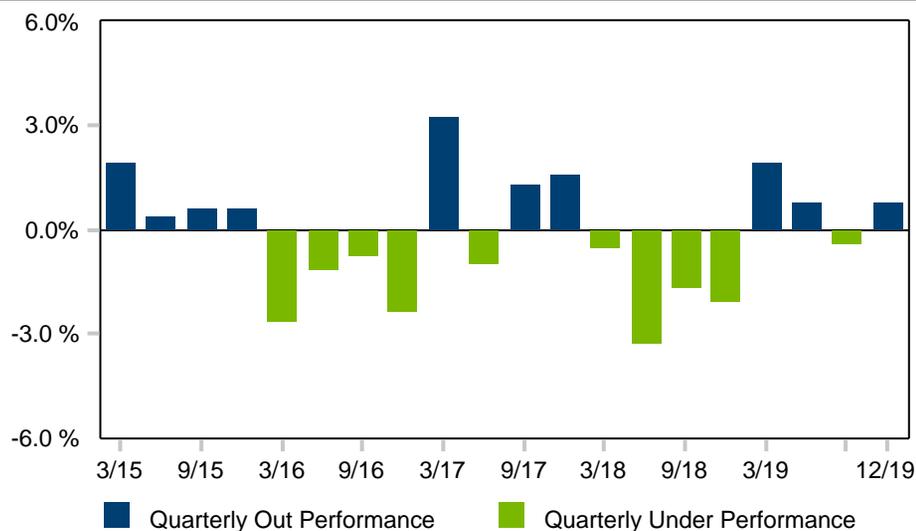
### Account Information

Account Name: Kennedy Capital Management  
 Inception Date: 12/31/1993  
 Account Structure: Separate Account  
 Asset Class: US Equity  
 Benchmark: Russell 2000 Value Index  
 Peer Group: IM U.S. Small Cap Value Equity (SA+CF)

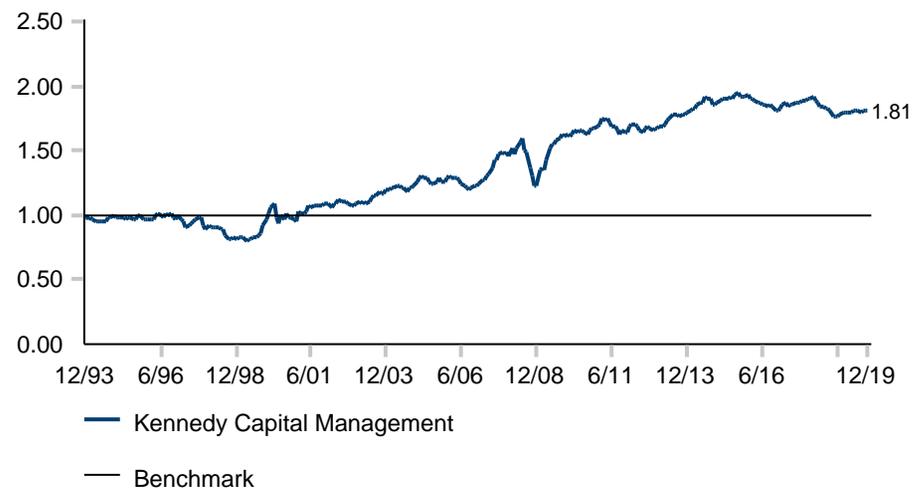
### Return Summary



### Quarterly Excess Performance

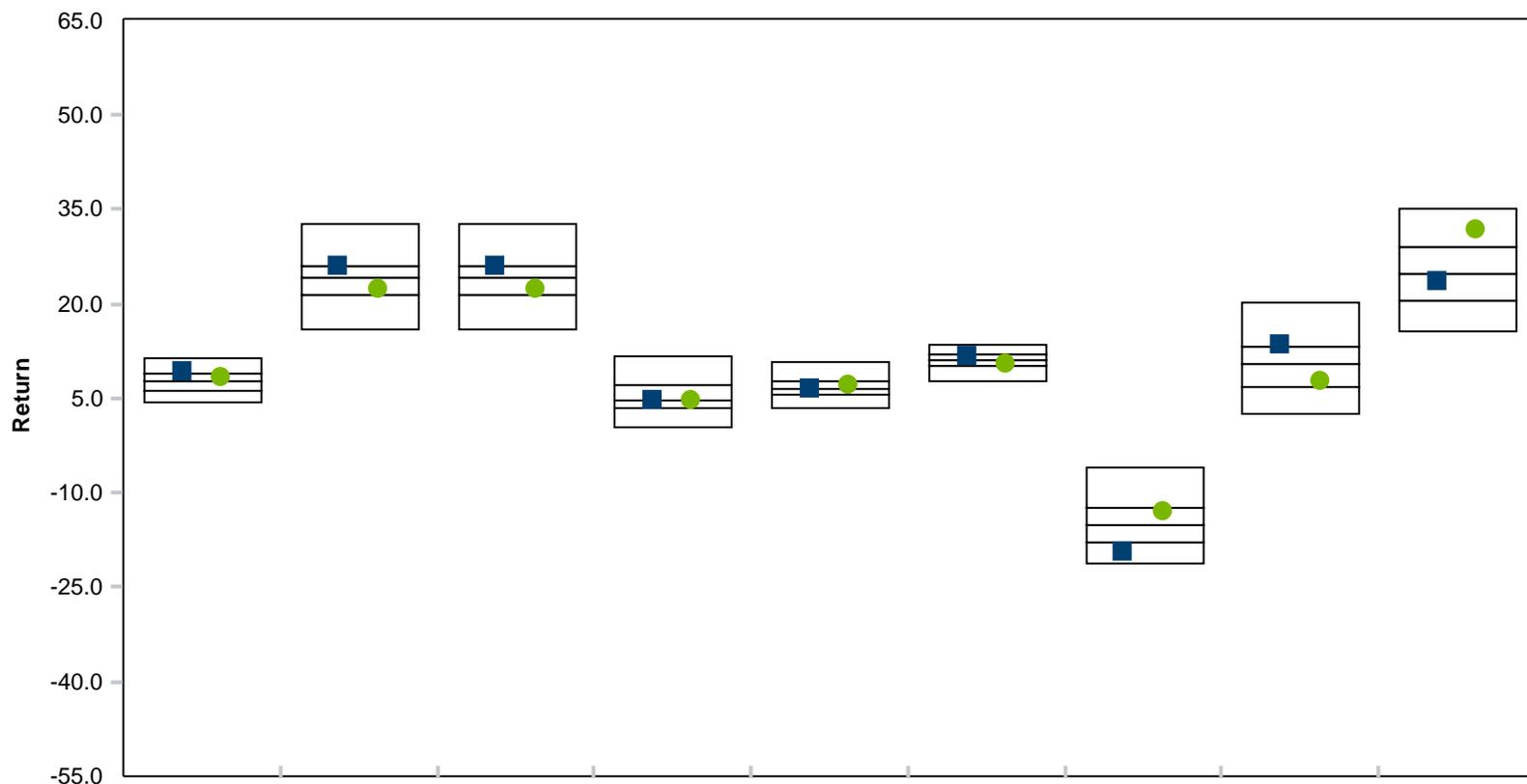


### Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM U.S. Small Cap Value Equity (SA+CF)

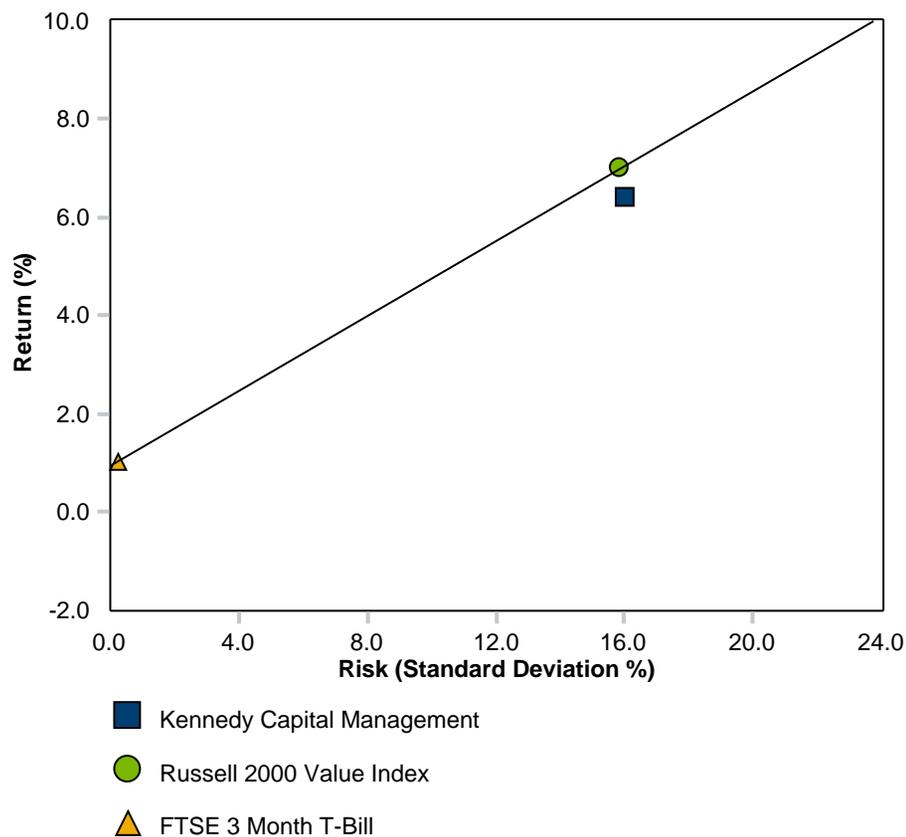


	1 Quarter	2019	1 Year	3 Years	5 Years	10 Years	2018	2017	2016
■ Kennedy Capital Management	9.3 (19)	25.9 (29)	25.9 (29)	4.8 (49)	6.4 (55)	11.8 (27)	-19.4 (85)	13.4 (25)	23.4 (60)
● Russell 2000 Value Index	8.5 (33)	22.4 (67)	22.4 (67)	4.8 (49)	7.0 (39)	10.6 (69)	-12.9 (30)	7.8 (68)	31.7 (11)
5th Percentile	11.5	32.6	32.6	11.6	10.8	13.5	-6.0	20.2	35.2
1st Quartile	9.0	26.1	26.1	7.0	7.8	11.9	-12.5	13.4	29.0
Median	7.7	24.1	24.1	4.7	6.6	11.1	-15.2	10.5	24.9
3rd Quartile	6.2	21.4	21.4	3.4	5.5	10.3	-17.8	6.7	20.4
95th Percentile	4.5	15.9	15.9	0.5	3.4	7.6	-21.2	2.6	15.5
Population	159	158	158	155	152	133	215	225	232

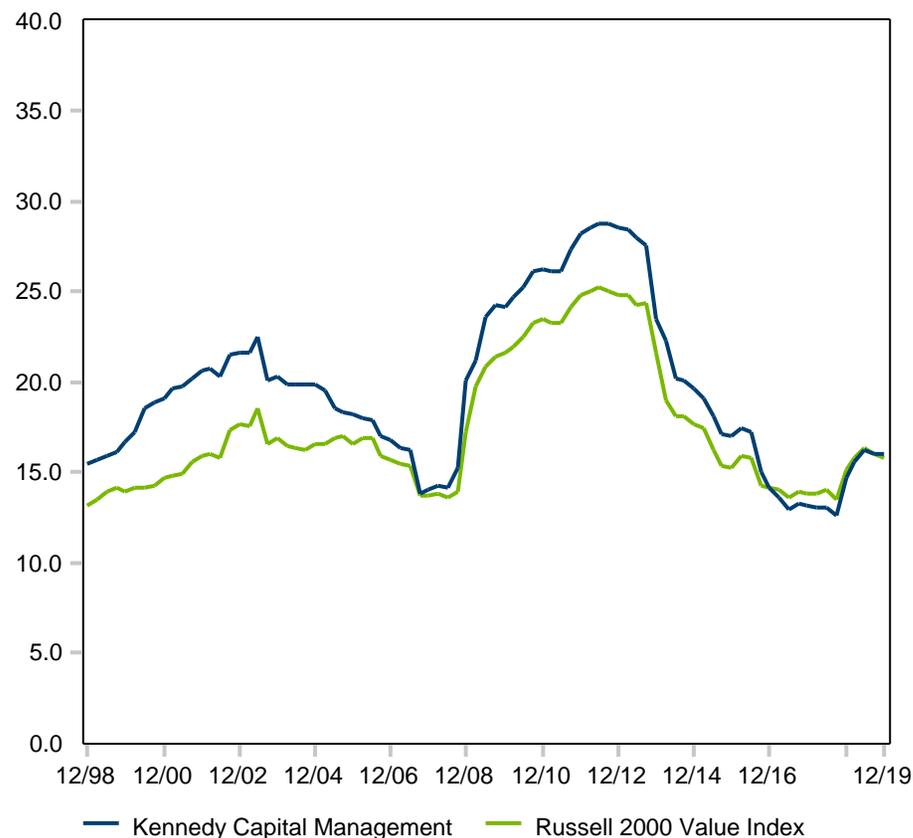
parentheses contain percentile rankings.

Kennedy Capital Management Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



Rolling 5 Years Standard Deviation



5 Years Historical Statistics

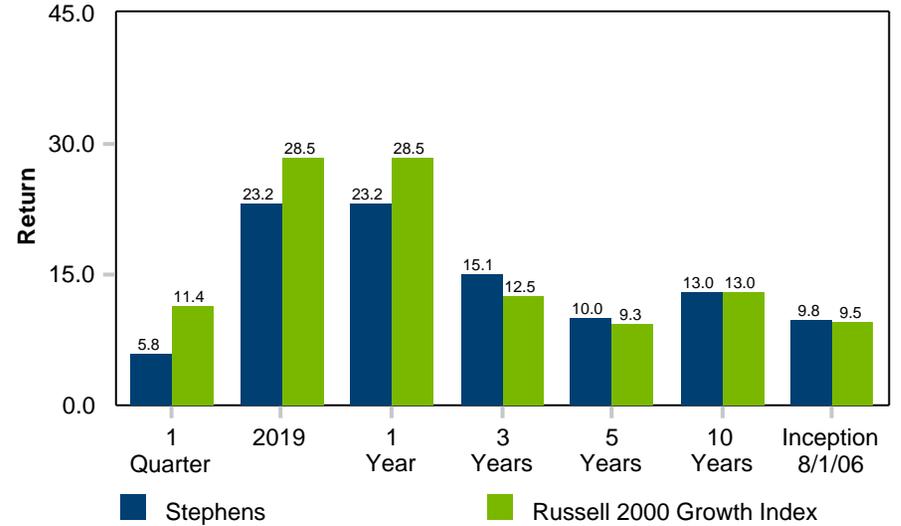
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Kennedy Capital Management	-0.54	2.85	-0.19	0.97	0.40	-0.48	0.99	6.39	16.02	0.98
Russell 2000 Value Index	0.00	0.00	N/A	1.00	0.44	0.00	1.00	6.99	15.88	1.00
FTSE 3 Month T-Bill	-6.97	15.89	-0.44	0.00	N/A	1.05	0.00	1.05	0.26	-0.04

Stephens Performance Summary

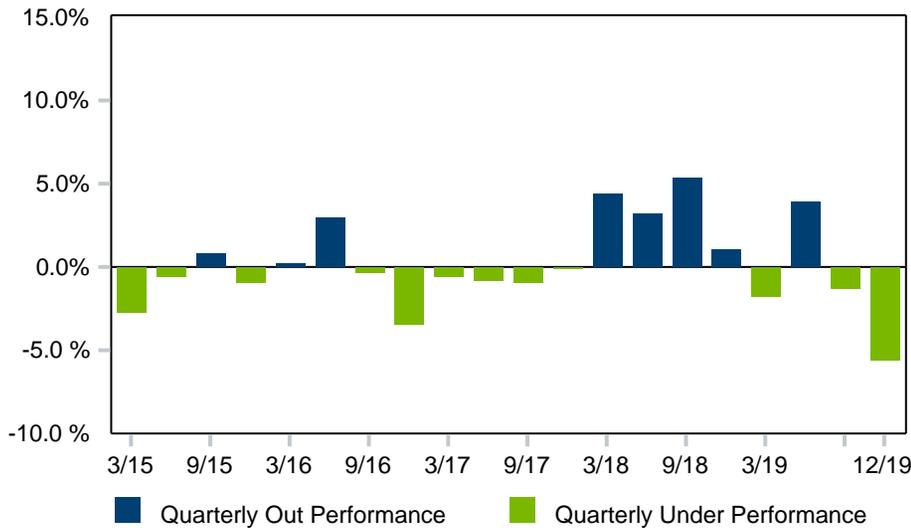
Account Information

Account Name: Stephens  
 Inception Date: 07/31/2006  
 Account Structure: Separate Account  
 Asset Class: US Equity  
 Benchmark: Russell 2000 Growth Index  
 Peer Group: IM U.S. Small Cap Growth Equity (SA+CF)

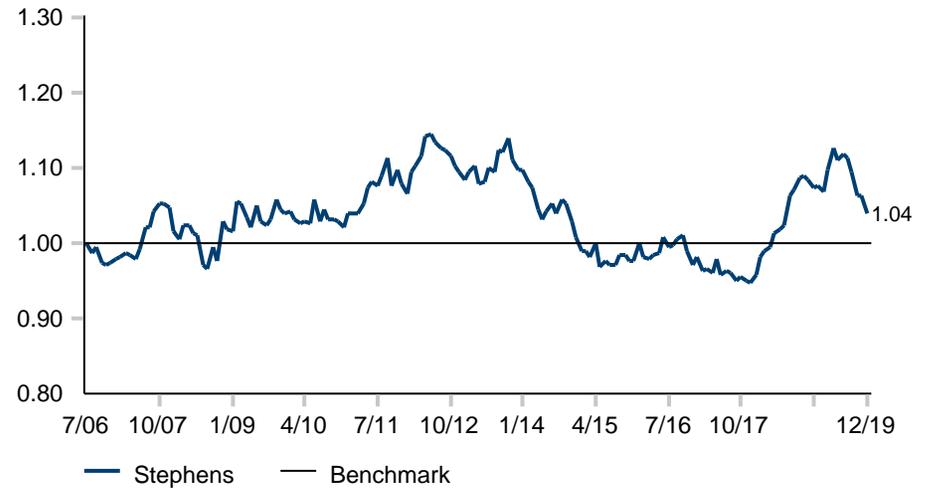
Return Summary



Quarterly Excess Performance

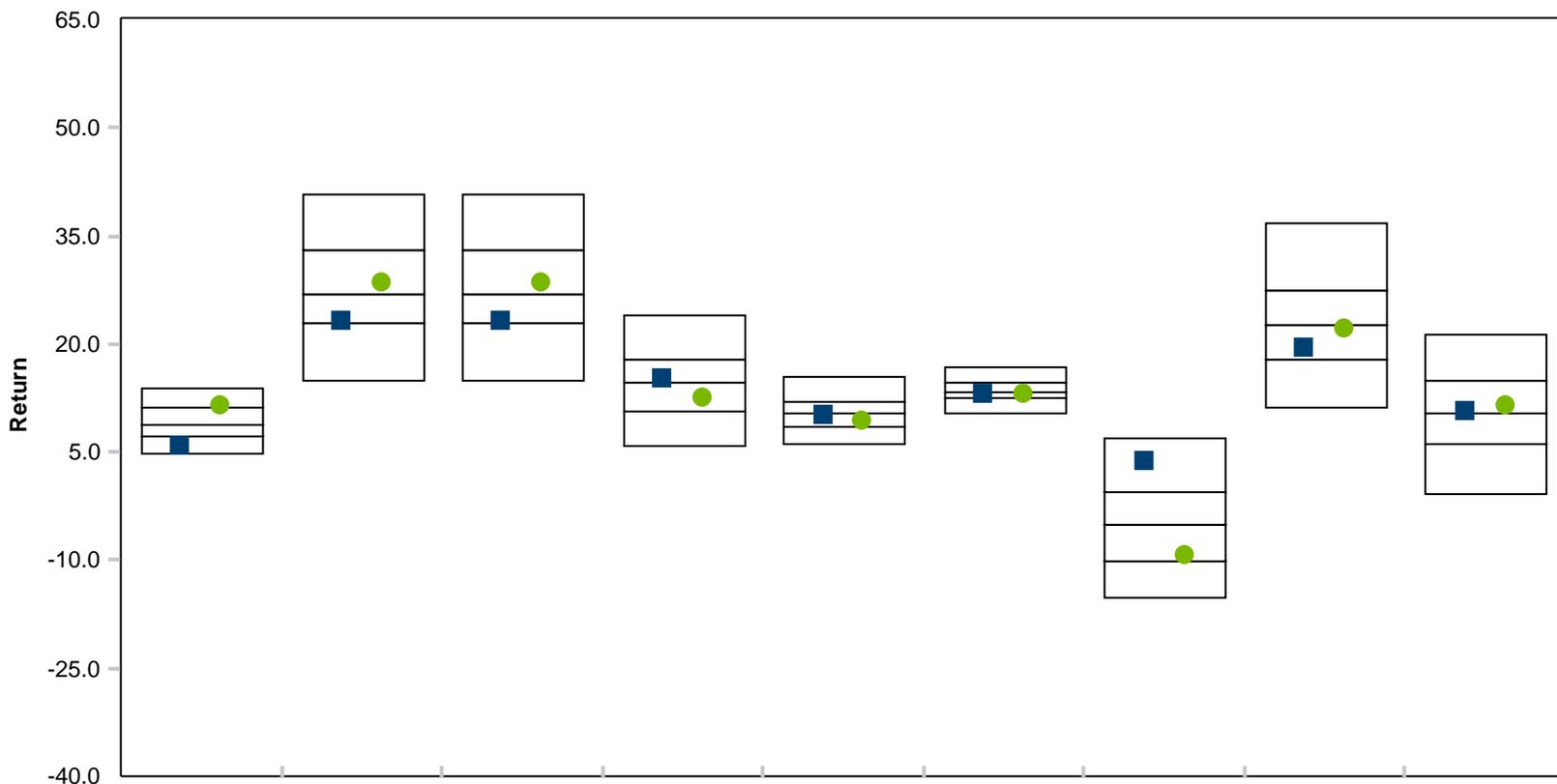


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM U.S. Small Cap Growth Equity (SA+CF)

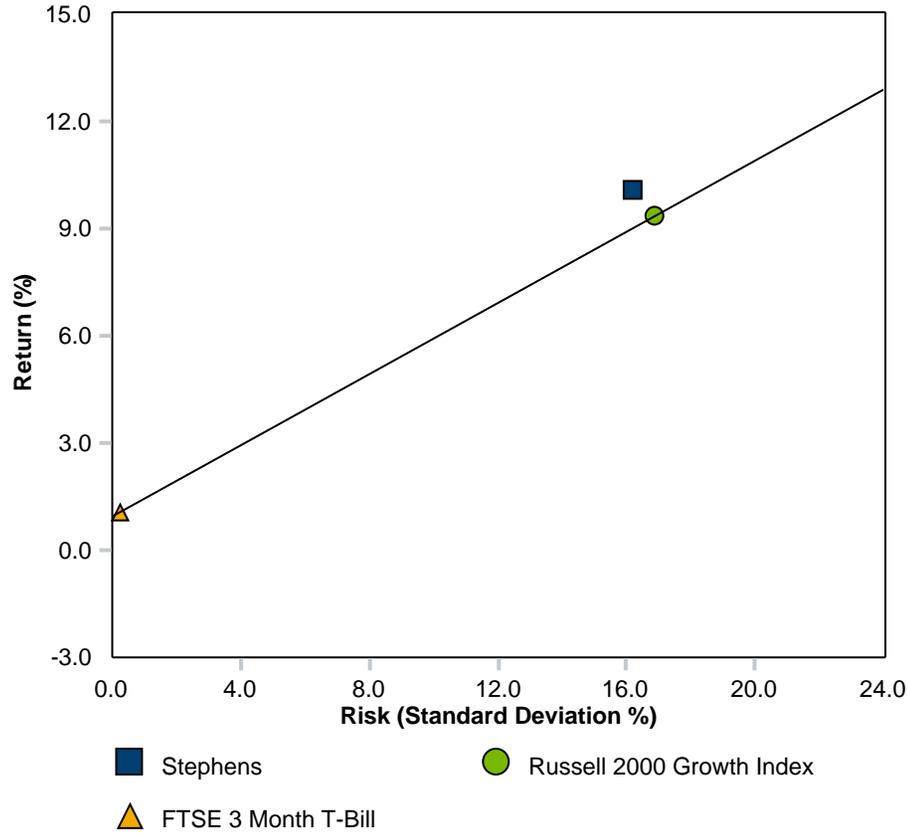


	1 Quarter	2019	1 Year	3 Years	5 Years	10 Years	2018	2017	2016
■ Stephens	5.8 (89)	23.2 (74)	23.2 (74)	15.1 (45)	10.0 (55)	13.0 (61)	3.7 (10)	19.4 (67)	10.6 (49)
● Russell 2000 Growth Index	11.4 (21)	28.5 (42)	28.5 (42)	12.5 (64)	9.3 (65)	13.0 (61)	-9.3 (73)	22.2 (52)	11.3 (45)
5th Percentile	13.8	40.8	40.8	24.0	15.4	16.9	6.8	36.9	21.3
1st Quartile	11.1	33.1	33.1	17.9	12.1	14.5	-0.5	27.4	15.0
Median	8.9	27.0	27.0	14.7	10.3	13.4	-5.2	22.5	10.3
3rd Quartile	7.1	23.0	23.0	10.7	8.6	12.4	-10.0	17.7	6.1
95th Percentile	4.7	15.0	15.0	5.9	6.0	10.3	-15.1	11.3	-0.9
Population	130	130	130	126	119	112	178	181	188

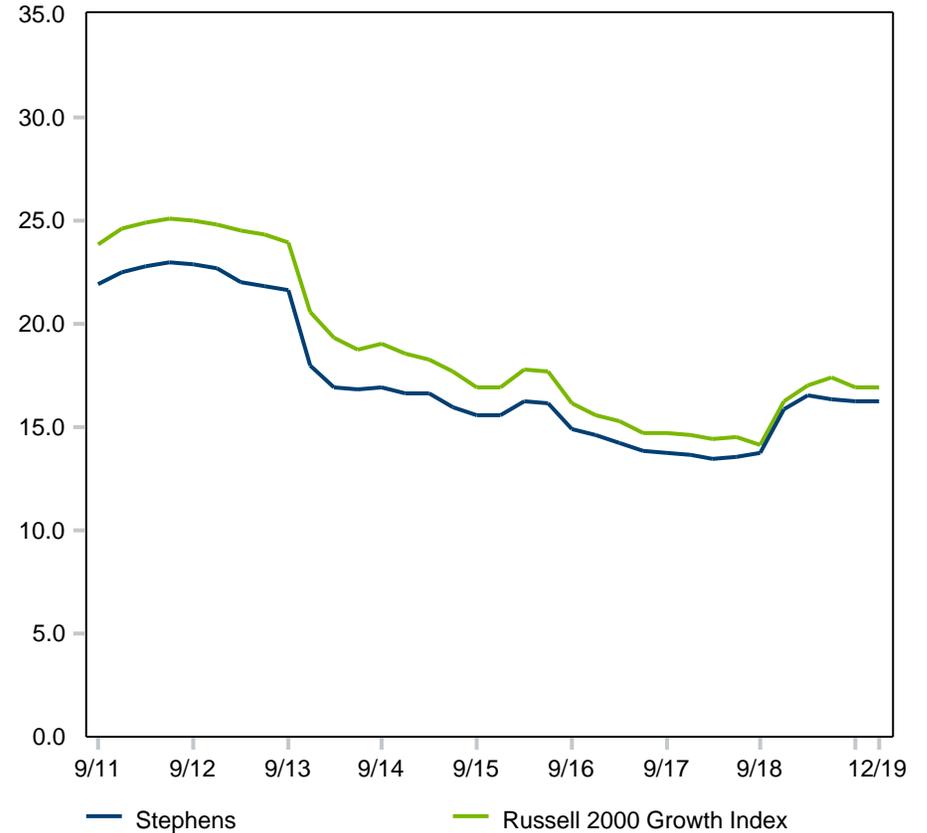
parentheses contain percentile rankings.

Stephens Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



Rolling 5 Years Standard Deviation



5 Years Historical Statistics

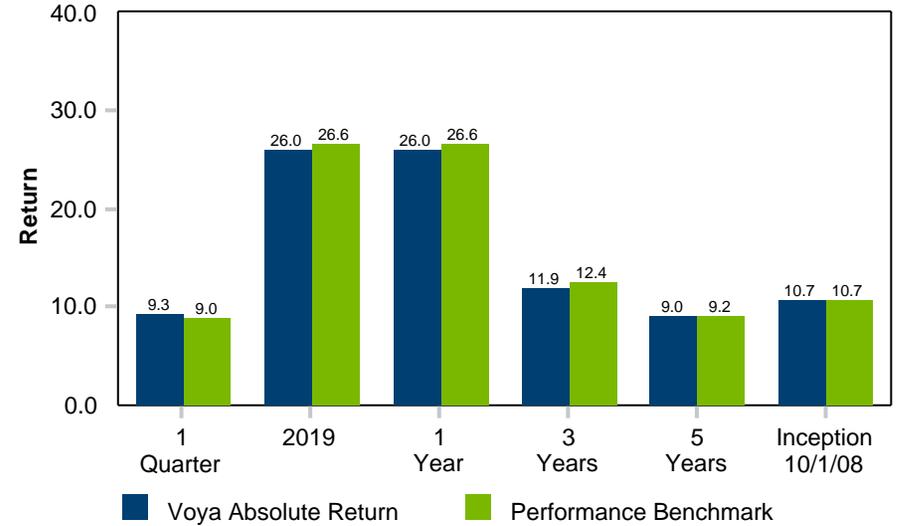
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Stephens	0.53	5.01	0.11	0.91	0.61	1.40	0.92	10.05	16.23	0.96
Russell 2000 Growth Index	0.00	0.00	N/A	1.00	0.55	0.00	1.00	9.34	16.90	1.00
FTSE 3 Month T-Bill	-9.35	16.90	-0.55	0.00	N/A	1.05	0.00	1.05	0.26	0.00

Voya Absolute Return Performance Summary

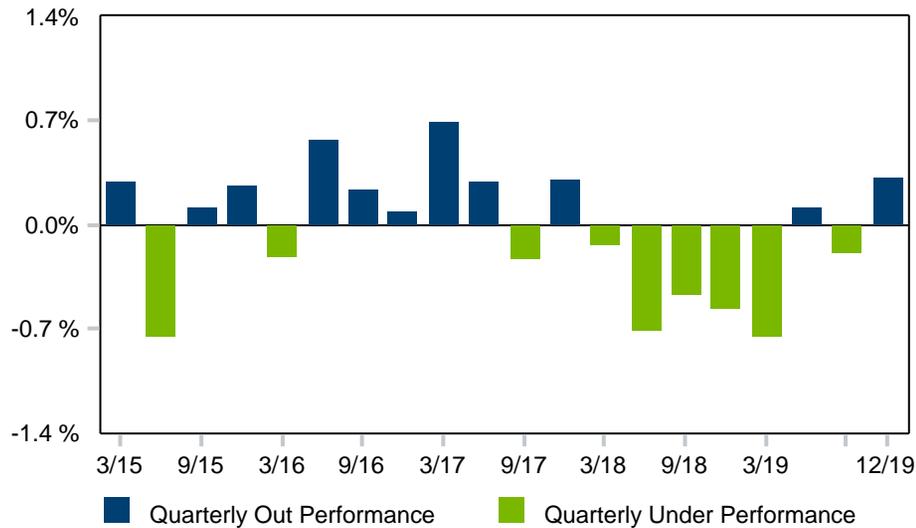
Account Information

Account Name: Voya Absolute Return  
 Inception Date: 09/30/2008  
 Account Structure: Commingled Fund  
 Asset Class: Global Equity  
 Benchmark: Performance Benchmark  
 Peer Group: IM Global Equity (MF)

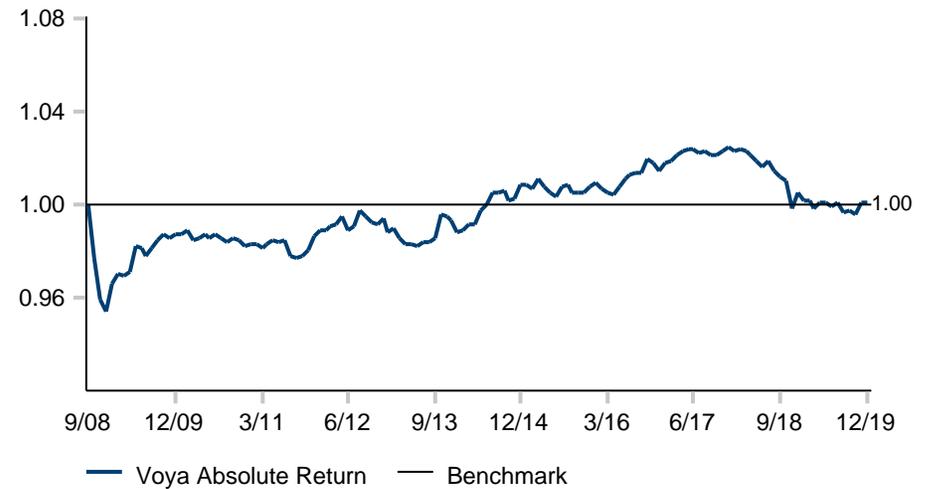
Return Summary



Quarterly Excess Performance

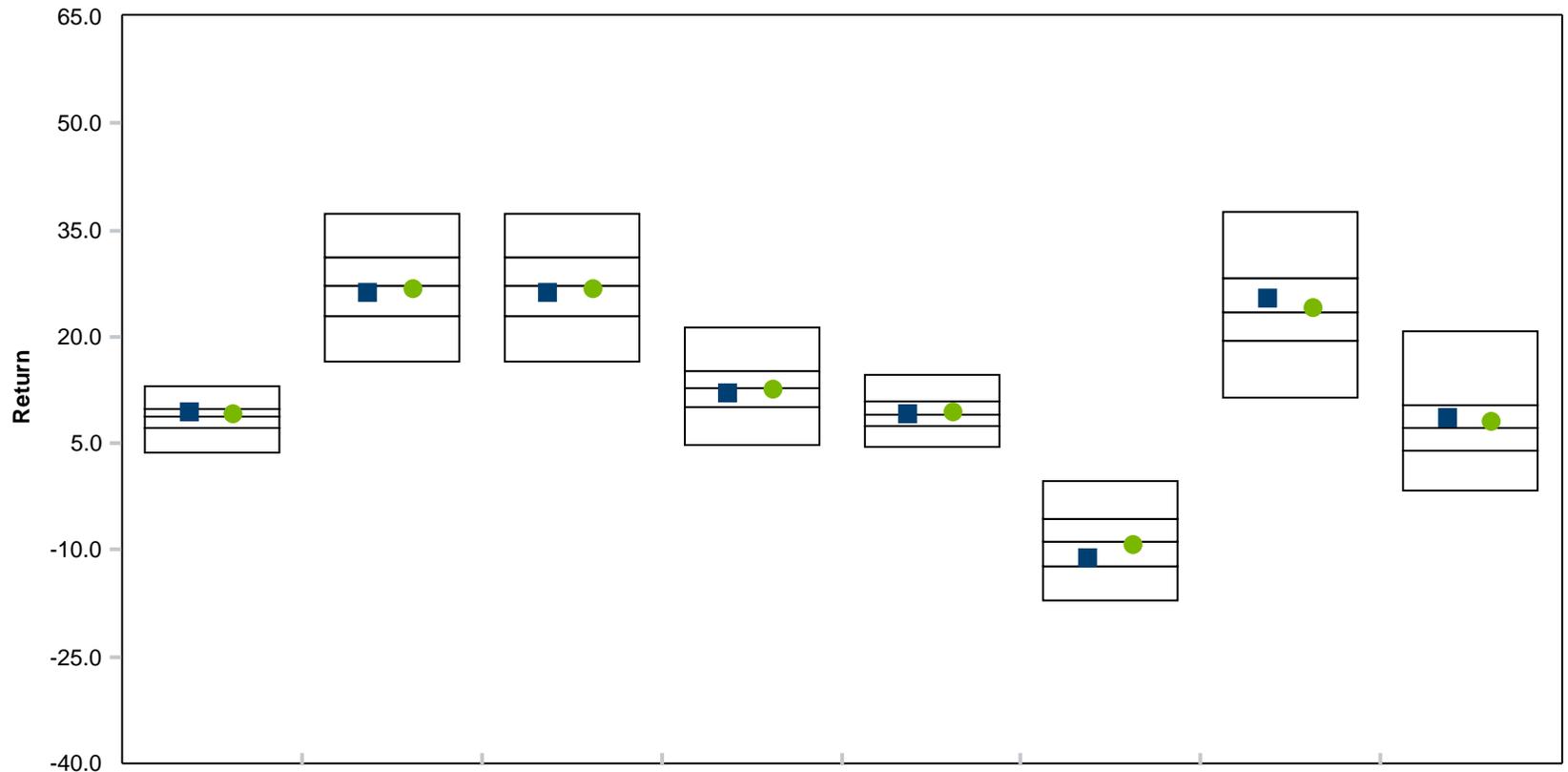


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM Global Equity (SA+CF)

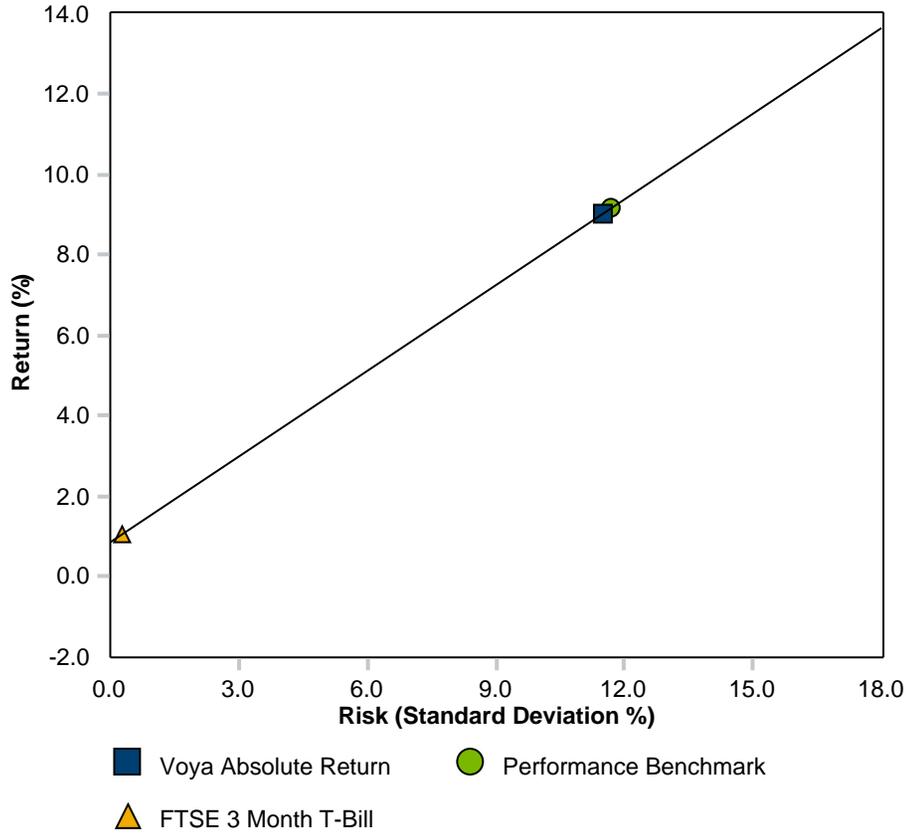


	1 Quarter	2019	1 Year	3 Years	5 Years	2018	2017	2016
■ Voya Absolute Return	9.3 (38)	26.0 (60)	26.0 (60)	11.9 (61)	9.0 (50)	-11.1 (68)	25.2 (41)	8.6 (38)
● Performance Benchmark	9.0 (45)	26.6 (55)	26.6 (55)	12.4 (54)	9.2 (47)	-9.4 (56)	24.0 (48)	7.9 (45)
5th Percentile	13.0	37.3	37.3	21.2	14.7	-0.4	37.5	20.7
1st Quartile	9.9	31.2	31.2	15.2	11.0	-5.7	28.2	10.3
Median	8.6	27.2	27.2	12.7	9.0	-8.8	23.4	7.1
3rd Quartile	7.1	22.8	22.8	10.0	7.3	-12.2	19.4	3.9
95th Percentile	3.6	16.4	16.4	4.8	4.6	-17.1	11.5	-1.5
Population	365	365	365	352	317	522	544	569

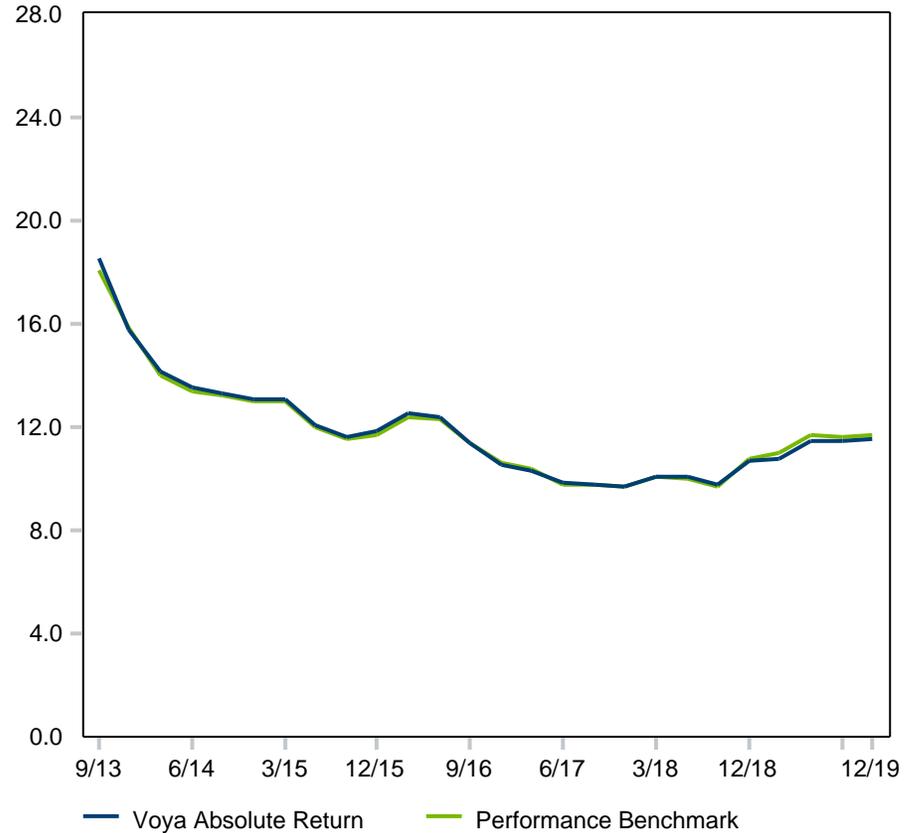
parentheses contain percentile rankings.

Voya Absolute Return Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



Rolling 5 Years Standard Deviation



5 Years Historical Statistics

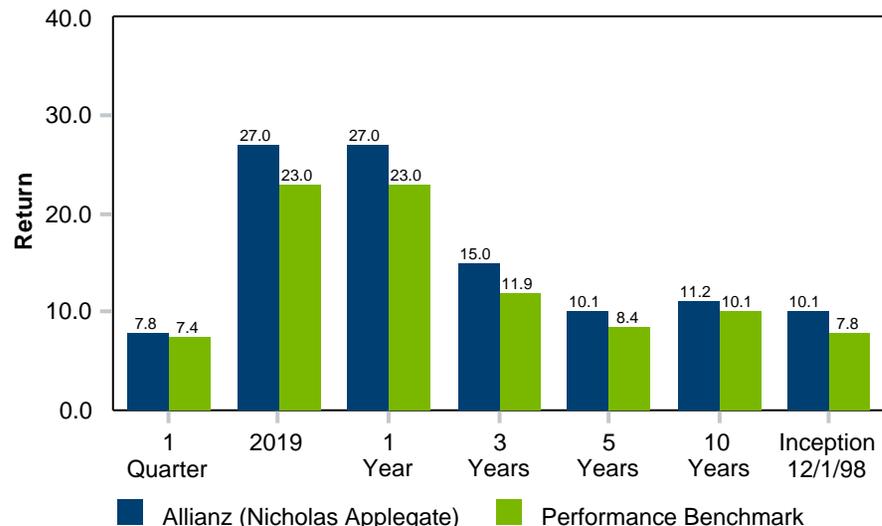
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Voya Absolute Return	-0.18	1.04	-0.17	0.99	0.72	-0.01	0.98	9.01	11.54	1.00
Performance Benchmark	0.00	0.00	N/A	1.00	0.72	0.00	1.00	9.18	11.70	1.00
FTSE 3 Month T-Bill	-8.44	11.70	-0.72	0.00	N/A	1.05	0.00	1.05	0.26	0.01

Allianz (Nicholas Applegate) Performance Summary

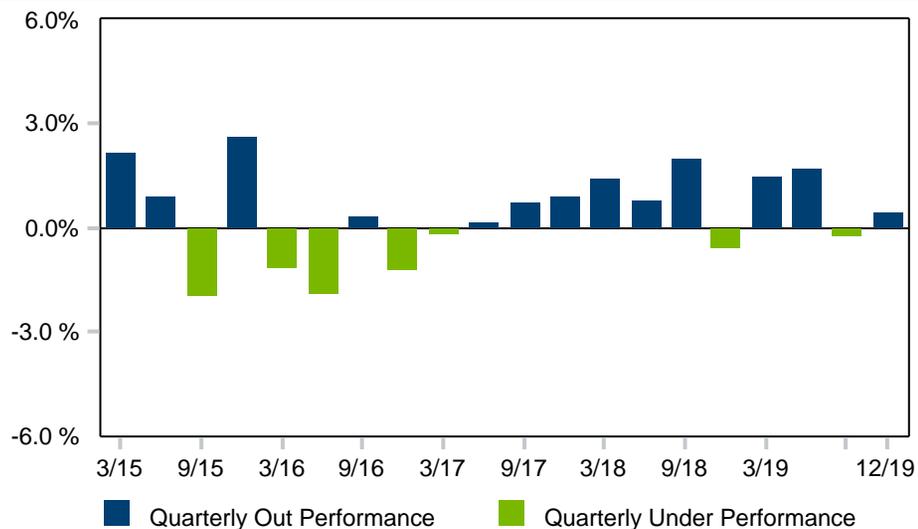
Account Information

Account Name: Allianz (Nicholas Applegate)  
 Inception Date: 11/30/1998  
 Account Structure: Separate Account  
 Asset Class: US Equity  
 Benchmark: Performance Benchmark  
 Peer Group: IM U.S. Equity (SA+CF)

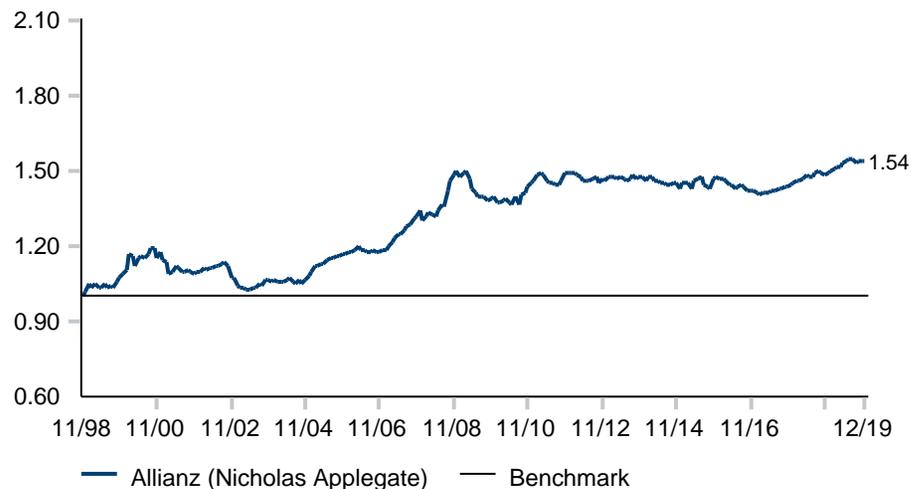
Return Summary



Quarterly Excess Performance

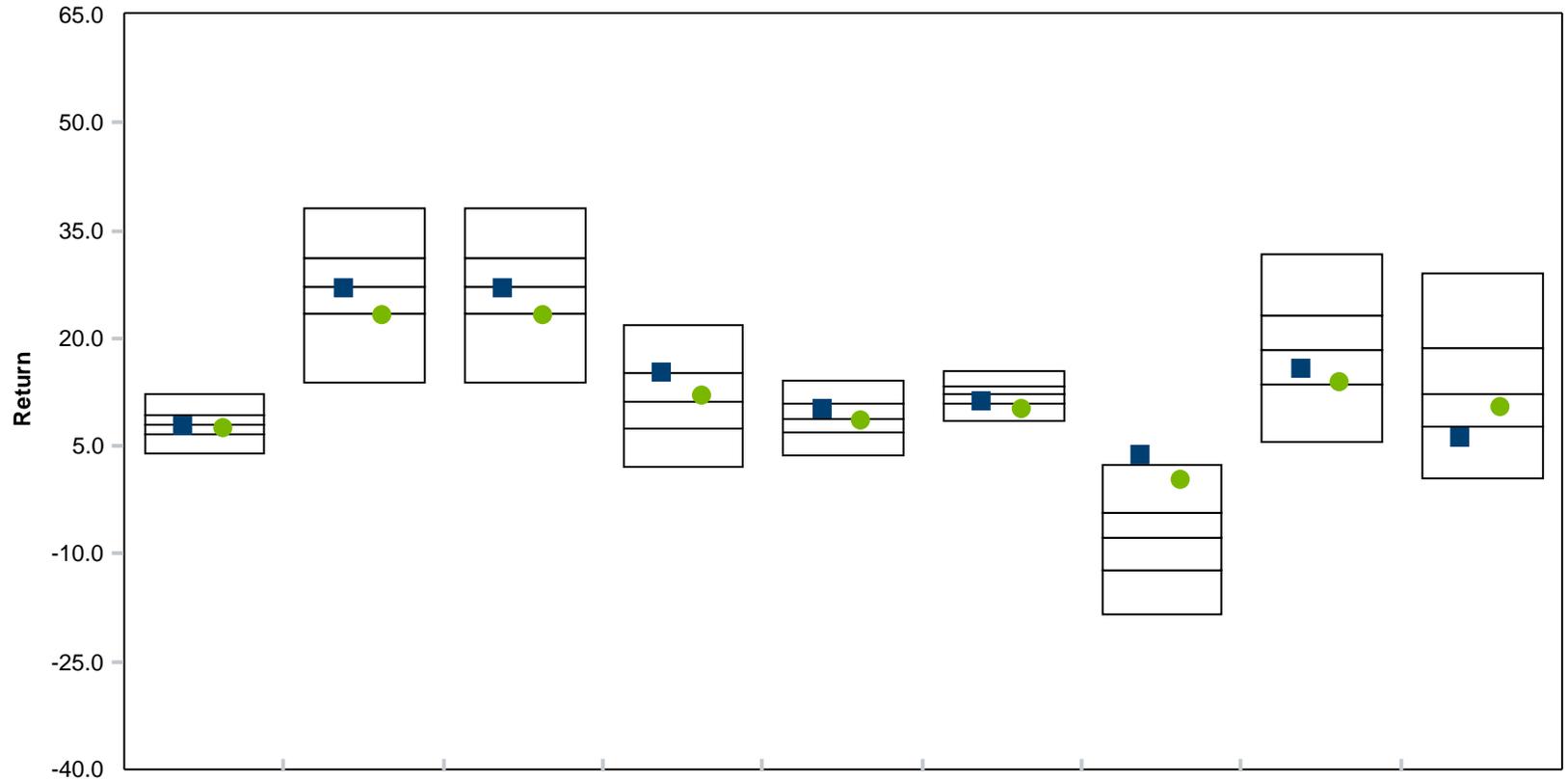


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM U.S. Equity (SA+CF)

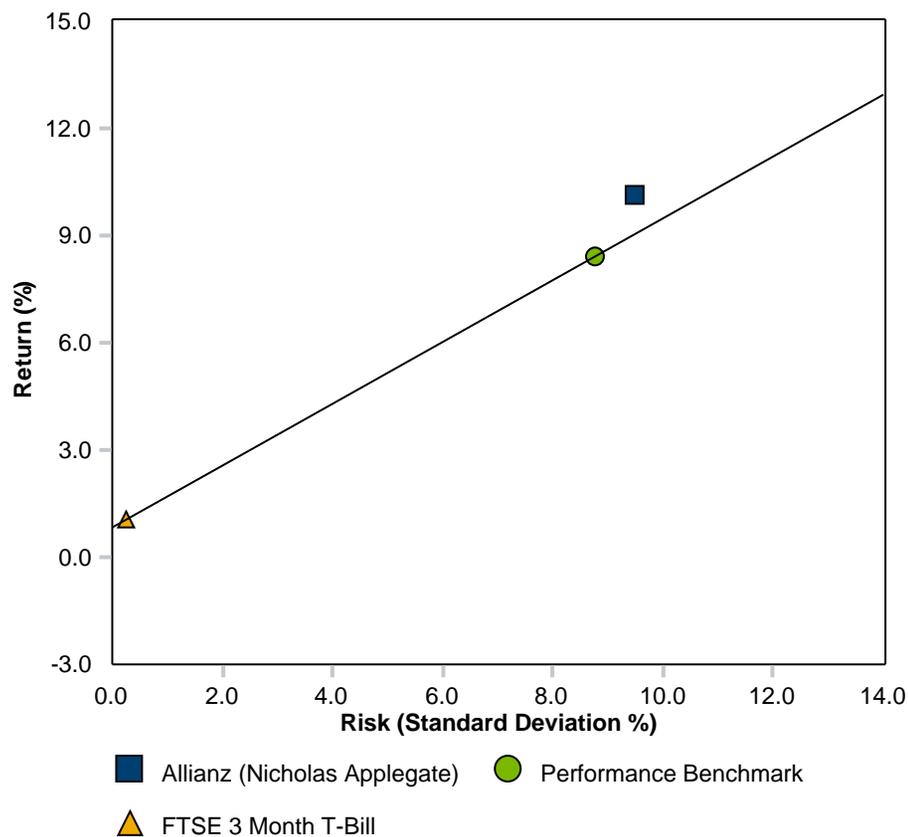


	1 Quarter	2019	1 Year	3 Years	5 Years	10 Years	2018	2017	2016
■ Allianz (Nicholas Applegate)	7.8 (53)	27.0 (53)	27.0 (53)	15.0 (26)	10.1 (36)	11.2 (73)	3.7 (4)	15.6 (64)	6.2 (81)
● Performance Benchmark	7.4 (62)	23.0 (77)	23.0 (77)	11.9 (46)	8.4 (57)	10.1 (88)	0.2 (10)	13.7 (75)	10.4 (62)
5th Percentile	12.1	38.2	38.2	21.8	14.1	15.4	2.3	31.8	29.1
1st Quartile	9.3	31.2	31.2	15.1	10.9	13.4	-4.2	23.2	18.7
Median	8.0	27.3	27.3	11.1	8.9	12.2	-7.8	18.3	12.2
3rd Quartile	6.6	23.3	23.3	7.4	7.0	11.0	-12.4	13.6	7.6
95th Percentile	3.9	13.9	13.9	2.2	3.7	8.6	-18.5	5.6	0.5
Population	1,620	1,616	1,616	1,578	1,510	1,285	2,425	2,542	2,682

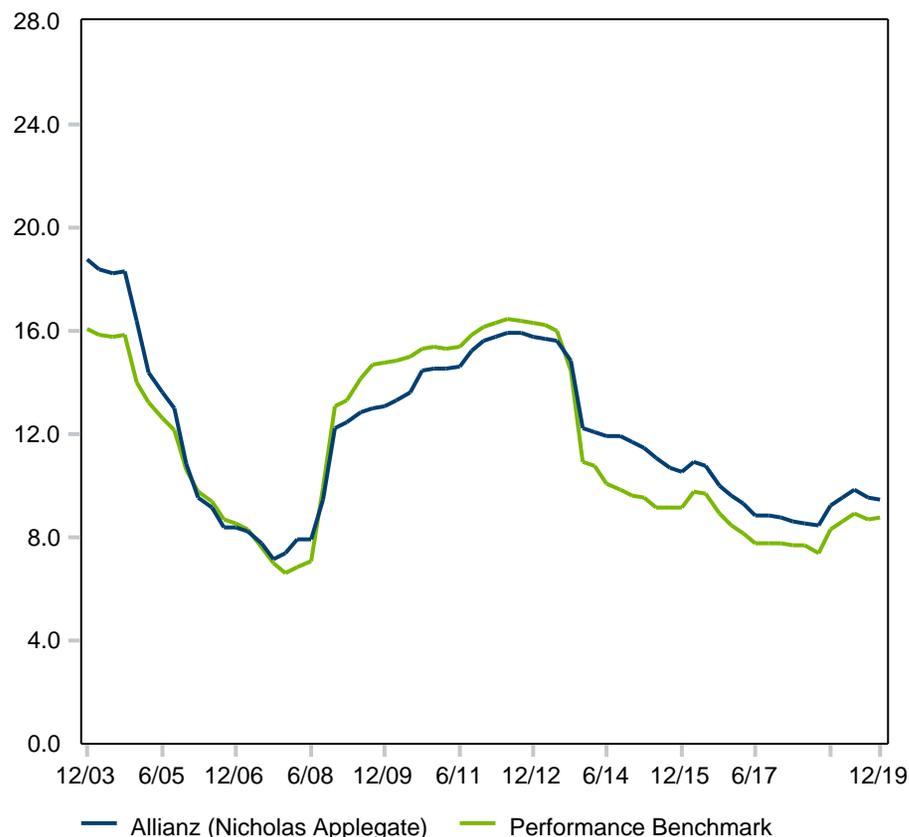
parentheses contain percentile rankings.

Allianz (Nicholas Applegate) Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



Rolling 5 Years Standard Deviation



5 Years Historical Statistics

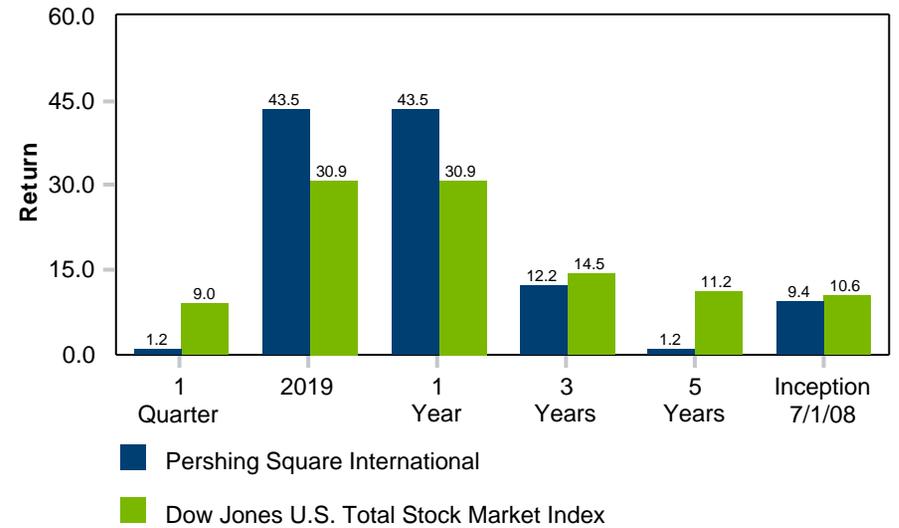
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Allianz (Nicholas Applegate)	1.64	2.80	0.59	0.91	0.96	1.35	1.04	10.12	9.50	0.96
Performance Benchmark	0.00	0.00	N/A	1.00	0.85	0.00	1.00	8.41	8.77	1.00
FTSE 3 Month T-Bill	-7.44	8.75	-0.85	0.01	N/A	1.03	0.00	1.05	0.26	0.09

Pershing Square International Performance Summary

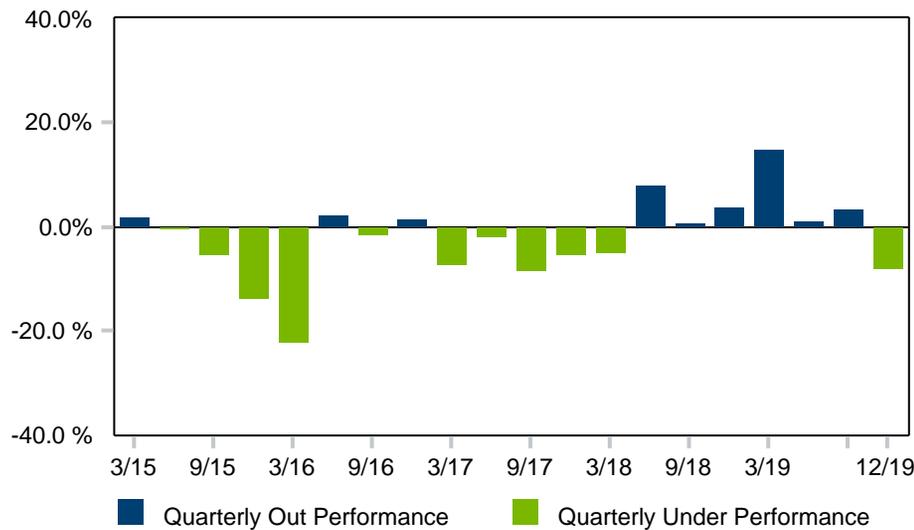
Account Information

Account Name: Pershing Square International  
 Inception Date: 06/30/2008  
 Account Structure: Commingled Fund  
 Asset Class: US Equity  
 Benchmark: Dow Jones U.S. Total Stock Market Index  
 Peer Group: IM U.S. Equity (SA+CF)

Return Summary



Quarterly Excess Performance

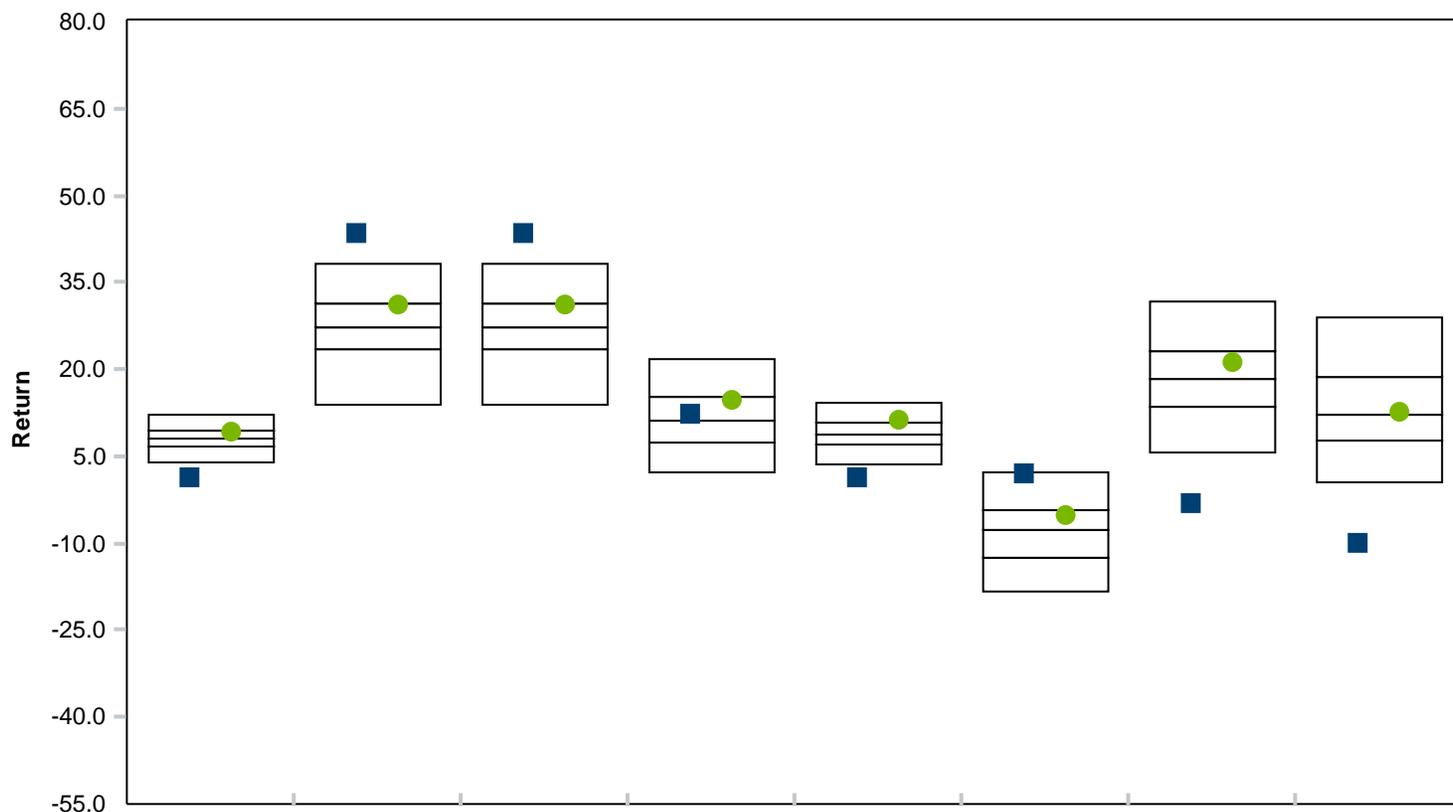


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM U.S. Equity (SA+CF)

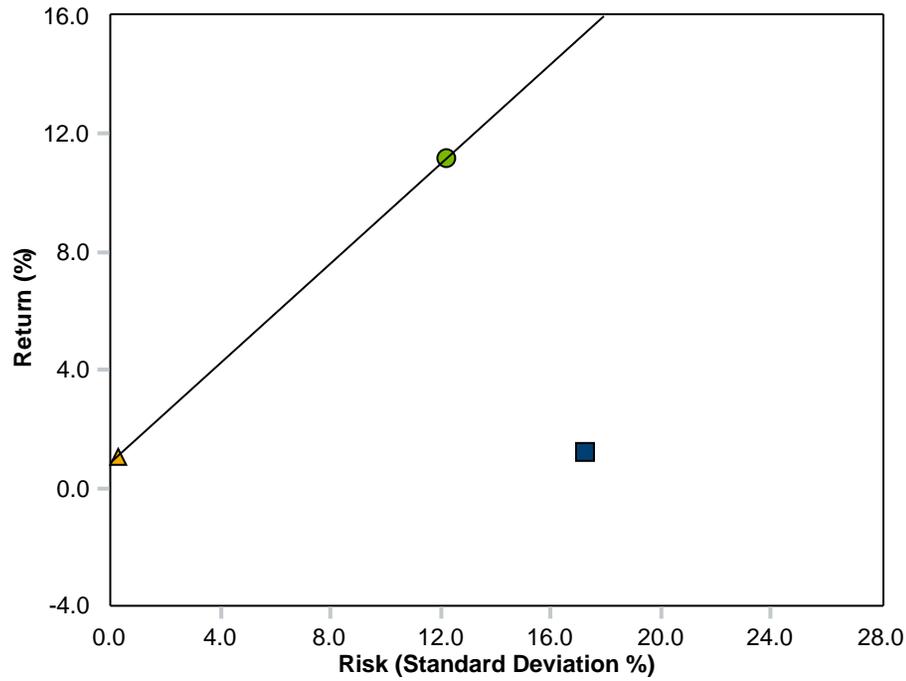


	1 Quarter	2019	1 Year	3 Years	5 Years	2018	2017	2016
■ Pershing Square International	1.2 (98)	43.5 (2)	43.5 (2)	12.2 (44)	1.2 (98)	1.8 (6)	-3.2 (99)	-10.1 (100)
● Dow Jones U.S. Total Stock Market Index	9.0 (30)	30.9 (27)	30.9 (27)	14.5 (29)	11.2 (23)	-5.3 (33)	21.2 (35)	12.6 (49)
5th Percentile	12.1	38.2	38.2	21.8	14.1	2.3	31.8	29.1
1st Quartile	9.3	31.2	31.2	15.1	10.9	-4.2	23.2	18.7
Median	8.0	27.3	27.3	11.1	8.9	-7.8	18.3	12.2
3rd Quartile	6.6	23.3	23.3	7.4	7.0	-12.4	13.6	7.6
95th Percentile	3.9	13.9	13.9	2.2	3.7	-18.5	5.6	0.5
Population	1,620	1,616	1,616	1,578	1,510	2,425	2,542	2,682

parentheses contain percentile rankings.

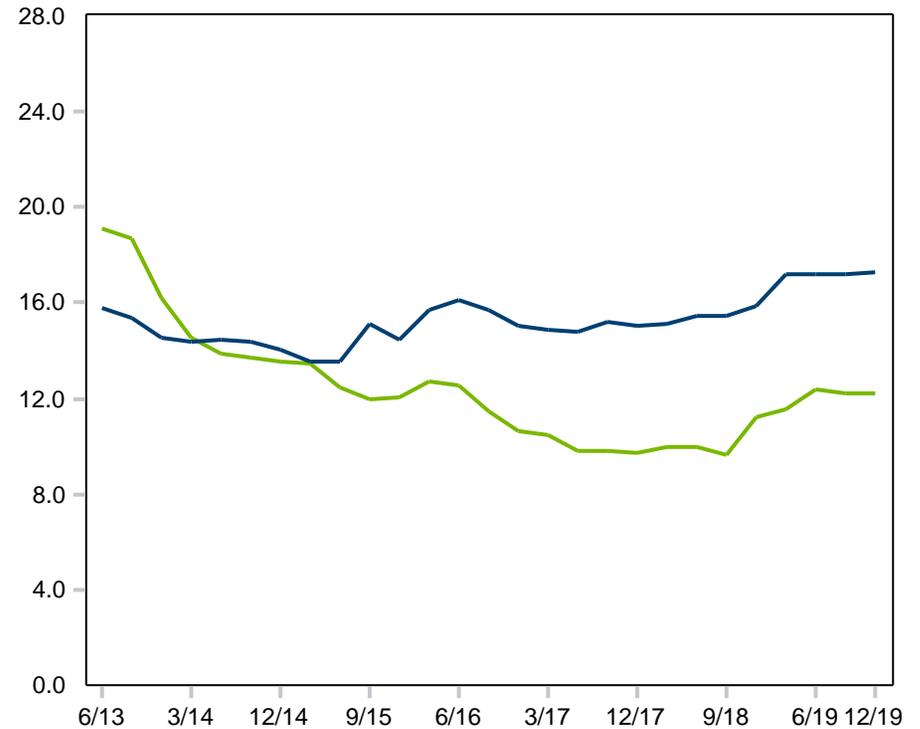
Pershing Square International Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



- Pershing Square International
- Dow Jones U.S. Total Stock Market Index
- ▲ FTSE 3 Month T-Bill

Rolling 5 Years Standard Deviation



- Pershing Square International
- Dow Jones U.S. Total Stock Market Index

5 Years Historical Statistics

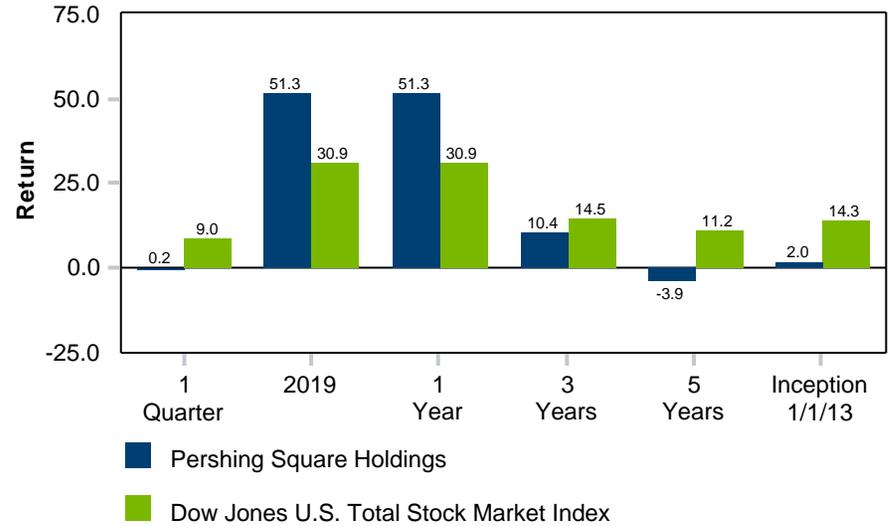
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Pershing Square International	-8.74	14.20	-0.62	0.34	0.09	-6.52	0.82	1.19	17.28	0.58
Dow Jones U.S. Total Stock Market Index	0.00	0.00	N/A	1.00	0.85	0.00	1.00	11.18	12.24	1.00
FTSE 3 Month T-Bill	-10.35	12.23	-0.85	0.00	N/A	1.04	0.00	1.05	0.26	0.04

Pershing Square Holdings Performance Summary

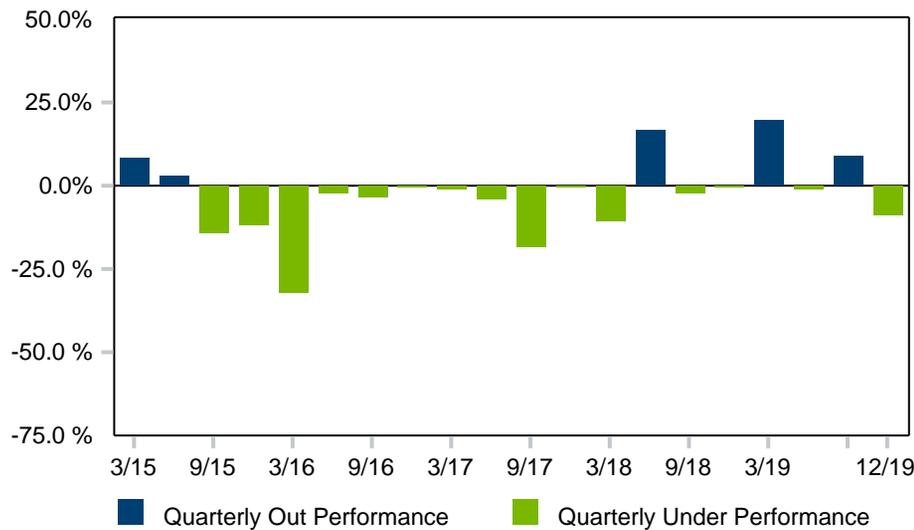
Account Information

Account Name: Pershing Square Holdings  
 Inception Date: 12/31/2012  
 Account Structure: Commingled Fund  
 Asset Class: US Equity  
 Benchmark: Dow Jones U.S. Total Stock Market Index  
 Peer Group: IM U.S. Equity (SA+CF)

Return Summary



Quarterly Excess Performance

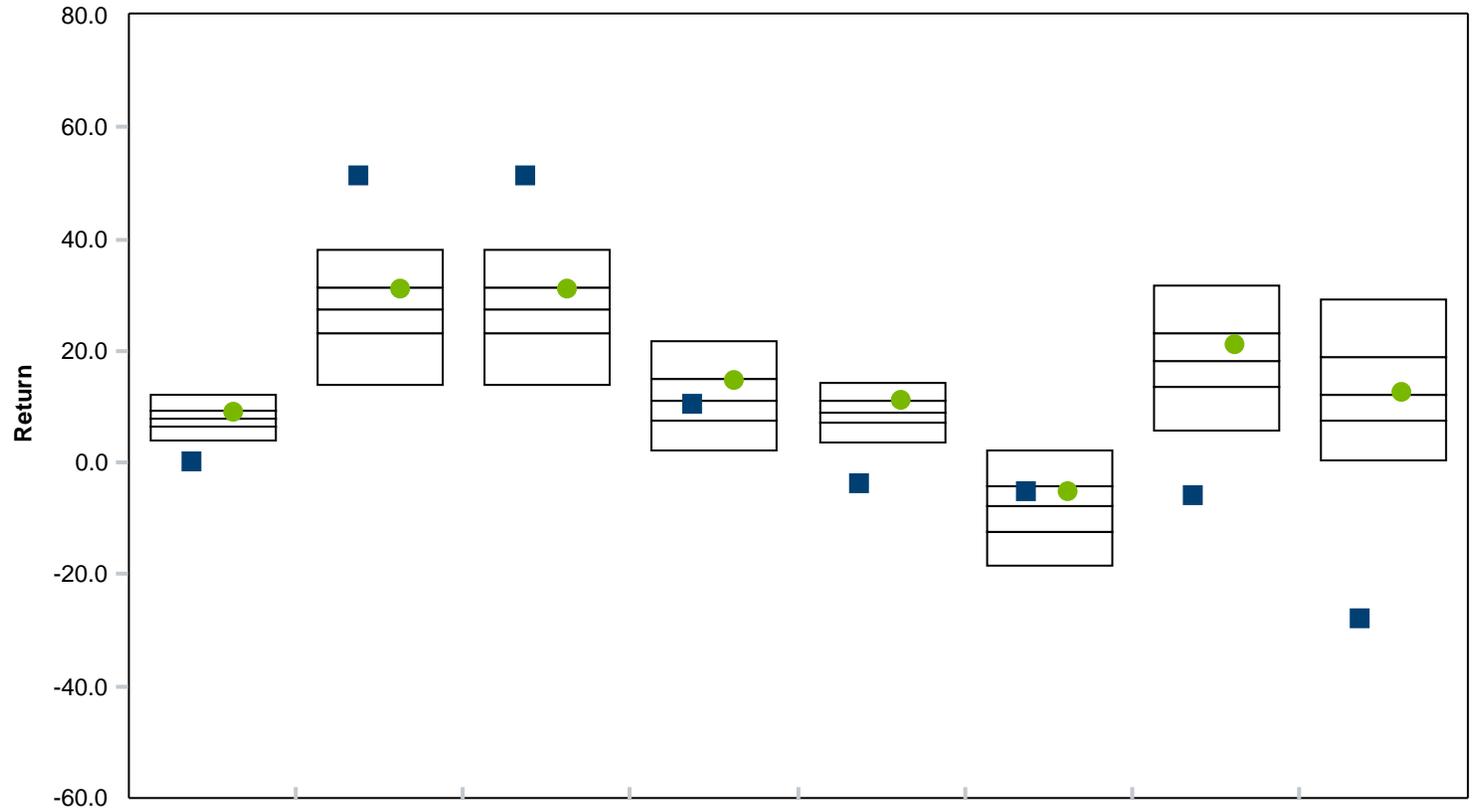


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM U.S. Equity (SA+CF)

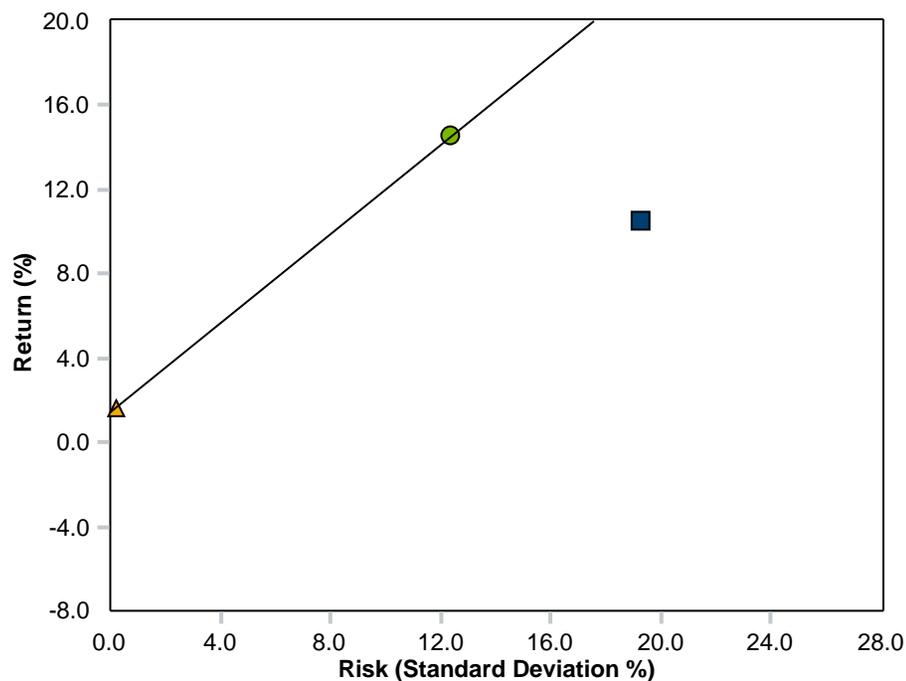


	1 Quarter	2019	1 Year	3 Years	5 Years	2018	2017	2016
■ Pershing Square Holdings	0.2 (99)	51.3 (1)	51.3 (1)	10.4 (54)	-3.9 (99)	-5.3 (33)	-6.0 (100)	-27.9 (100)
● Dow Jones U.S. Total Stock Market Index	9.0 (30)	30.9 (27)	30.9 (27)	14.5 (29)	11.2 (23)	-5.3 (33)	21.2 (35)	12.6 (49)
5th Percentile	12.1	38.2	38.2	21.8	14.1	2.3	31.8	29.1
1st Quartile	9.3	31.2	31.2	15.1	10.9	-4.2	23.2	18.7
Median	8.0	27.3	27.3	11.1	8.9	-7.8	18.3	12.2
3rd Quartile	6.6	23.3	23.3	7.4	7.0	-12.4	13.6	7.6
95th Percentile	3.9	13.9	13.9	2.2	3.7	-18.5	5.6	0.5
Population	1,620	1,616	1,616	1,578	1,510	2,425	2,542	2,682

Parenteses contain percentile rankings.

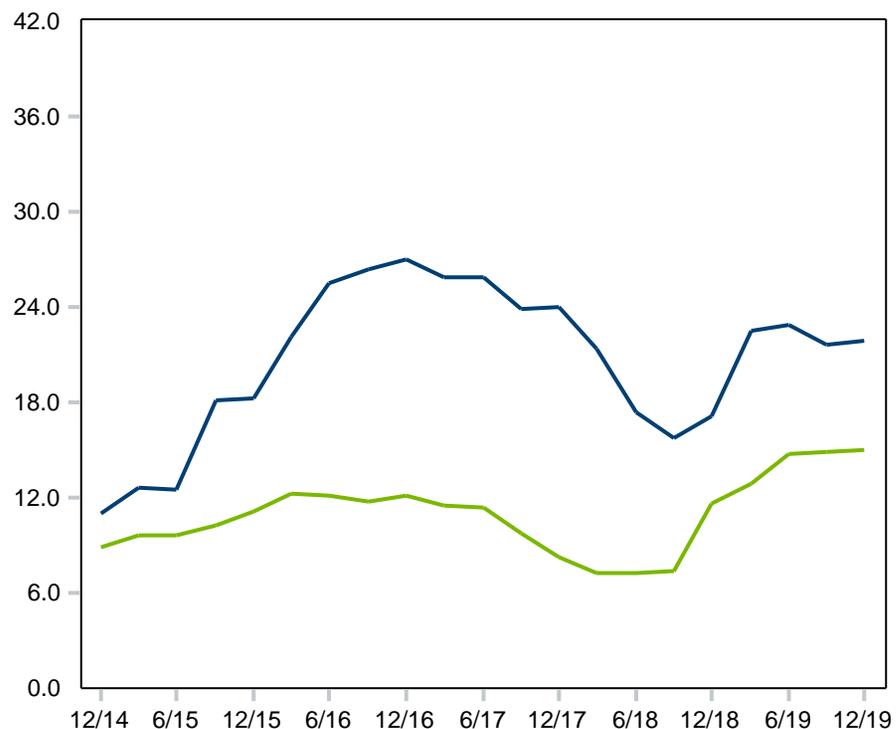
Pershing Square Holdings Risk Profile

Annualized Return vs. Annualized Standard Deviation 3 Years



- Pershing Square Holdings
- Dow Jones U.S. Total Stock Market Index
- ▲ FTSE 3 Month T-Bill

Rolling 2 Years Standard Deviation



- Pershing Square Holdings
- Dow Jones U.S. Total Stock Market Index

3 Years Historical Statistics

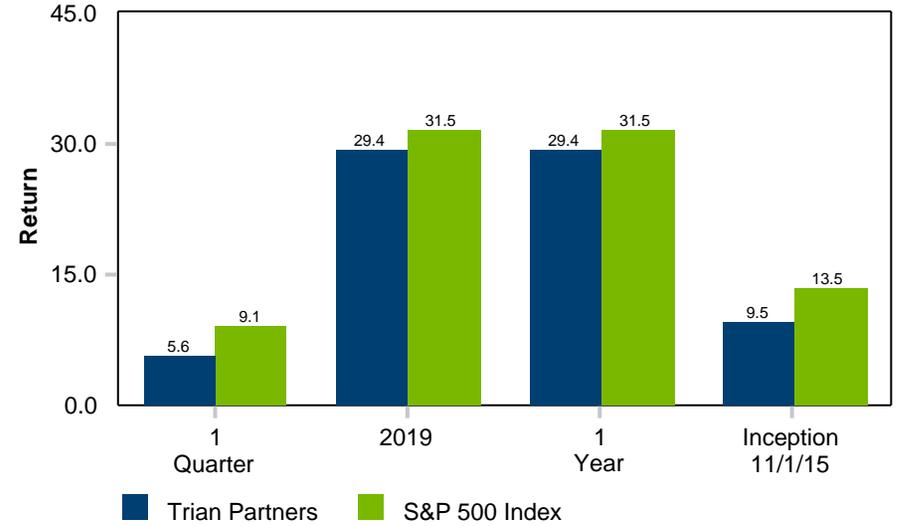
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Pershing Square Holdings	-2.65	13.62	-0.19	0.51	0.52	-4.16	1.11	10.43	19.31	0.71
Dow Jones U.S. Total Stock Market Index	0.00	0.00	N/A	1.00	1.03	0.00	1.00	14.52	12.39	1.00
FTSE 3 Month T-Bill	-12.76	12.41	-1.03	0.01	N/A	1.67	0.00	1.65	0.19	-0.09

Trian Partners Performance Summary

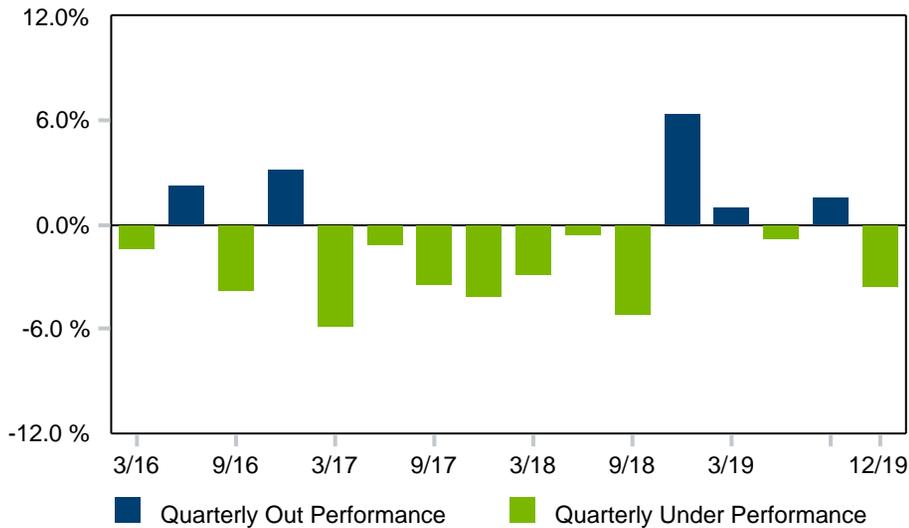
Account Information

Account Name: Trian Partners  
 Inception Date: 11/01/2015  
 Account Structure: Commingled Fund  
 Asset Class: US Equity  
 Benchmark: S&P 500 Index  
 Peer Group:

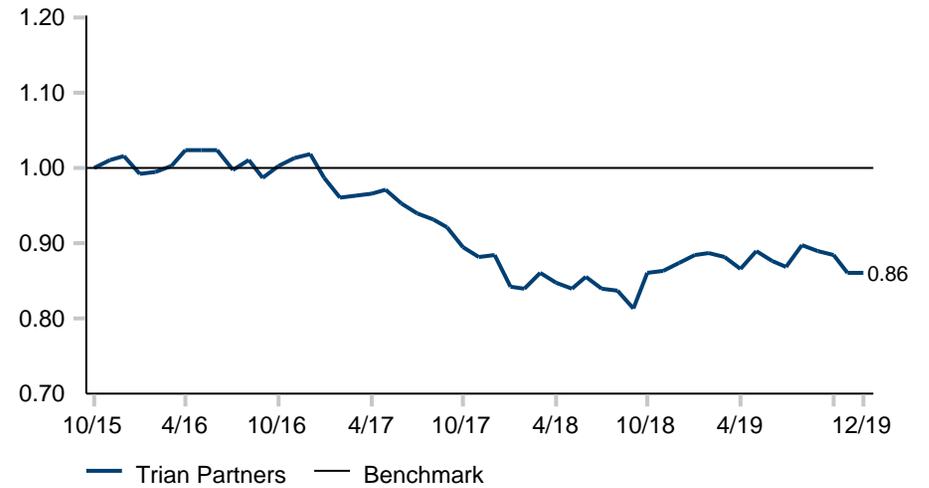
Return Summary



Quarterly Excess Performance



Ratio of Cumulative Wealth - Since Inception

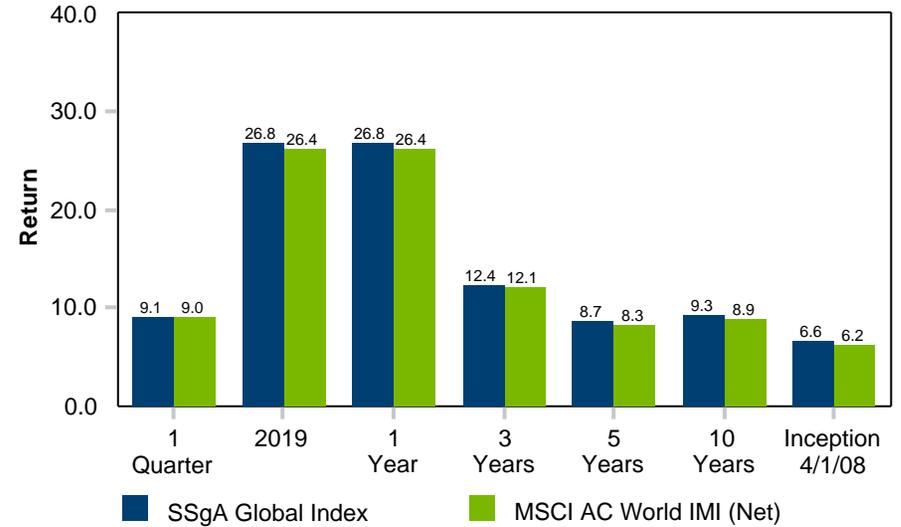


SSgA Global Index Performance Summary

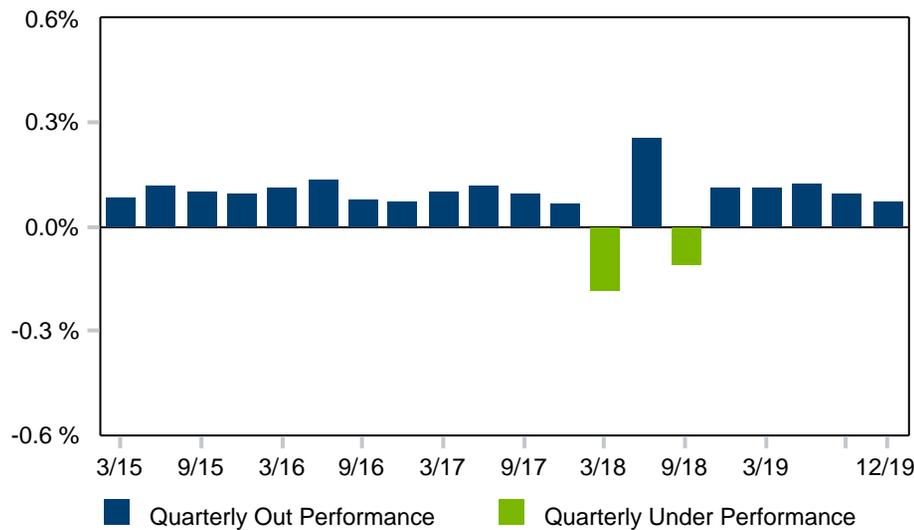
Account Information

Account Name: SSgA Global Index  
 Inception Date: 03/31/2008  
 Account Structure: Commingled Fund  
 Asset Class: Global Equity  
 Benchmark: MSCI AC World IMI (Net)  
 Peer Group: IM Global Equity (SA+CF)

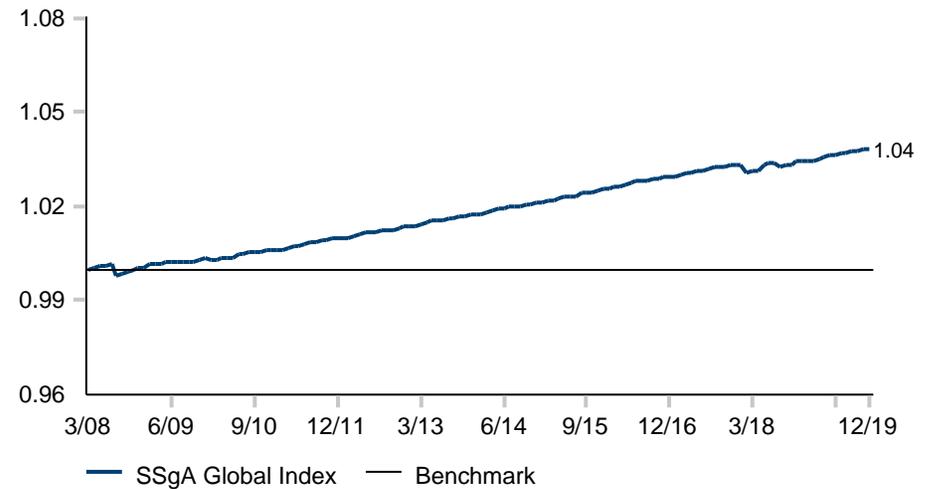
Return Summary



Quarterly Excess Performance

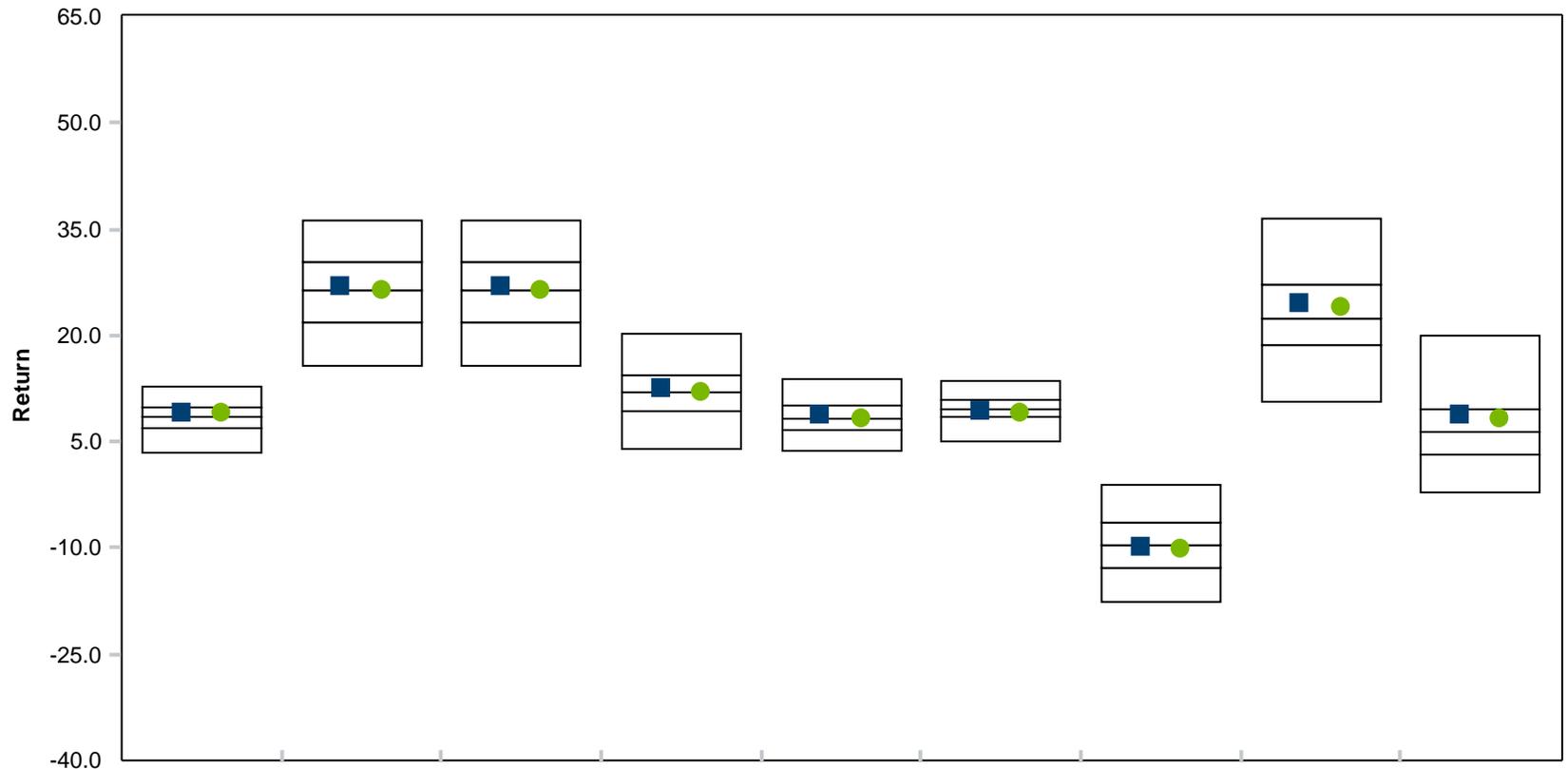


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM Global Equity (SA+CF)

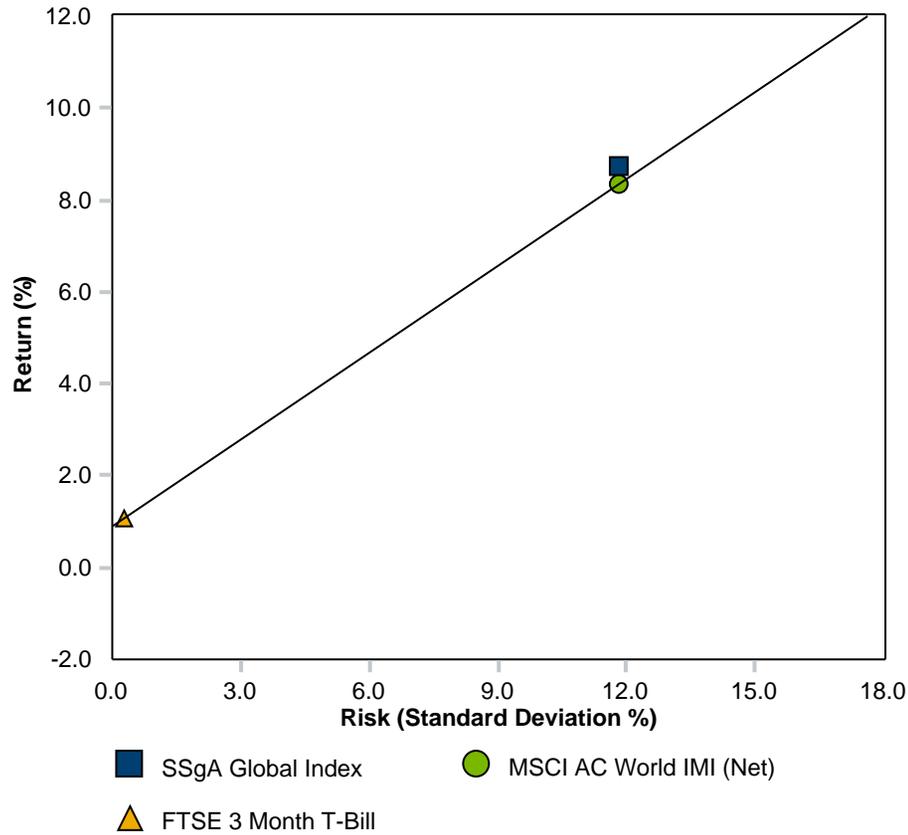


	1 Quarter	2019	1 Year	3 Years	5 Years	10 Years	2018	2017	2016
■ SSgA Global Index	9.1 (38)	26.8 (46)	26.8 (46)	12.4 (45)	8.7 (40)	9.3 (57)	-10.0 (54)	24.4 (40)	8.8 (30)
● MSCI AC World IMI (Net)	9.0 (39)	26.4 (49)	26.4 (49)	12.1 (48)	8.3 (48)	8.9 (65)	-10.1 (56)	23.9 (42)	8.4 (34)
5th Percentile	12.8	36.3	36.3	20.3	13.8	13.6	-1.2	36.5	19.8
1st Quartile	9.7	30.3	30.3	14.4	10.2	10.9	-6.4	27.3	9.5
Median	8.4	26.2	26.2	11.9	8.2	9.6	-9.5	22.5	6.3
3rd Quartile	6.9	21.9	21.9	9.2	6.5	8.4	-12.9	18.6	3.1
95th Percentile	3.4	15.6	15.6	4.0	3.8	5.1	-17.7	10.7	-2.2
Population	365	365	365	352	317	197	522	544	569

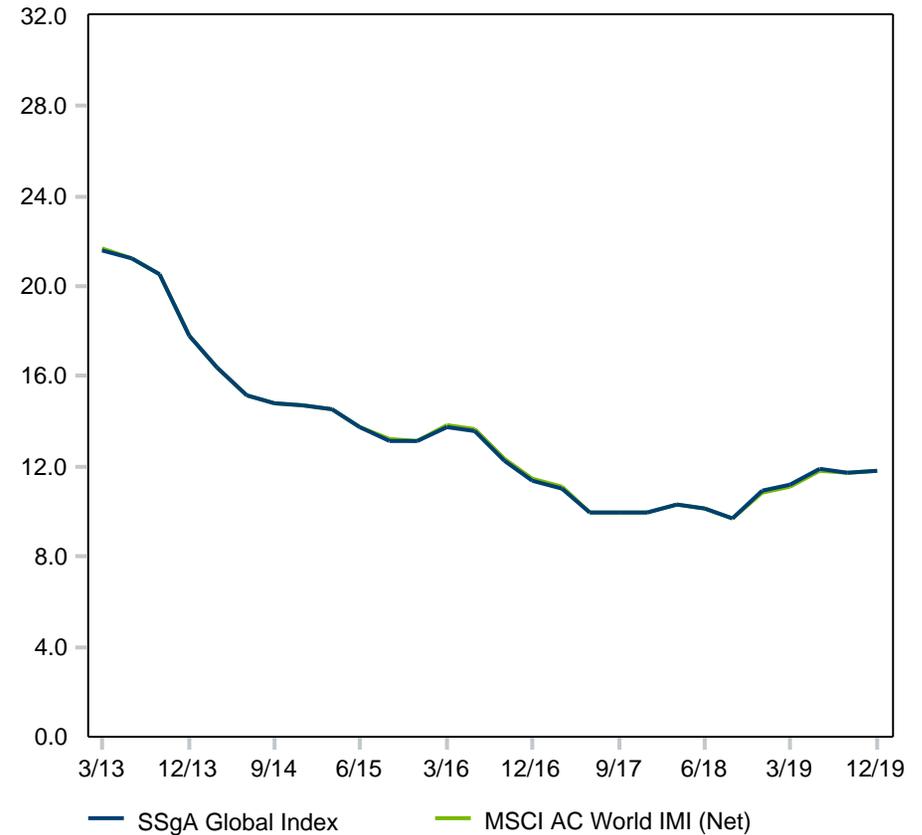
Parenteses contain percentile rankings.

SSgA Global Index Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



Rolling 5 Years Standard Deviation



5 Years Historical Statistics

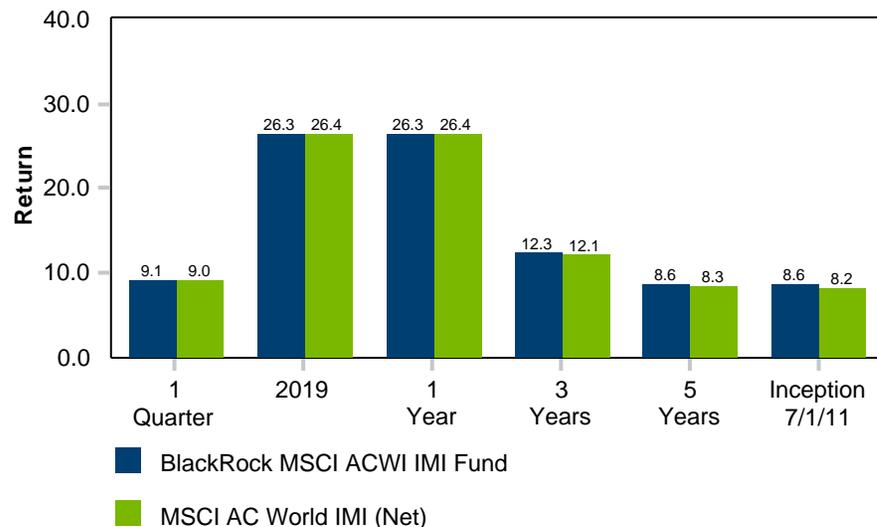
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
SSgA Global Index	0.33	0.17	1.94	1.00	0.68	0.33	1.00	8.70	11.84	1.00
MSCI AC World IMI (Net)	0.00	0.00	N/A	1.00	0.65	0.00	1.00	8.34	11.83	1.00
FTSE 3 Month T-Bill	-7.68	11.82	-0.65	0.00	N/A	1.04	0.00	1.05	0.26	0.02

**BlackRock MSCI ACWI IMI Fund Performance Summary**

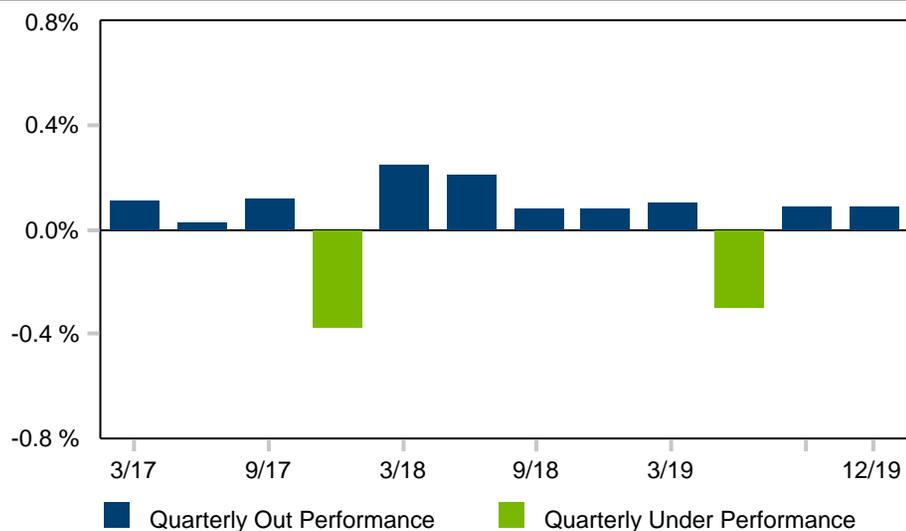
**Account Information**

Account Name: BlackRock MSCI ACWI IMI Fund  
 Inception Date: 06/30/2011  
 Account Structure: Commingled Fund  
 Asset Class: Global Equity  
 Benchmark: MSCI AC World IMI (Net)  
 Peer Group: IM Global Equity (SA+CF)

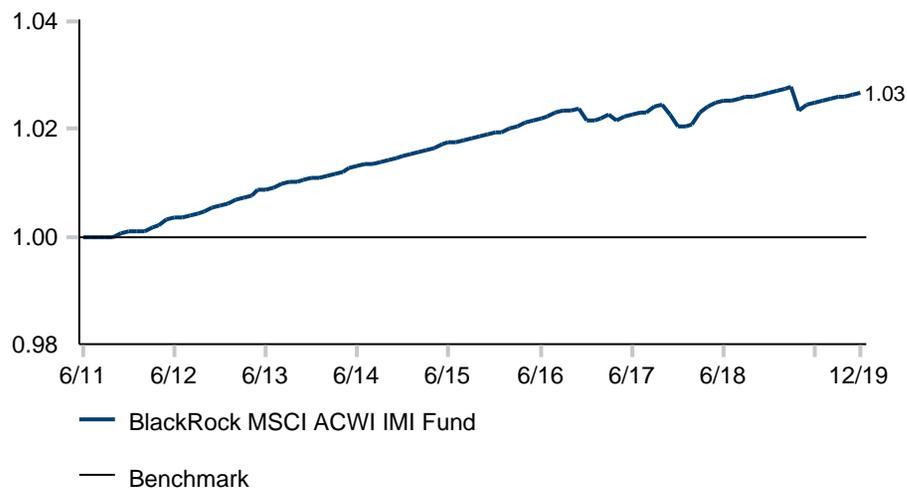
**Return Summary**



**Quarterly Excess Performance**

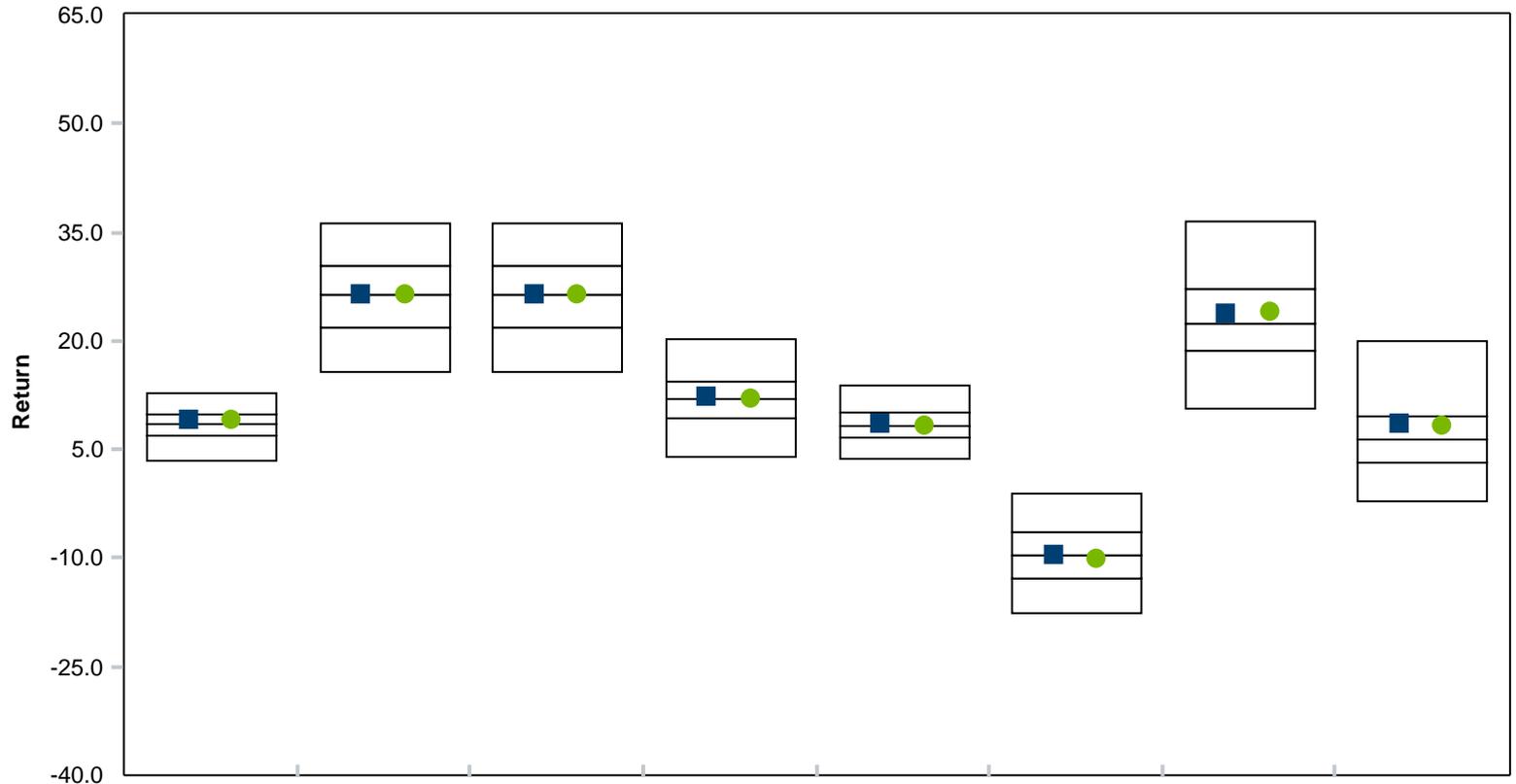


**Ratio of Cumulative Wealth - Since Inception**



Peer Group Analysis

IM Global Equity (SA+CF)

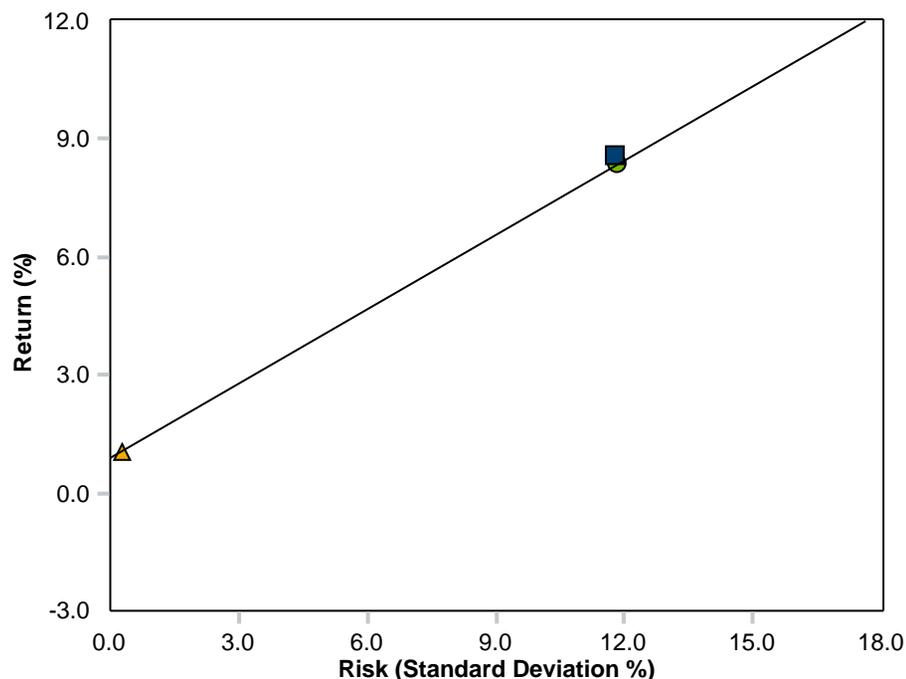


	1 Quarter	2019	1 Year	3 Years	5 Years	2018	2017	2016
■ BlackRock MSCI ACWI IMI Fund	9.1 (37)	26.3 (49)	26.3 (49)	12.3 (45)	8.6 (42)	-9.5 (50)	23.8 (43)	8.6 (32)
● MSCI AC World IMI (Net)	9.0 (39)	26.4 (49)	26.4 (49)	12.1 (48)	8.3 (48)	-10.1 (56)	23.9 (42)	8.4 (34)
5th Percentile	12.8	36.3	36.3	20.3	13.8	-1.2	36.5	19.8
1st Quartile	9.7	30.3	30.3	14.4	10.2	-6.4	27.3	9.5
Median	8.4	26.2	26.2	11.9	8.2	-9.5	22.5	6.3
3rd Quartile	6.9	21.9	21.9	9.2	6.5	-12.9	18.6	3.1
95th Percentile	3.4	15.6	15.6	4.0	3.8	-17.7	10.7	-2.2
Population	365	365	365	352	317	522	544	569

Parentheses contain percentile rankings.

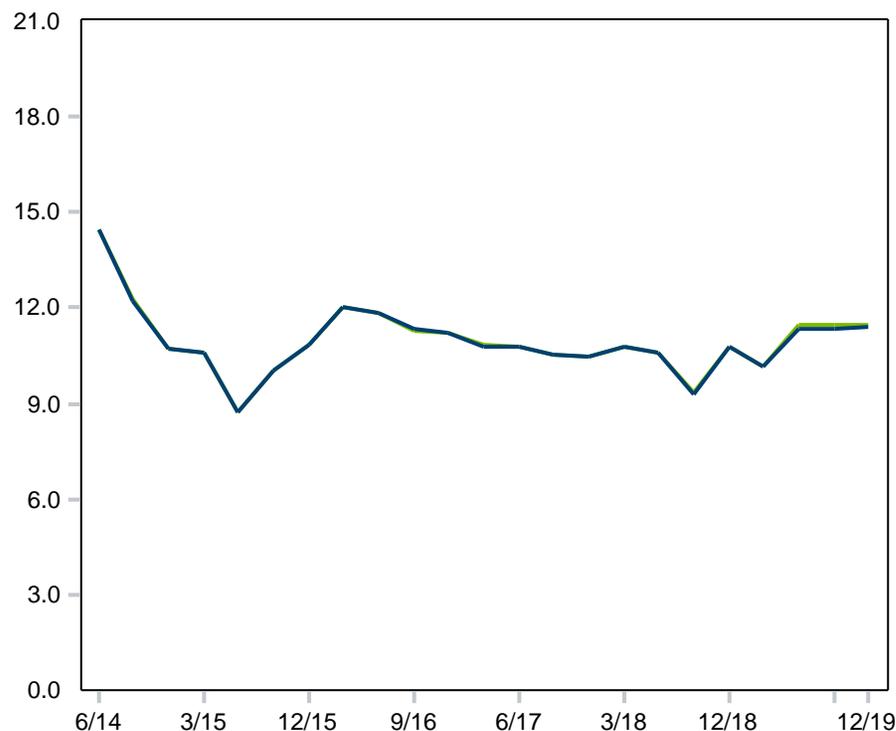
**BlackRock MSCI ACWI IMI Fund Risk Profile**

**Annualized Return vs. Annualized Standard Deviation  
5 Years**



- BlackRock MSCI ACWI IMI Fund
- MSCI AC World IMI (Net)
- ▲ FTSE 3 Month T-Bill

**Rolling 3 Years Standard Deviation**



- BlackRock MSCI ACWI IMI Fund
- MSCI AC World IMI (Net)

**5 Years Historical Statistics**

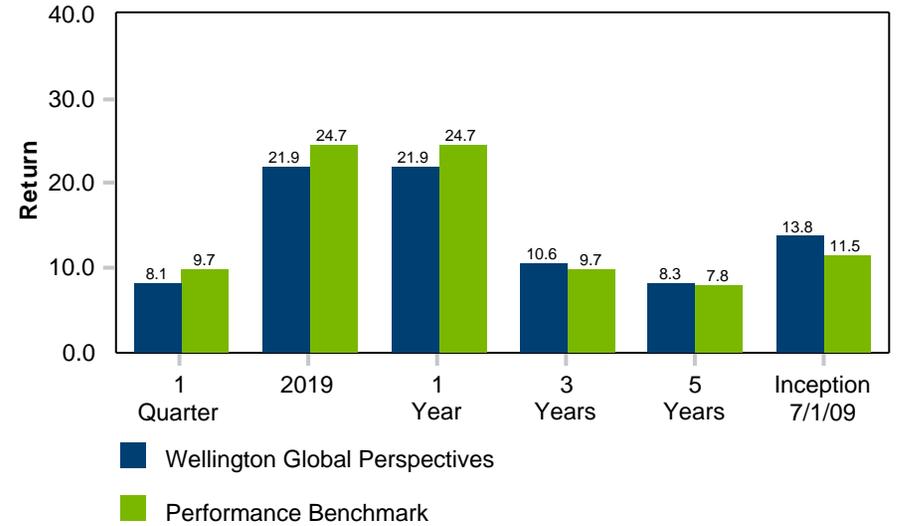
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
BlackRock MSCI ACWI IMI Fund	0.23	0.31	0.73	1.00	0.67	0.26	1.00	8.59	11.78	1.00
MSCI AC World IMI (Net)	0.00	0.00	N/A	1.00	0.65	0.00	1.00	8.34	11.83	1.00
FTSE 3 Month T-Bill	-7.68	11.82	-0.65	0.00	N/A	1.04	0.00	1.05	0.26	0.02

Wellington Global Perspectives Performance Summary

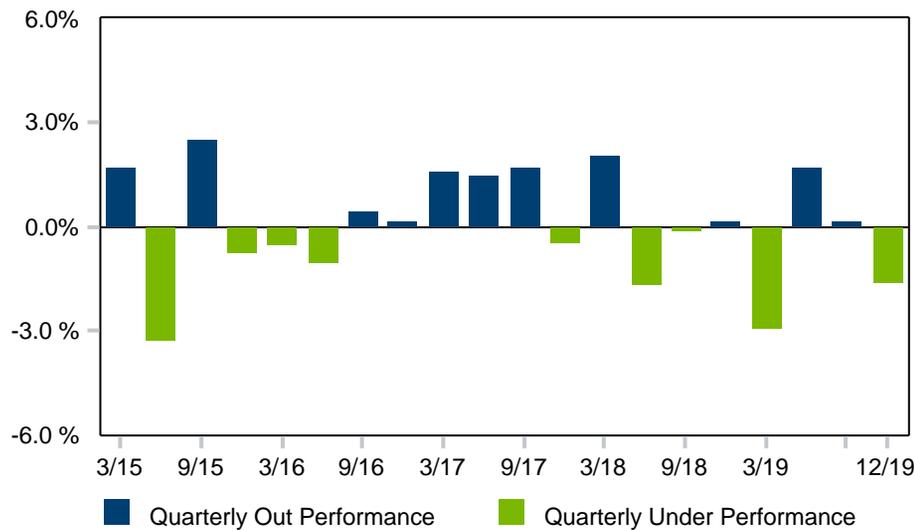
Account Information

Account Name: Wellington Global Perspectives  
 Inception Date: 06/30/2009  
 Account Structure: Separate Account  
 Asset Class: Global Equity  
 Benchmark: Performance Benchmark  
 Peer Group: IM Global Small Cap Equity (SA+CF)

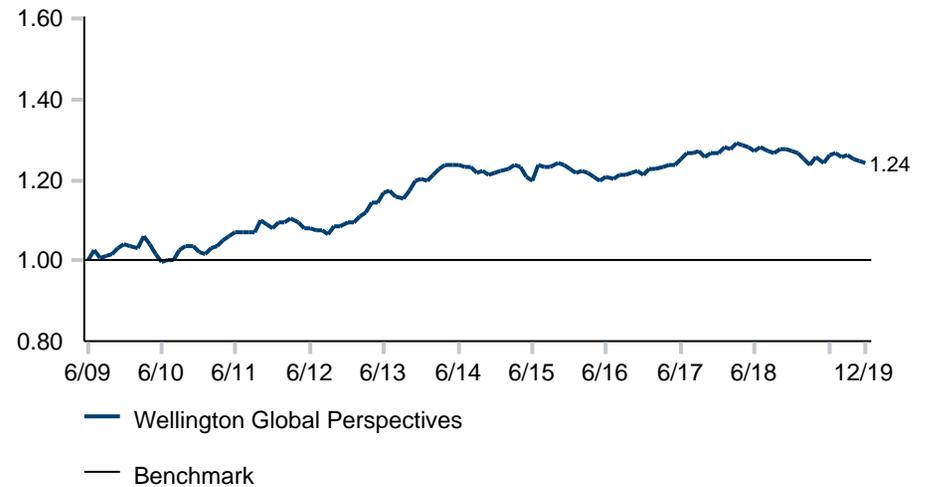
Return Summary



Quarterly Excess Performance

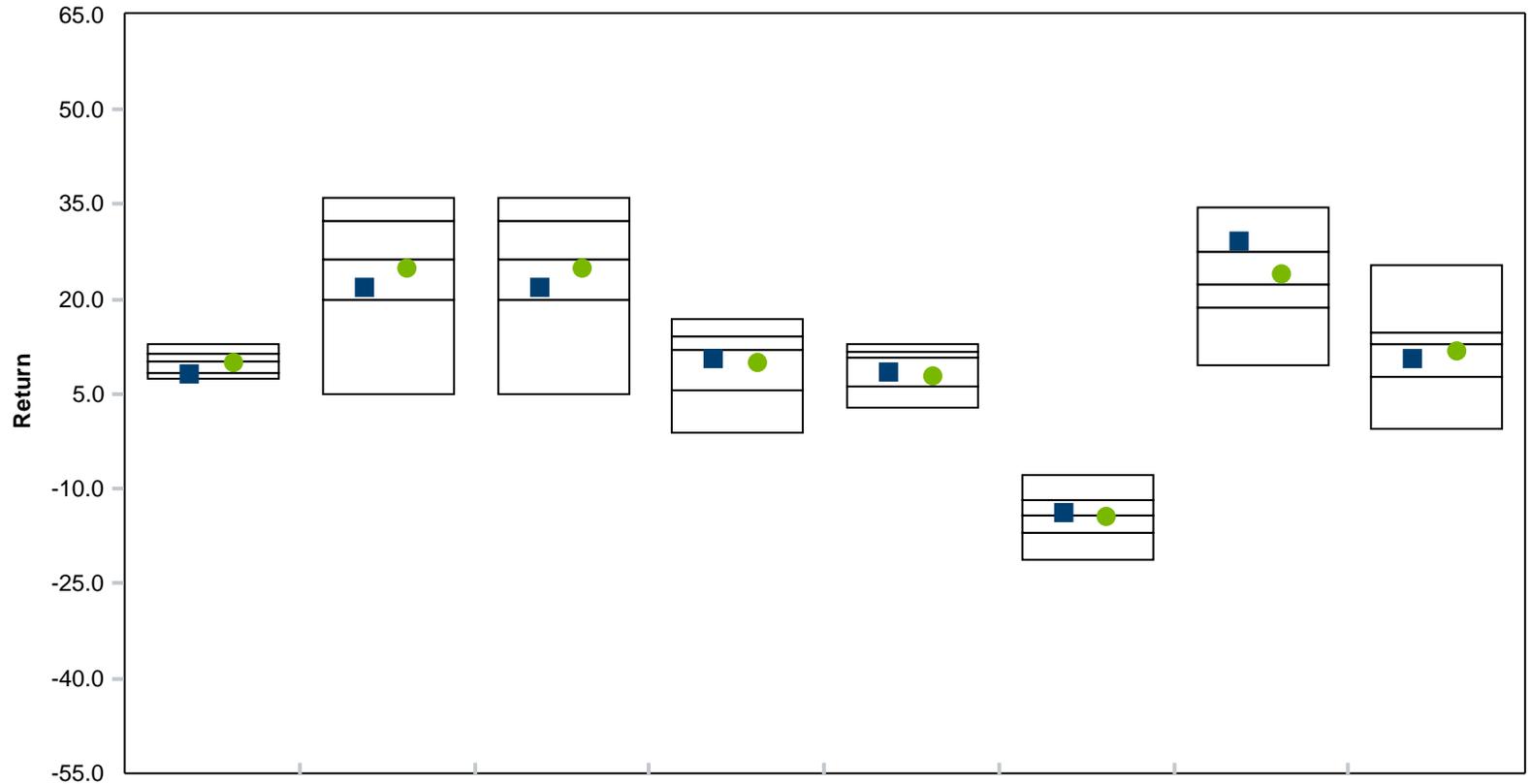


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM Global Small Cap Equity (SA+CF)

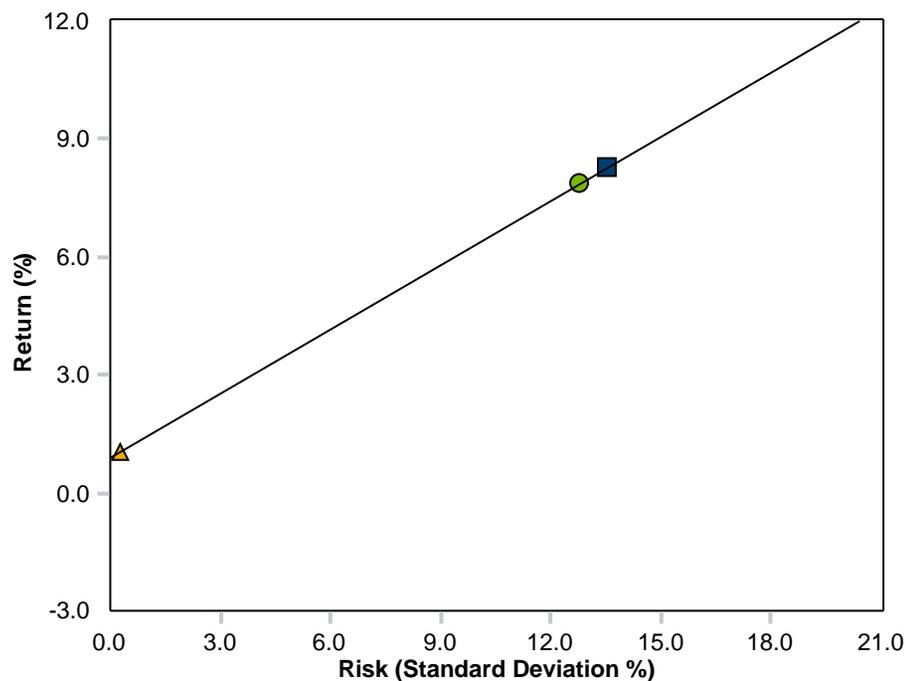


	1 Quarter	2019	1 Year	3 Years	5 Years	2018	2017	2016
Wellington Global Perspectives	8.1 (82)	21.9 (71)	21.9 (71)	10.6 (56)	8.3 (70)	-14.0 (42)	29.0 (20)	10.6 (57)
Performance Benchmark	9.7 (55)	24.7 (65)	24.7 (65)	9.7 (59)	7.8 (72)	-14.4 (51)	23.8 (40)	11.6 (53)
5th Percentile	12.8	36.1	36.1	16.8	12.9	-7.8	34.6	25.5
1st Quartile	11.4	32.5	32.5	14.0	11.7	-11.7	27.4	14.7
Median	10.1	26.4	26.4	12.0	10.8	-14.3	22.3	12.8
3rd Quartile	8.4	20.0	20.0	5.7	6.4	-17.1	18.6	7.9
95th Percentile	7.3	5.1	5.1	-1.1	2.9	-21.1	9.6	-0.4
Population	20	20	20	20	17	32	31	33

parentheses contain percentile rankings.

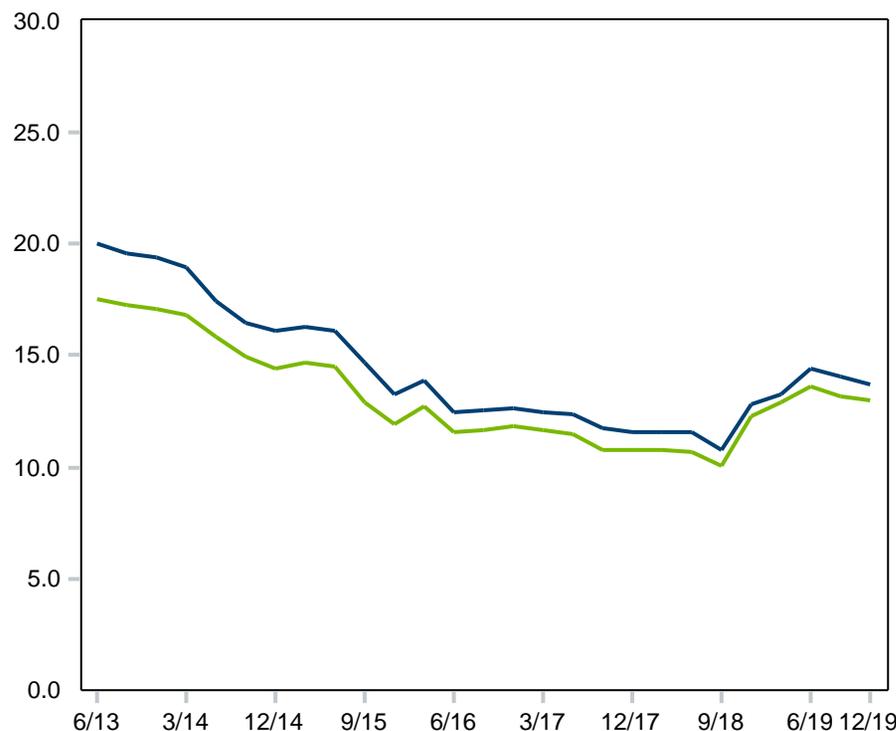
**Wellington Global Perspectives Risk Profile**

**Annualized Return vs. Annualized Standard Deviation 5 Years**



- Wellington Global Perspectives
- Performance Benchmark
- ▲ FTSE 3 Month T-Bill

**Rolling 4 Years Standard Deviation**



- Wellington Global Perspectives
- Performance Benchmark

**5 Years Historical Statistics**

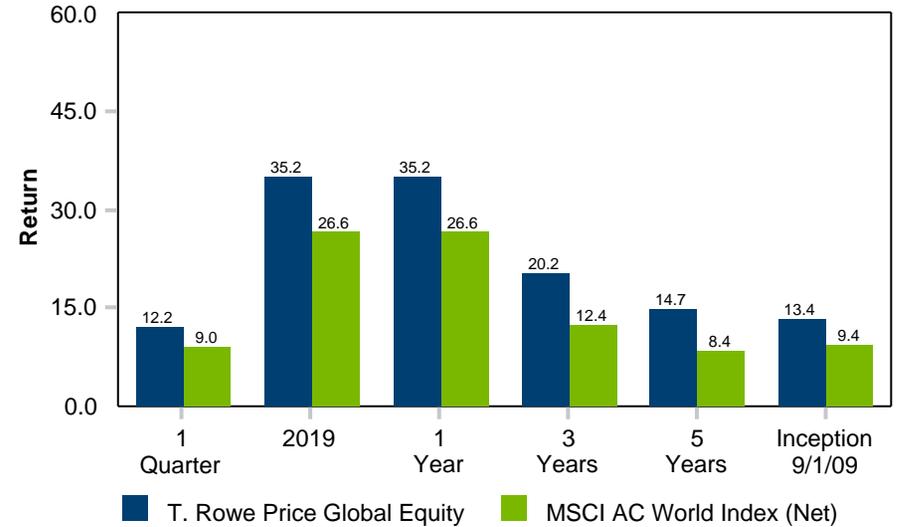
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Wellington Global Perspectives	0.49	3.01	0.16	0.95	0.58	0.21	1.03	8.26	13.52	0.98
Performance Benchmark	0.00	0.00	N/A	1.00	0.57	0.00	1.00	7.85	12.77	1.00
FTSE 3 Month T-Bill	-7.35	12.78	-0.57	0.00	N/A	1.05	0.00	1.05	0.26	-0.03

T. Rowe Price Global Equity Performance Summary

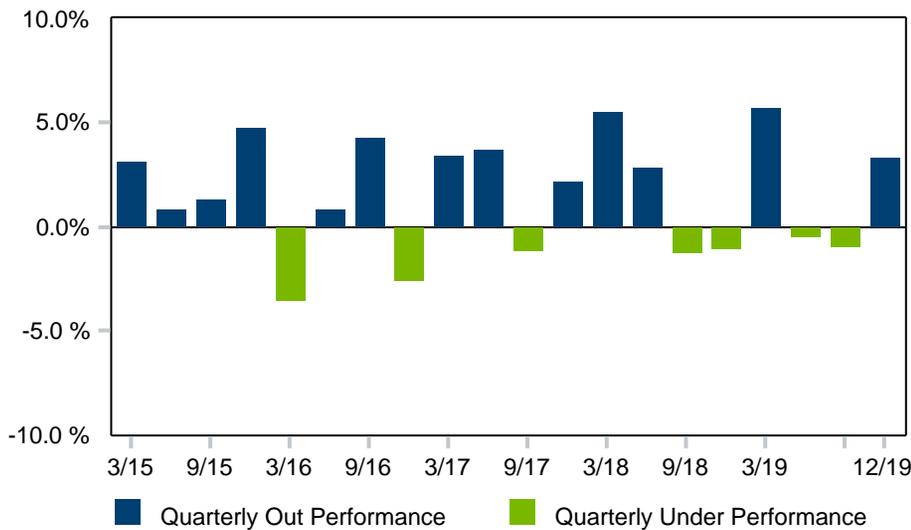
Account Information

Account Name: T. Rowe Price Global Equity  
 Inception Date: 08/31/2009  
 Account Structure: Separate Account  
 Asset Class: Global Equity  
 Benchmark: MSCI AC World Index (Net)  
 Peer Group: IM Global Equity (SA+CF)

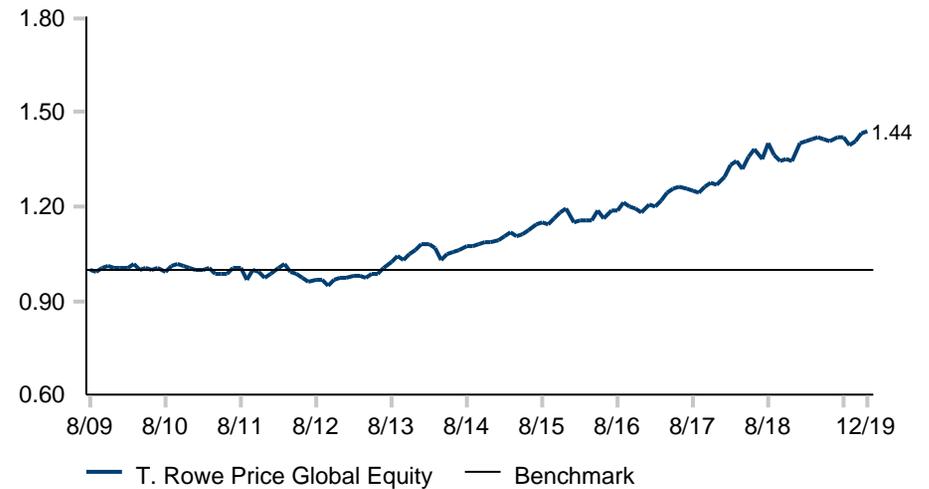
Return Summary



Quarterly Excess Performance

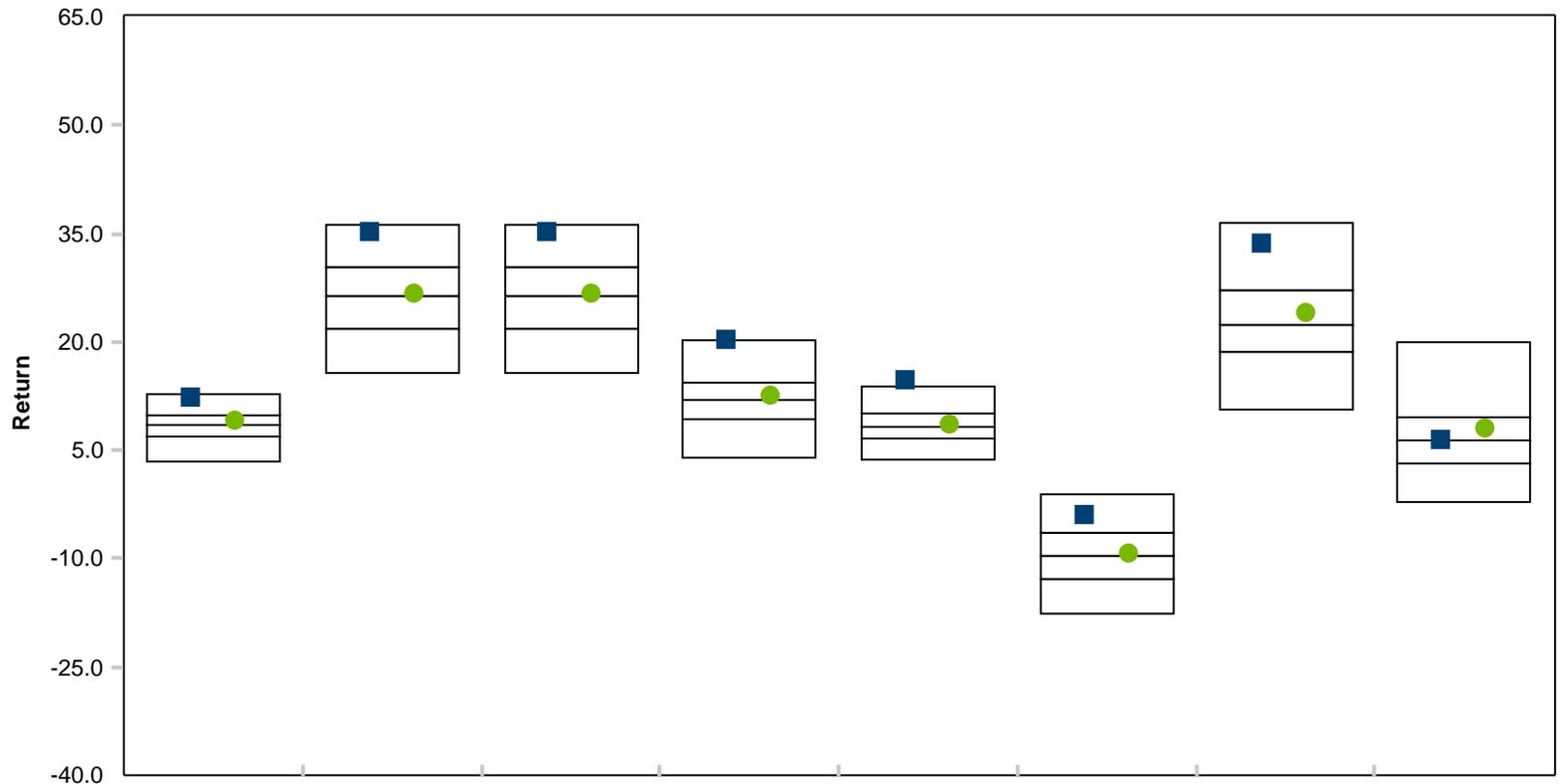


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM Global Equity (SA+CF)

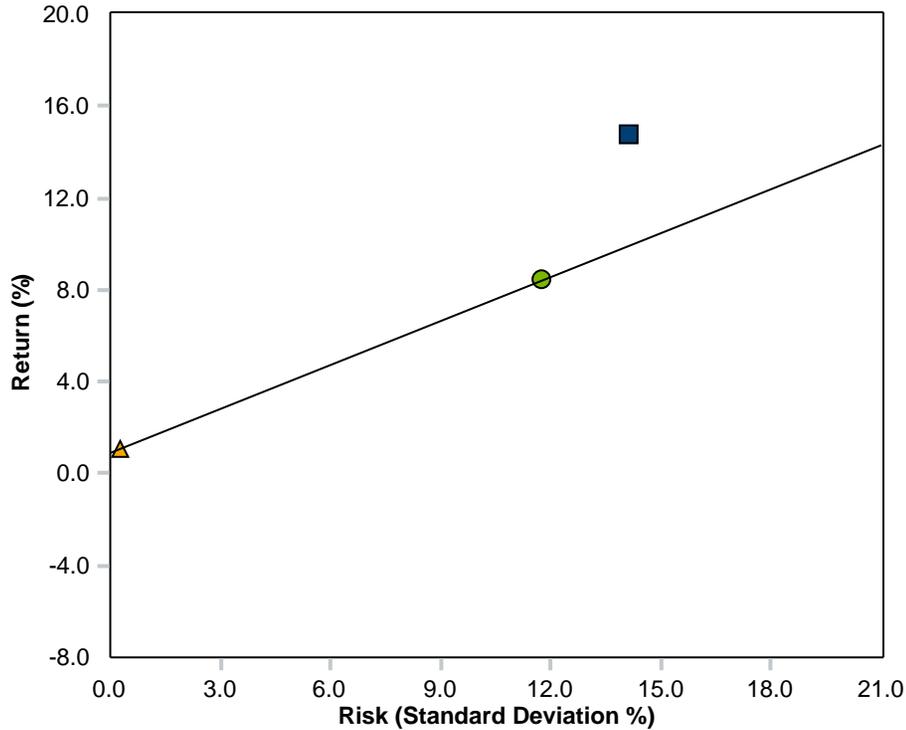


	1 Quarter	2019	1 Year	3 Years	5 Years	2018	2017	2016
■ T. Rowe Price Global Equity	12.2 (8)	35.2 (8)	35.2 (8)	20.2 (6)	14.7 (3)	-4.0 (14)	33.7 (9)	6.4 (49)
● MSCI AC World Index (Net)	9.0 (39)	26.6 (47)	26.6 (47)	12.4 (45)	8.4 (47)	-9.4 (50)	24.0 (42)	7.9 (38)
5th Percentile	12.8	36.3	36.3	20.3	13.8	-1.2	36.5	19.8
1st Quartile	9.7	30.3	30.3	14.4	10.2	-6.4	27.3	9.5
Median	8.4	26.2	26.2	11.9	8.2	-9.5	22.5	6.3
3rd Quartile	6.9	21.9	21.9	9.2	6.5	-12.9	18.6	3.1
95th Percentile	3.4	15.6	15.6	4.0	3.8	-17.7	10.7	-2.2
Population	365	365	365	352	317	522	544	569

parentheses contain percentile rankings.

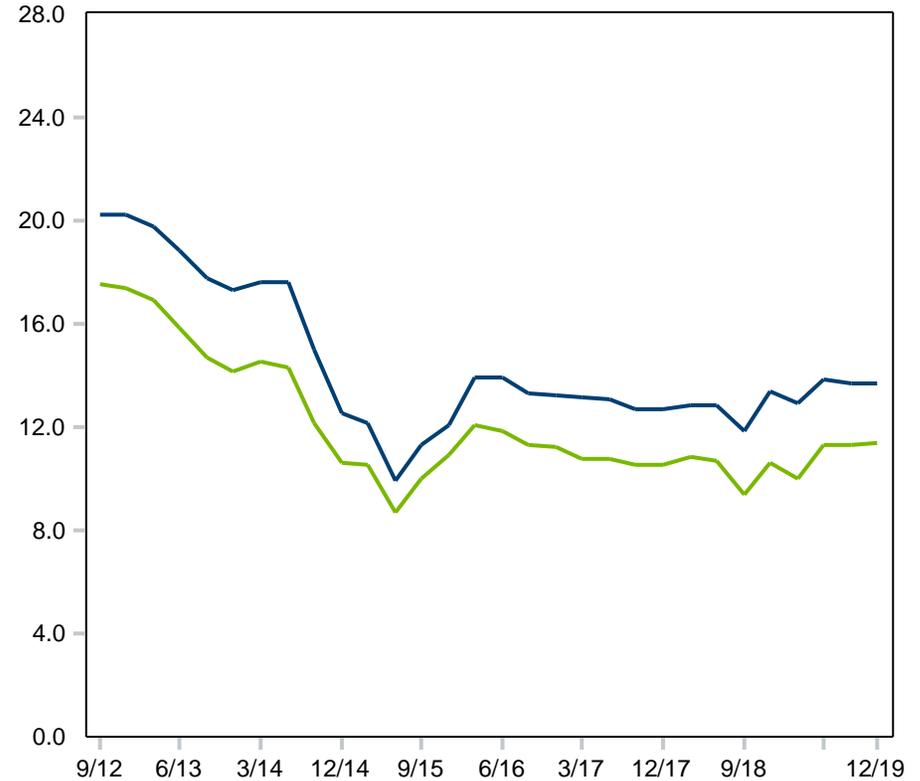
**T. Rowe Price Global Equity Risk Profile**

**Annualized Return vs. Annualized Standard Deviation  
5 Years**



■ T. Rowe Price Global Equity   ● MSCI AC World Index (Net)  
▲ FTSE 3 Month T-Bill

**Rolling 3 Years Standard Deviation**



— T. Rowe Price Global Equity   — MSCI AC World Index (Net)

**5 Years Historical Statistics**

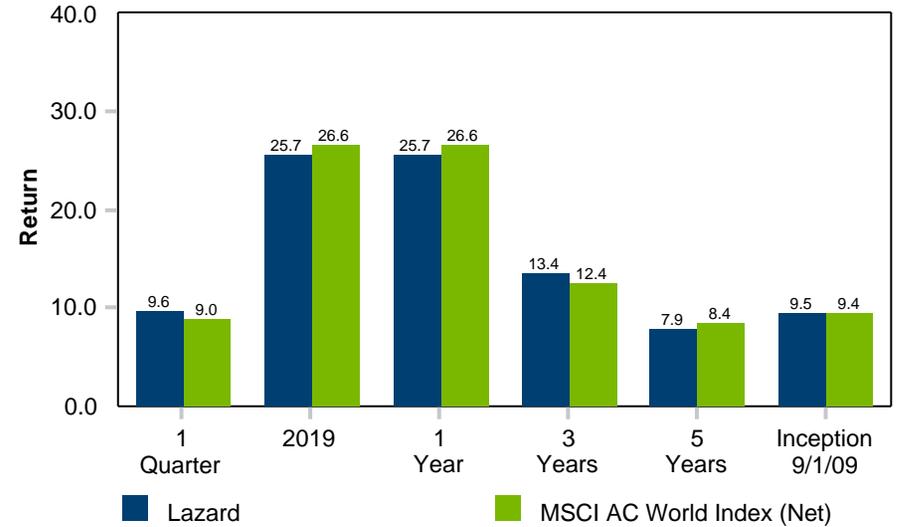
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
T. Rowe Price Global Equity	6.02	5.18	1.16	0.88	0.97	5.06	1.12	14.73	14.12	0.94
MSCI AC World Index (Net)	0.00	0.00	N/A	1.00	0.66	0.00	1.00	8.41	11.78	1.00
FTSE 3 Month T-Bill	-7.74	11.77	-0.66	0.00	N/A	1.04	0.00	1.05	0.26	0.03

Lazard Performance Summary

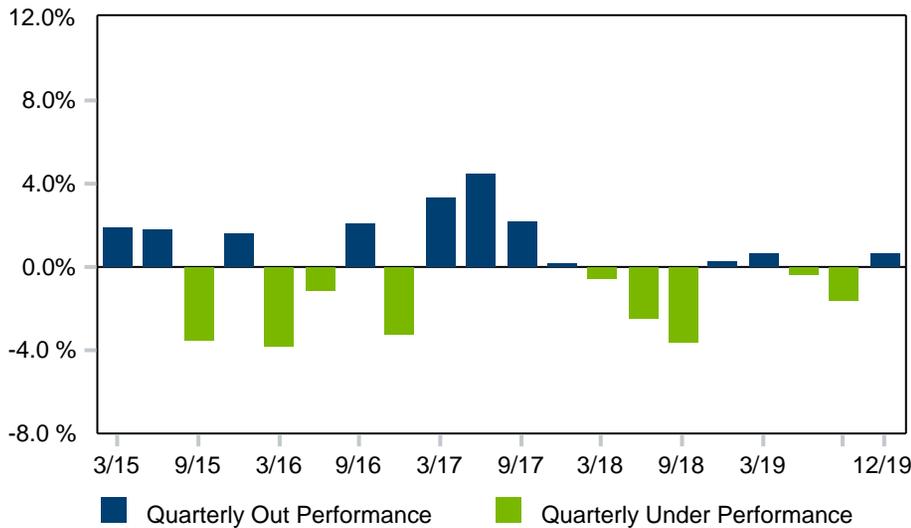
Account Information

Account Name: Lazard  
 Inception Date: 08/31/2009  
 Account Structure: Separate Account  
 Asset Class: Global Equity  
 Benchmark: MSCI AC World Index (Net)  
 Peer Group: IM Global Equity (SA+CF)

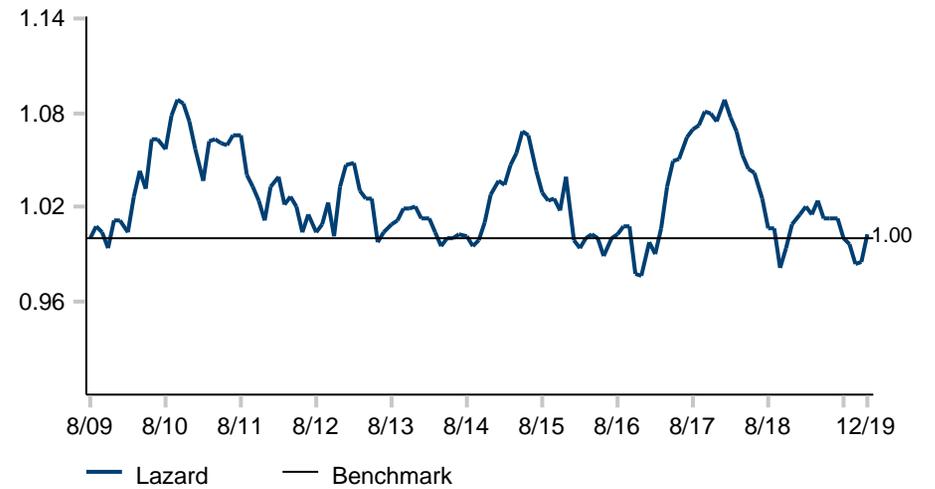
Return Summary



Quarterly Excess Performance

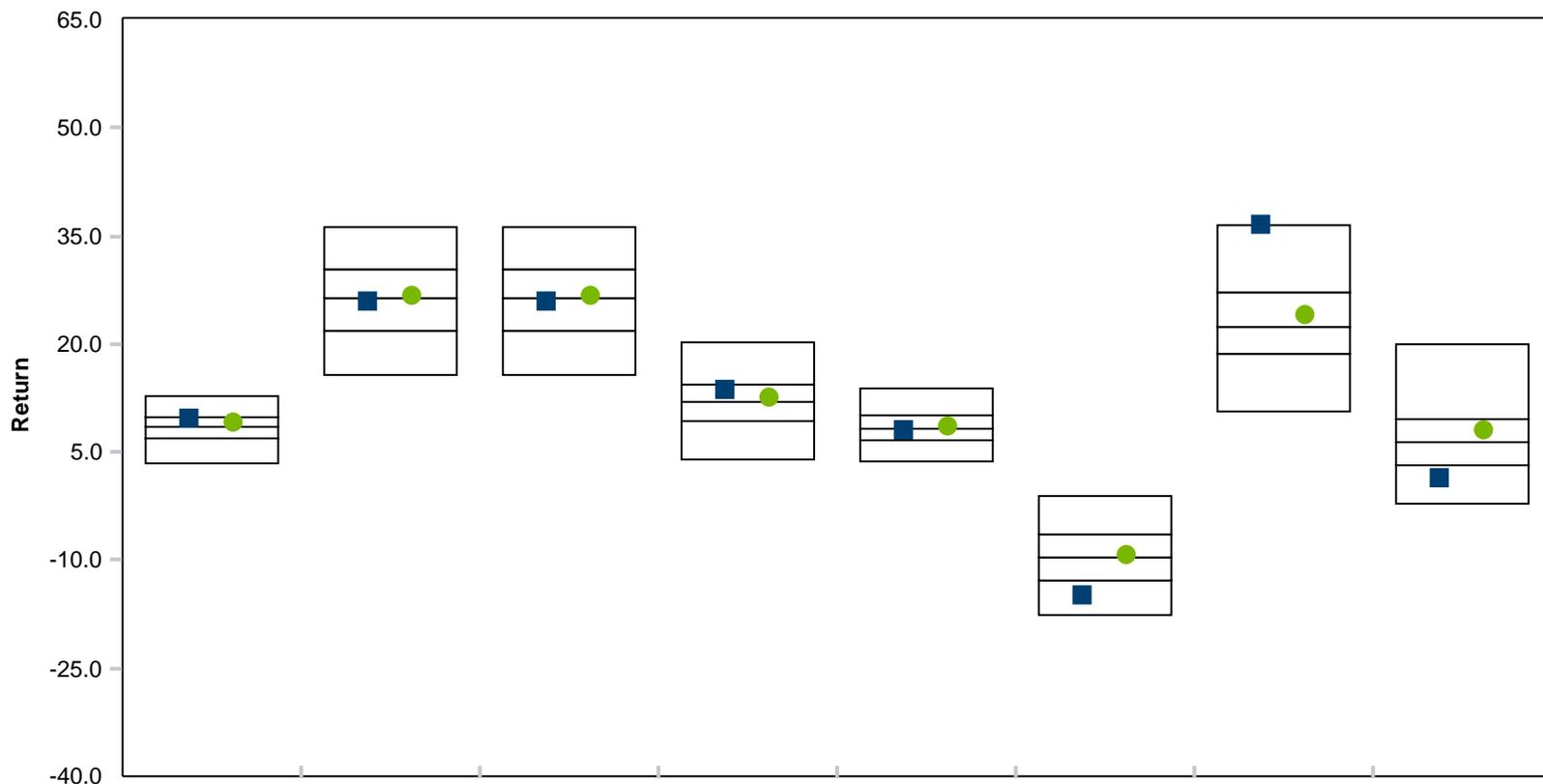


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM Global Equity (SA+CF)

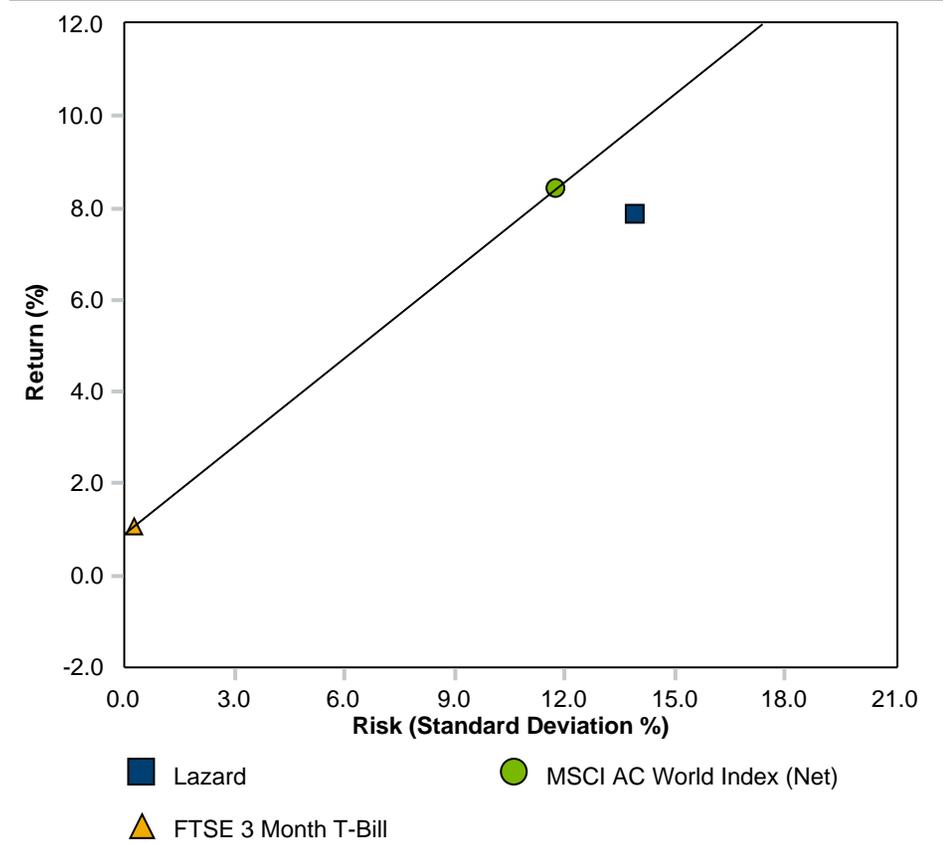


	1 Quarter	2019	1 Year	3 Years	5 Years	2018	2017	2016
■ Lazard	9.6 (28)	25.7 (54)	25.7 (54)	13.4 (31)	7.9 (54)	-14.9 (86)	36.5 (5)	1.3 (85)
● MSCI AC World Index (Net)	9.0 (39)	26.6 (47)	26.6 (47)	12.4 (45)	8.4 (47)	-9.4 (50)	24.0 (42)	7.9 (38)
5th Percentile	12.8	36.3	36.3	20.3	13.8	-1.2	36.5	19.8
1st Quartile	9.7	30.3	30.3	14.4	10.2	-6.4	27.3	9.5
Median	8.4	26.2	26.2	11.9	8.2	-9.5	22.5	6.3
3rd Quartile	6.9	21.9	21.9	9.2	6.5	-12.9	18.6	3.1
95th Percentile	3.4	15.6	15.6	4.0	3.8	-17.7	10.7	-2.2
Population	365	365	365	352	317	522	544	569

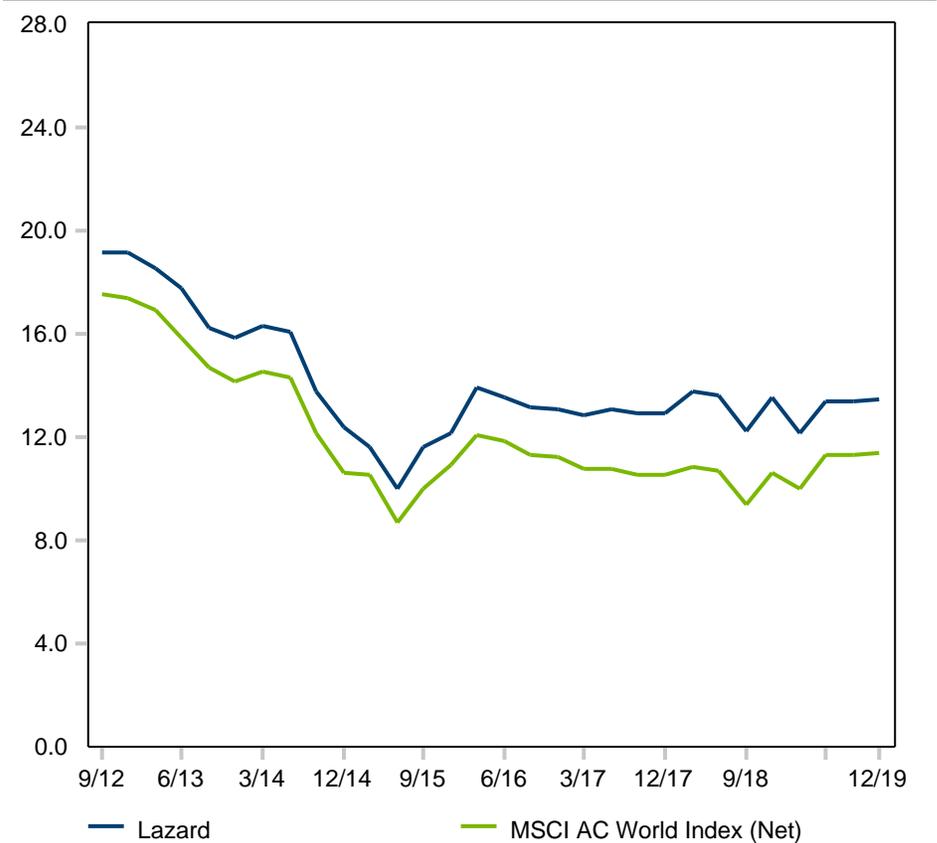
parentheses contain percentile rankings.

Lazard Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



Rolling 3 Years Standard Deviation



5 Years Historical Statistics

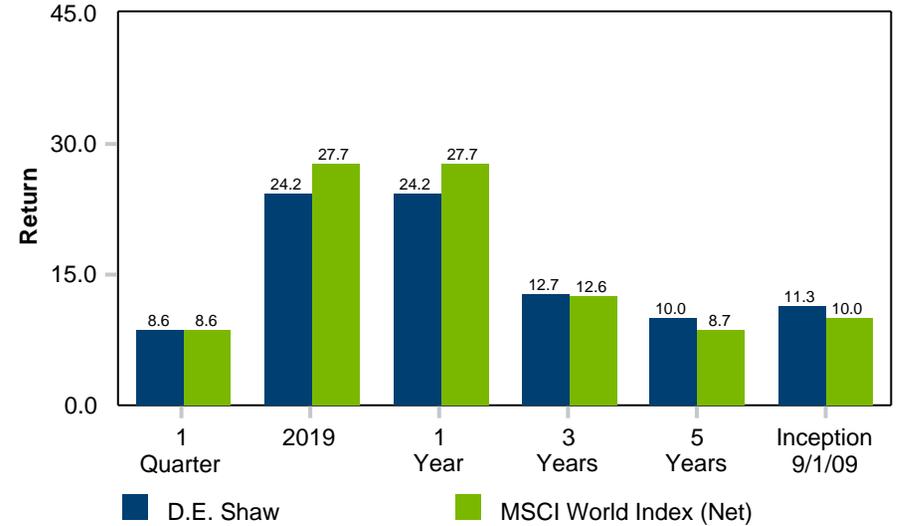
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Lazard	-0.22	4.39	-0.05	0.91	0.54	-1.37	1.13	7.87	13.95	0.96
MSCI AC World Index (Net)	0.00	0.00	N/A	1.00	0.66	0.00	1.00	8.41	11.78	1.00
FTSE 3 Month T-Bill	-7.74	11.77	-0.66	0.00	N/A	1.04	0.00	1.05	0.26	0.03

D.E. Shaw Performance Summary

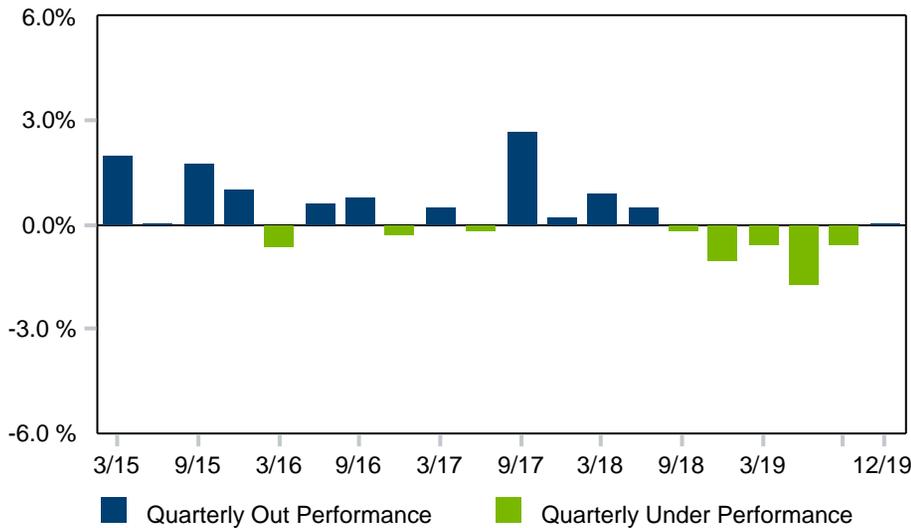
Account Information

Account Name: D.E. Shaw  
 Inception Date: 08/31/2009  
 Account Structure: Commingled Fund  
 Asset Class: Global Equity  
 Benchmark: MSCI World Index (Net)  
 Peer Group: IM Global Equity (SA+CF)

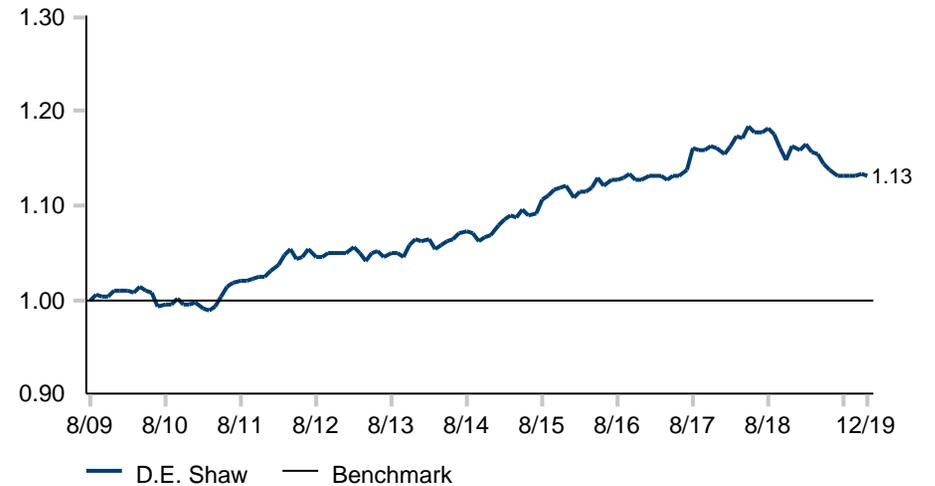
Return Summary



Quarterly Excess Performance

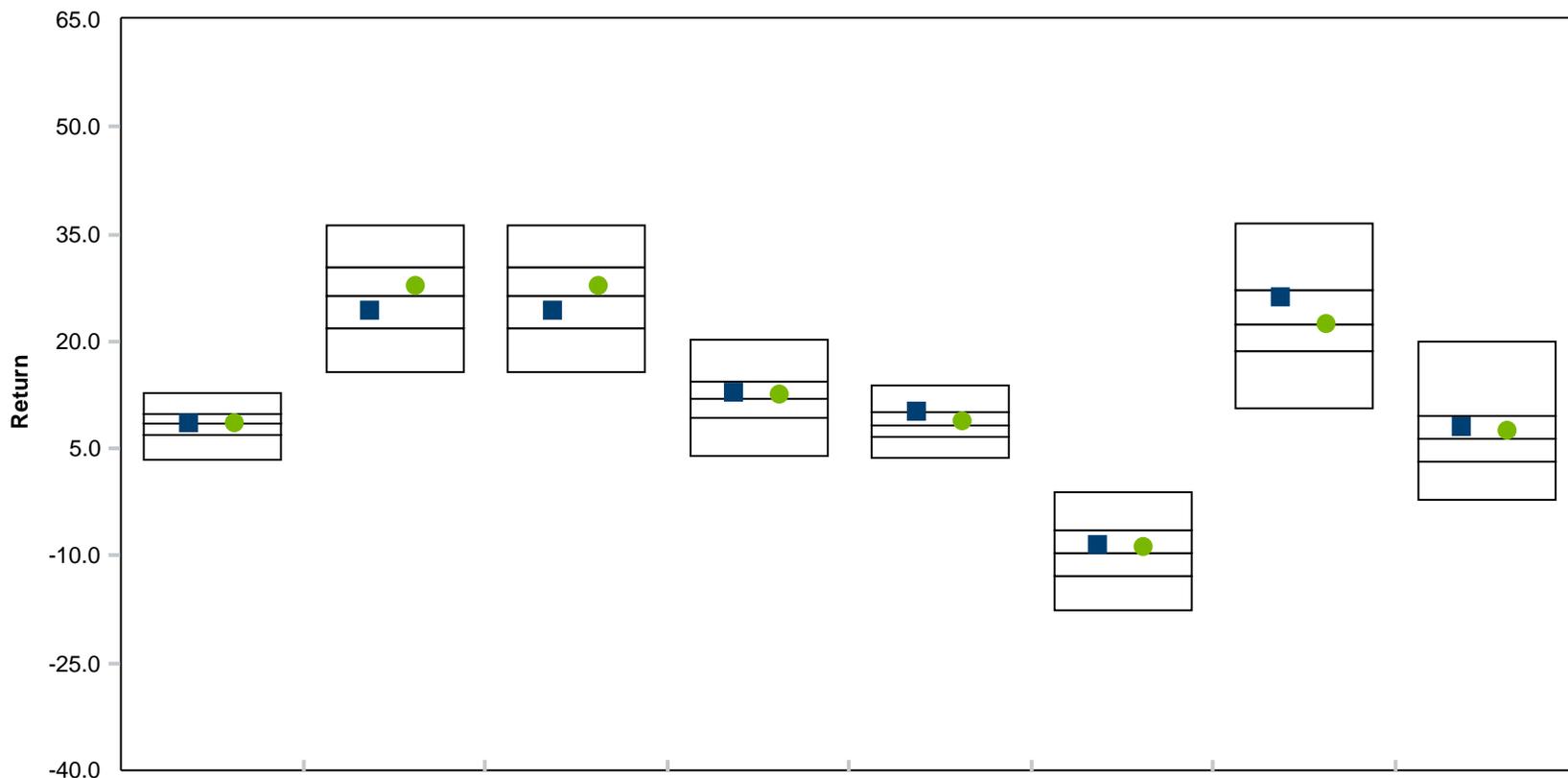


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM Global Equity (SA+CF)

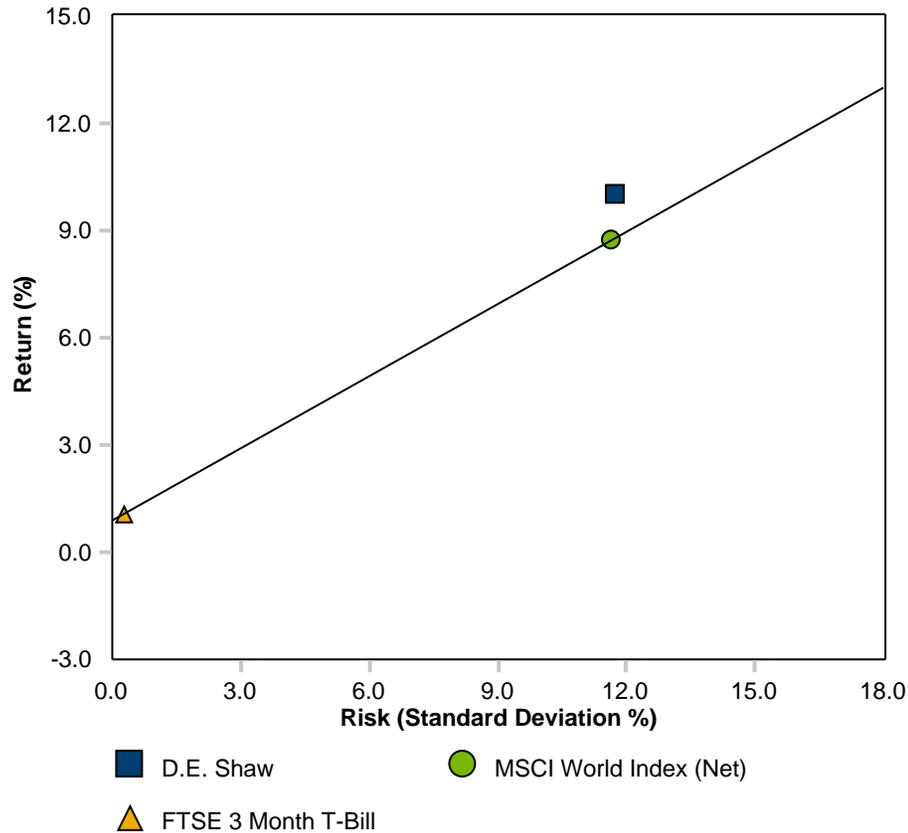


	1 Quarter	2019	1 Year	3 Years	5 Years	2018	2017	2016
■ D.E. Shaw	8.6 (47)	24.2 (65)	24.2 (65)	12.7 (41)	10.0 (27)	-8.6 (43)	26.2 (30)	8.0 (37)
● MSCI World Index (Net)	8.6 (48)	27.7 (41)	27.7 (41)	12.6 (43)	8.7 (40)	-8.7 (43)	22.4 (51)	7.5 (40)
5th Percentile	12.8	36.3	36.3	20.3	13.8	-1.2	36.5	19.8
1st Quartile	9.7	30.3	30.3	14.4	10.2	-6.4	27.3	9.5
Median	8.4	26.2	26.2	11.9	8.2	-9.5	22.5	6.3
3rd Quartile	6.9	21.9	21.9	9.2	6.5	-12.9	18.6	3.1
95th Percentile	3.4	15.6	15.6	4.0	3.8	-17.7	10.7	-2.2
Population	365	365	365	352	317	522	544	569

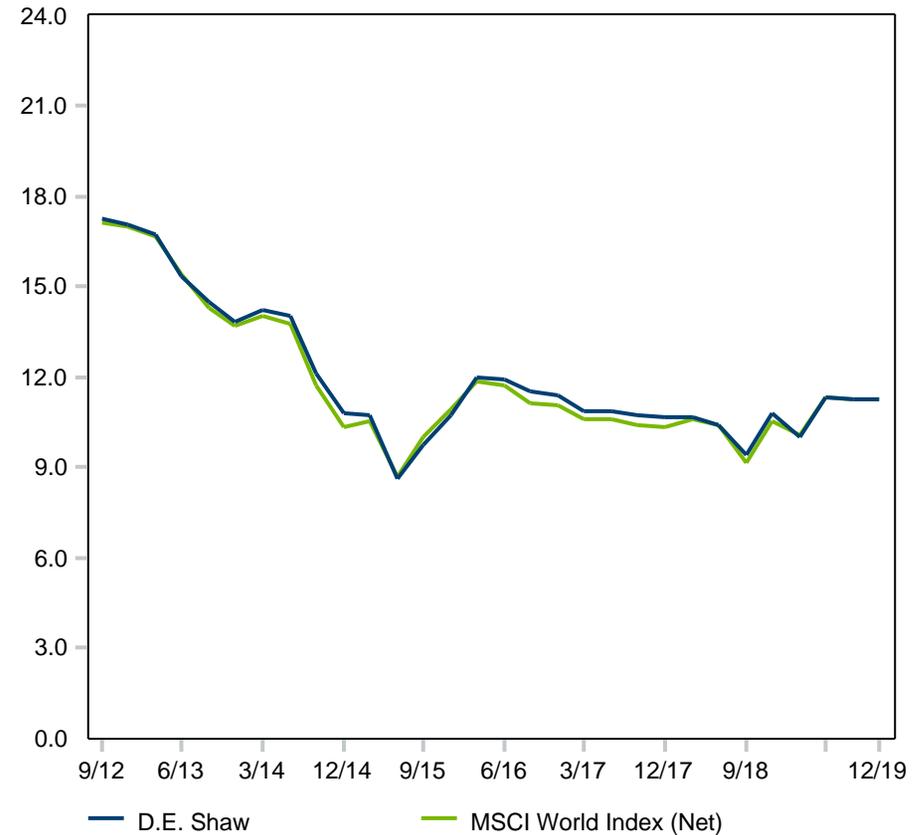
parentheses contain percentile rankings.

D.E. Shaw Risk Profile

Annualized Return vs. Annualized Standard Deviation  
5 Years



Rolling 3 Years Standard Deviation



5 Years Historical Statistics

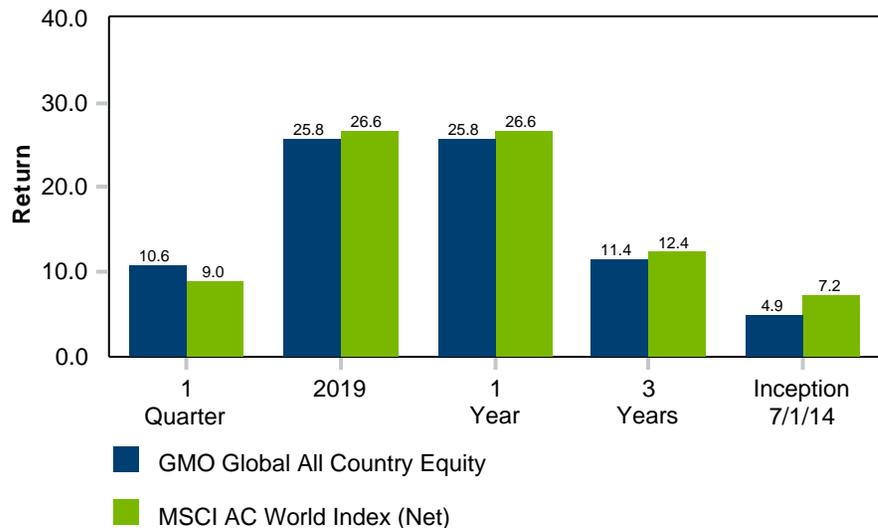
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
D.E. Shaw	1.17	2.13	0.55	0.97	0.78	1.26	0.99	10.00	11.77	0.98
MSCI World Index (Net)	0.00	0.00	N/A	1.00	0.69	0.00	1.00	8.74	11.68	1.00
FTSE 3 Month T-Bill	-8.04	11.67	-0.69	0.00	N/A	1.04	0.00	1.05	0.26	0.04

**GMO Global All Country Equity Performance Summary**

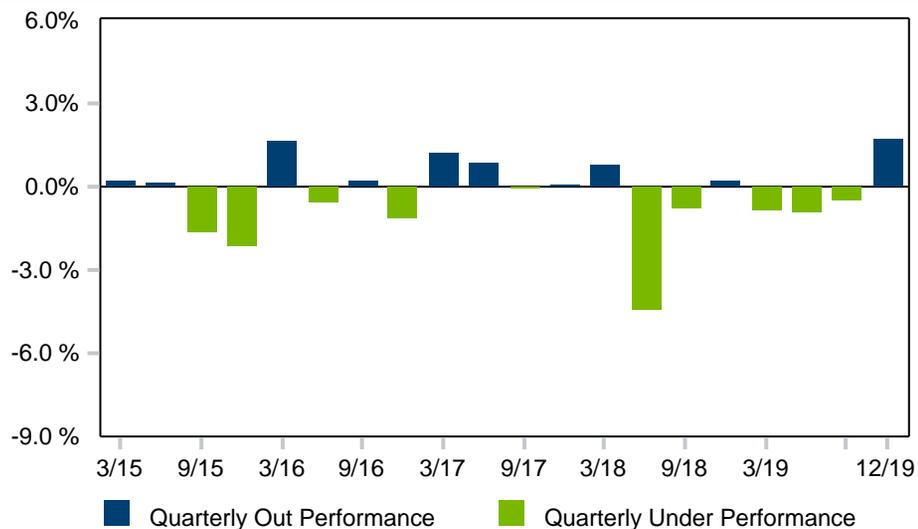
**Account Information as of 12/31/19**

Product Name : GMO:Global Eq All;III (GMGEX)  
 Fund Family : Grantham Mayo Van Otterloo & Co LLC  
 Ticker : GMGEX  
 Peer Group : IM Global Multi-Cap Core Equity (MF)  
 Benchmark : MSCI AC World Index (Net)  
 Fund Inception : 11/26/1996  
 Portfolio Manager : Inker/Wilderman  
 Total Assets : \$1,561.00 Million  
 Total Assets Date : 08/31/2019  
 Gross Expense : 0.62%  
 Net Expense : 0.61%  
 Turnover : 11%

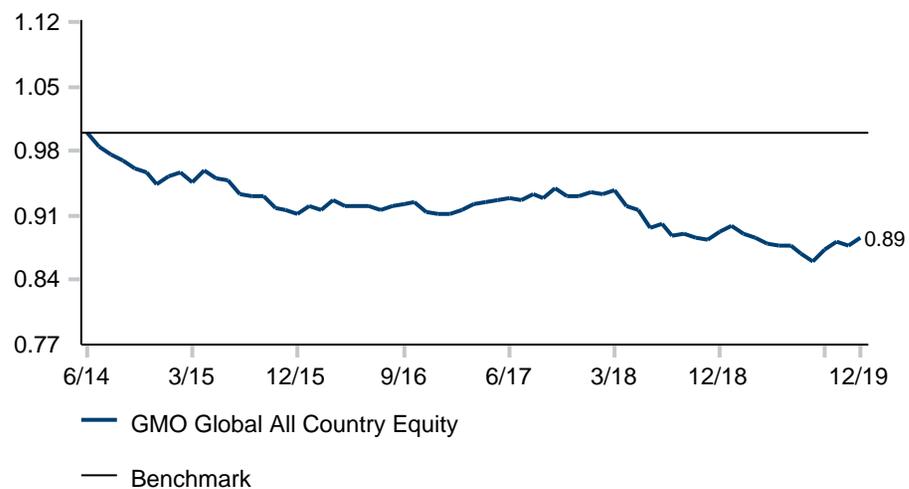
**Return Summary**



**Quarterly Excess Performance**



**Ratio of Cumulative Wealth - Since Inception**

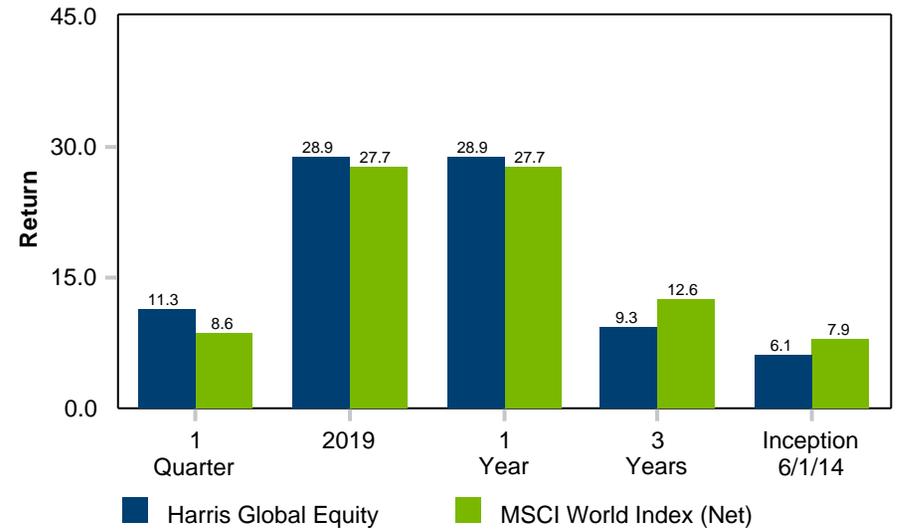


Harris Global Equity Performance Summary

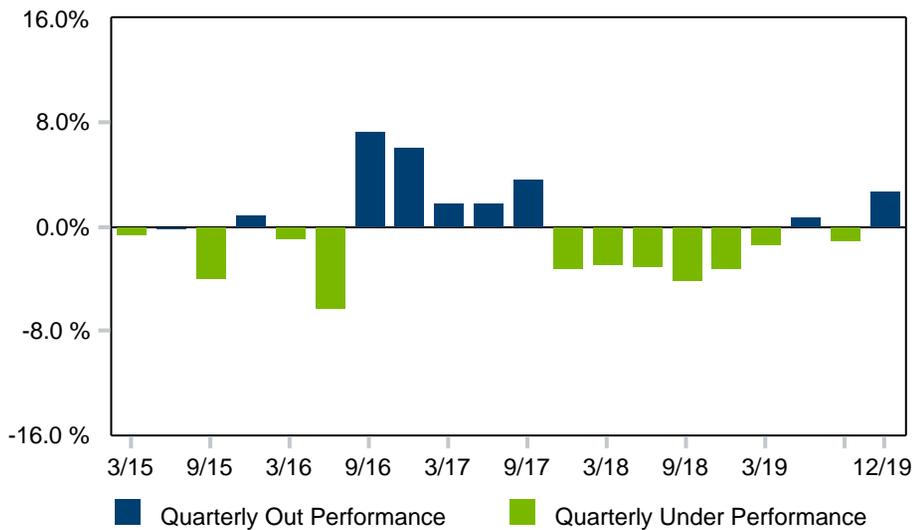
Account Information

Account Name: Harris Global Equity  
 Inception Date: 06/01/2014  
 Account Structure: Separate Account  
 Asset Class: Global Equity  
 Benchmark: MSCI World Index (Net)  
 Peer Group: IM Global Equity (SA+CF)

Return Summary

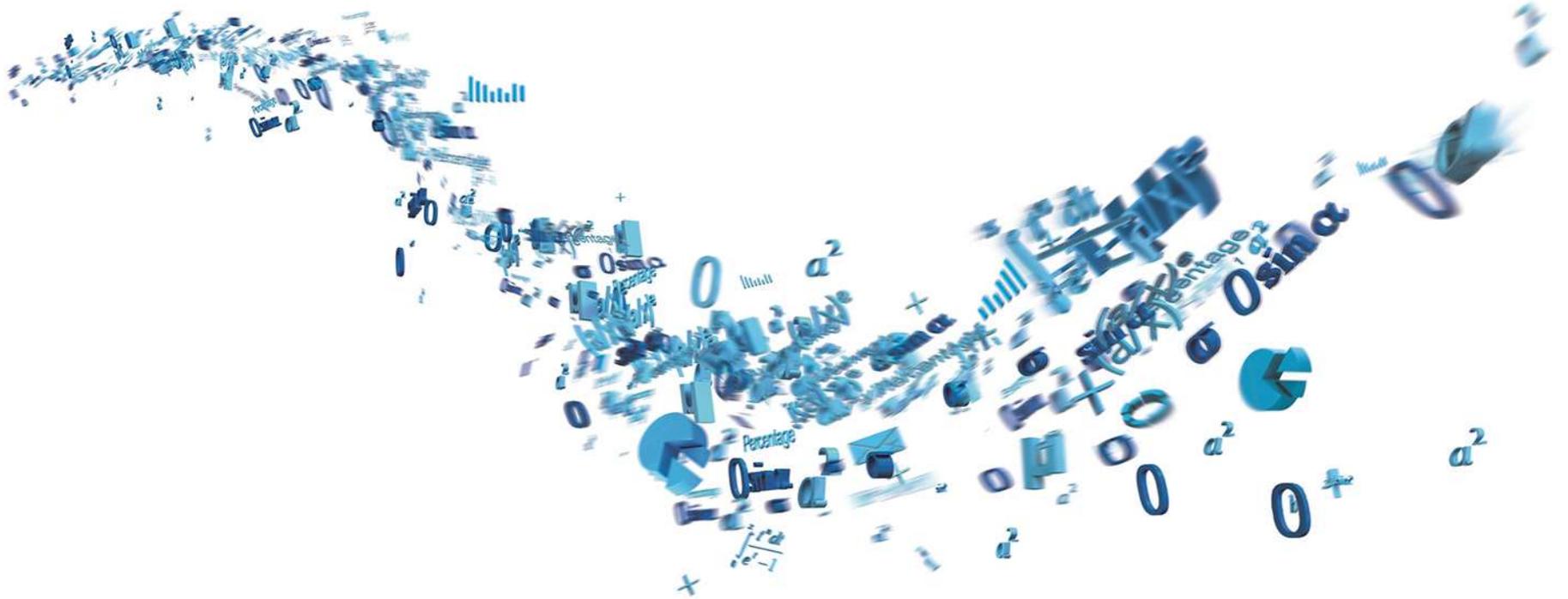


Quarterly Excess Performance



Ratio of Cumulative Wealth - Since Inception





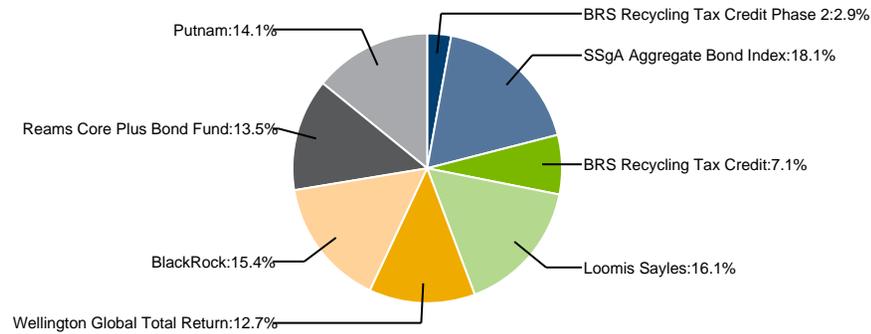
# Fixed Income

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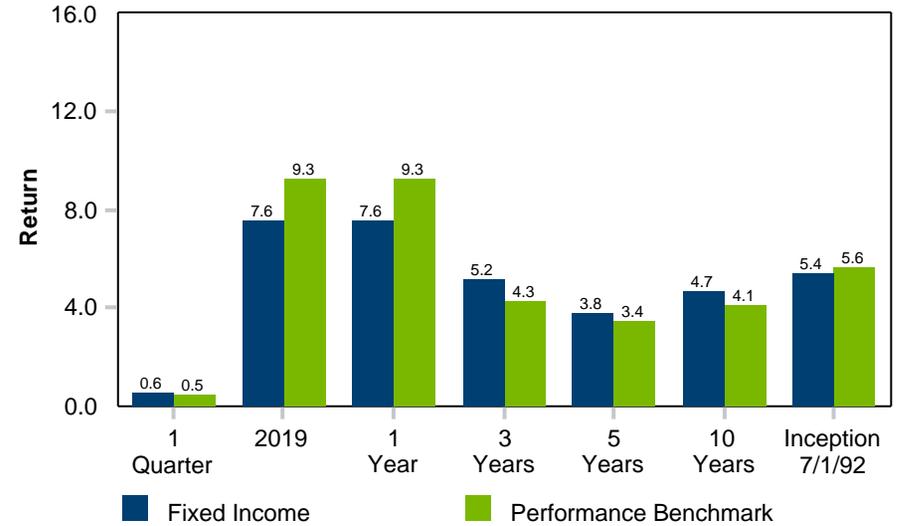
Fixed Income Portfolio Overview

Current Allocation

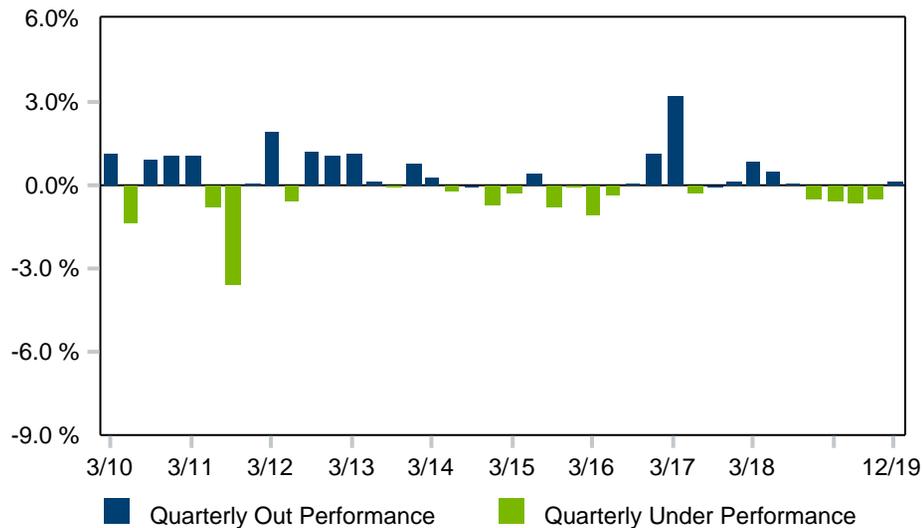
December 31, 2019 : \$2,699M



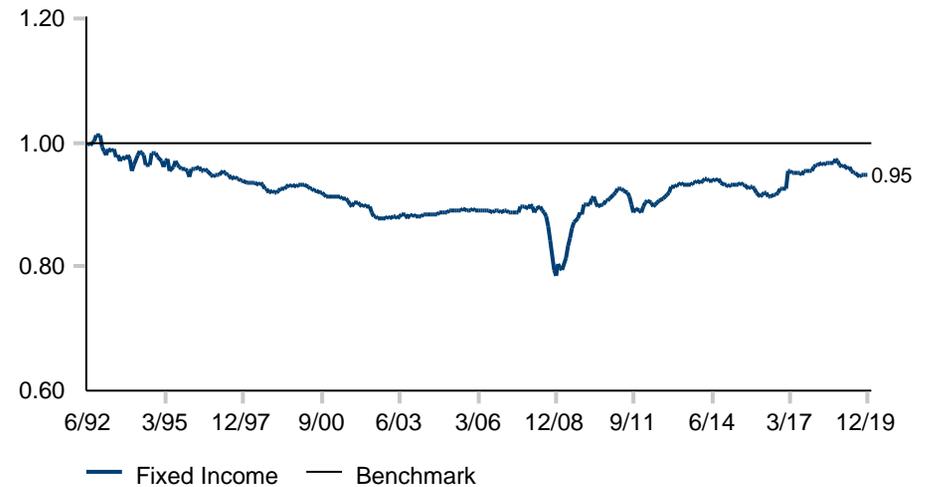
Return Summary



Quarterly Excess Performance

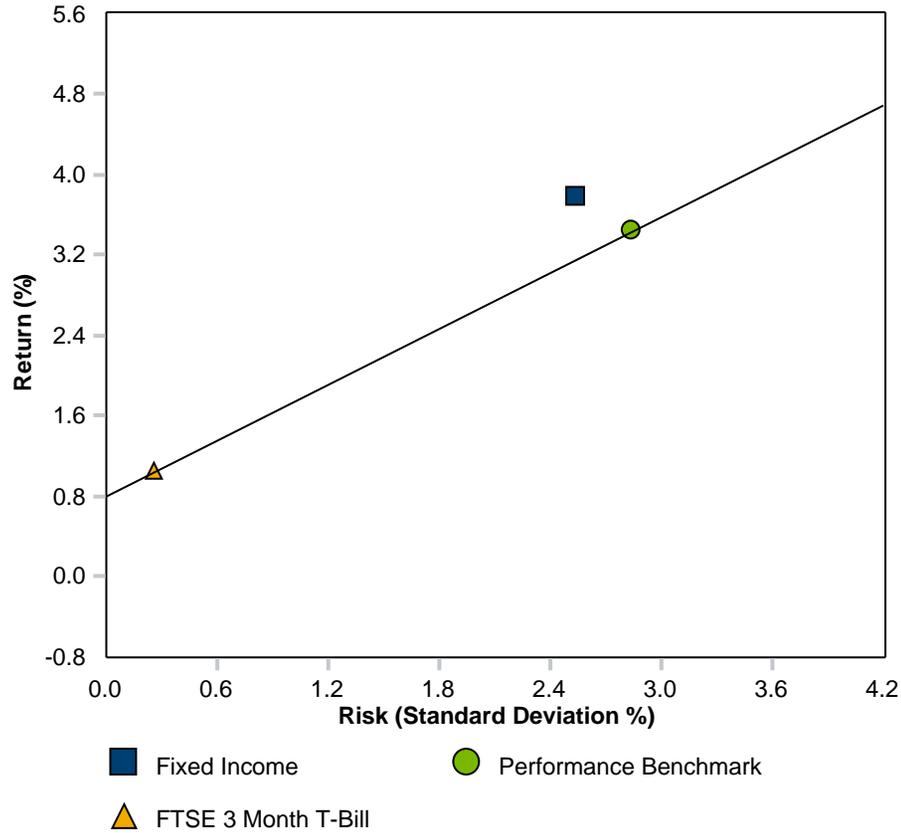


Ratio of Cumulative Wealth - Since Inception

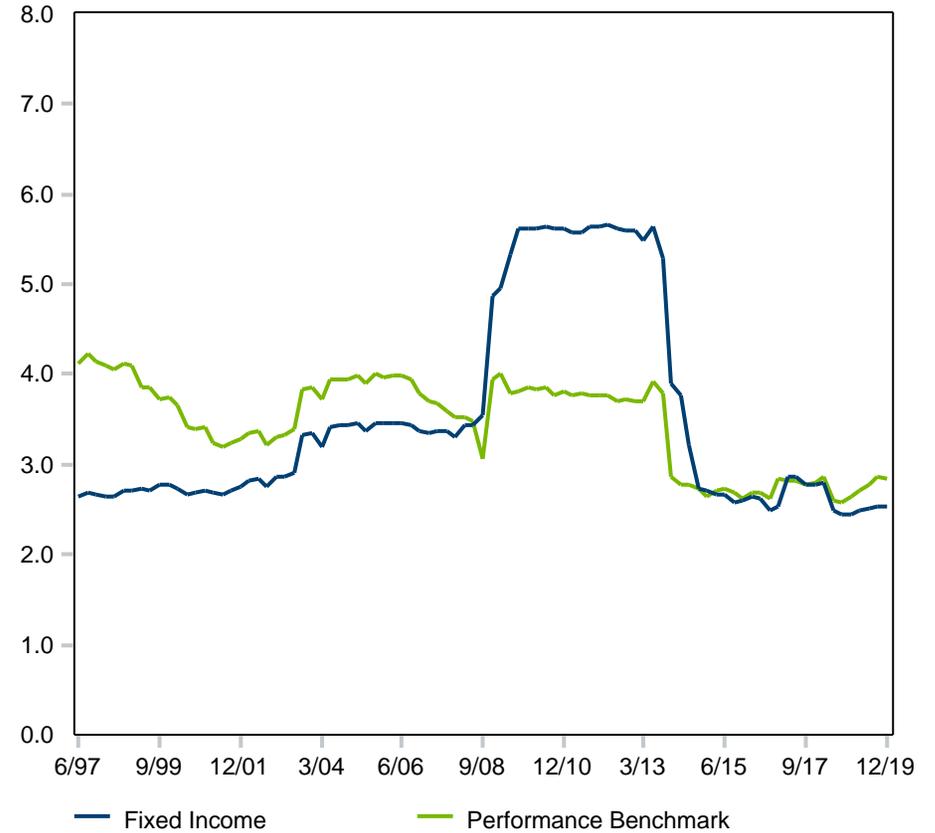


Fixed Income Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



Rolling 5 Years Standard Deviation

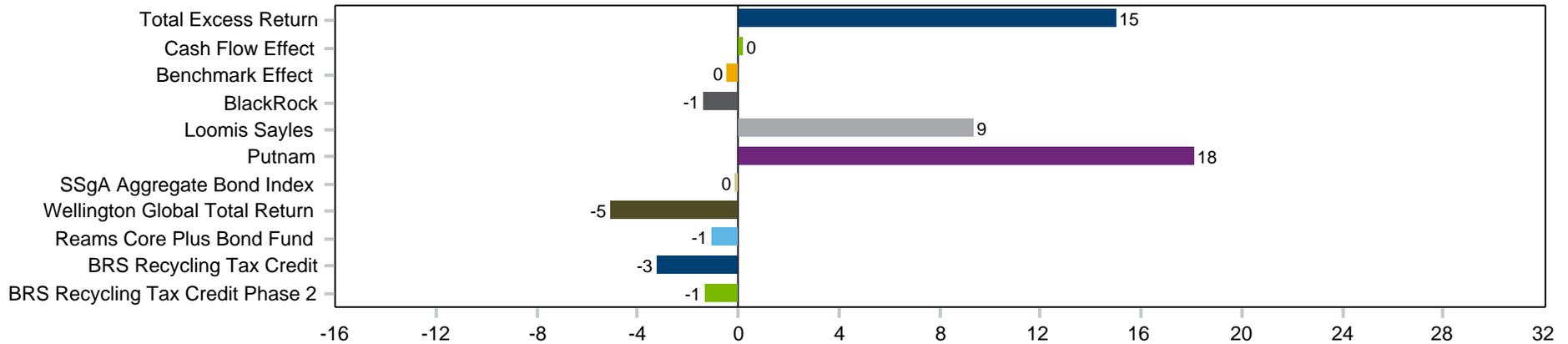


5 Years Historical Statistics

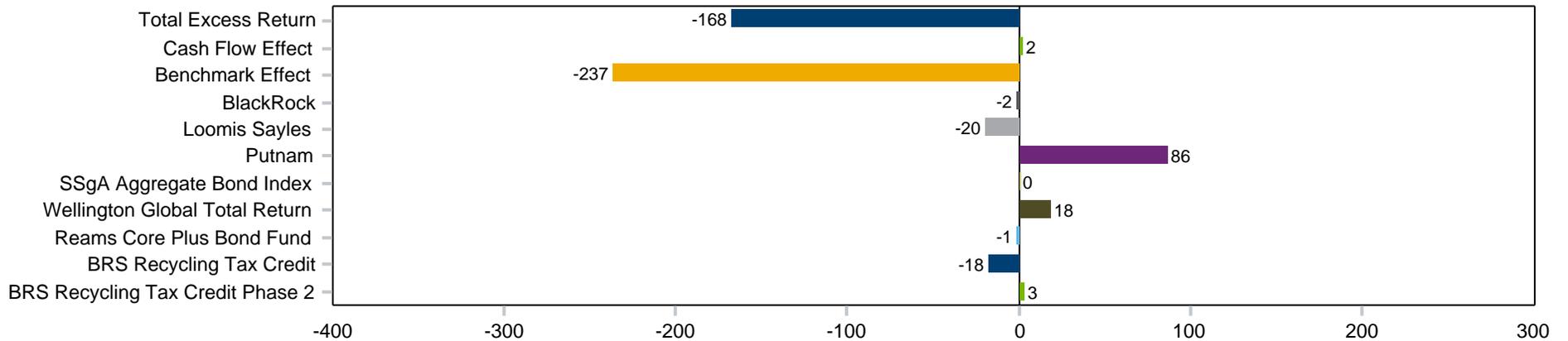
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Fixed Income	0.32	1.78	0.18	0.62	1.08	1.36	0.70	3.78	2.54	0.79
Performance Benchmark	0.00	0.00	N/A	1.00	0.85	0.00	1.00	3.44	2.84	1.00
FTSE 3 Month T-Bill	-2.38	2.80	-0.85	0.04	N/A	0.98	0.02	1.05	0.26	0.20

Asset Class Attribution

1 Quarter



1 Year



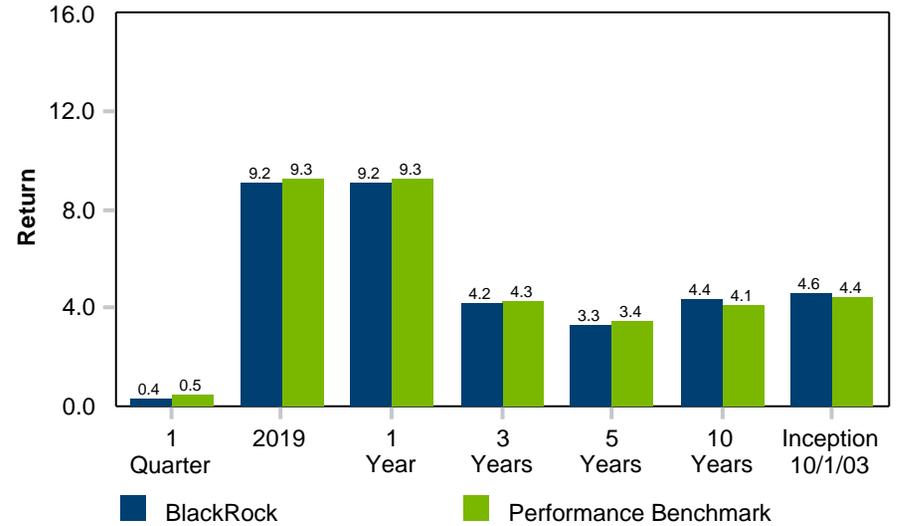
\*The BRS Recycling Tax Credit represents an annual income stream of \$16 million dollars over the next 14 years, which ATRS purchased for approximately \$162 million. This represents an approximate 9.9% yield for the 2017 fiscal year. The value shown above represents the year-end market value in accordance with GASB Statement 72, representing the 14 years of annual income, and has been incorporated into Total Fixed Income and Total Fund performance.

**BlackRock Performance Summary**

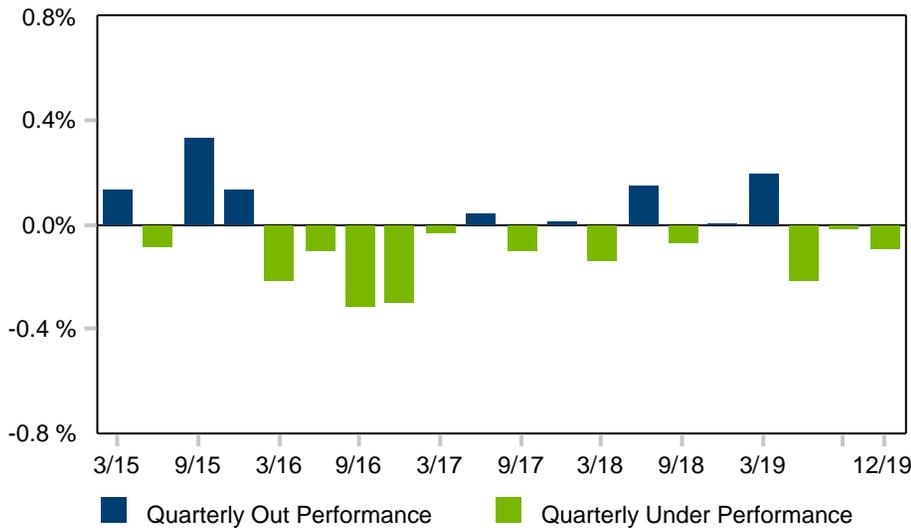
**Account Information**

Account Name: BlackRock  
 Inception Date: 09/30/2003  
 Account Structure: Separate Account  
 Asset Class: US Fixed Income  
 Benchmark: Performance Benchmark  
 Peer Group: IM U.S. Fixed Income (SA+CF)

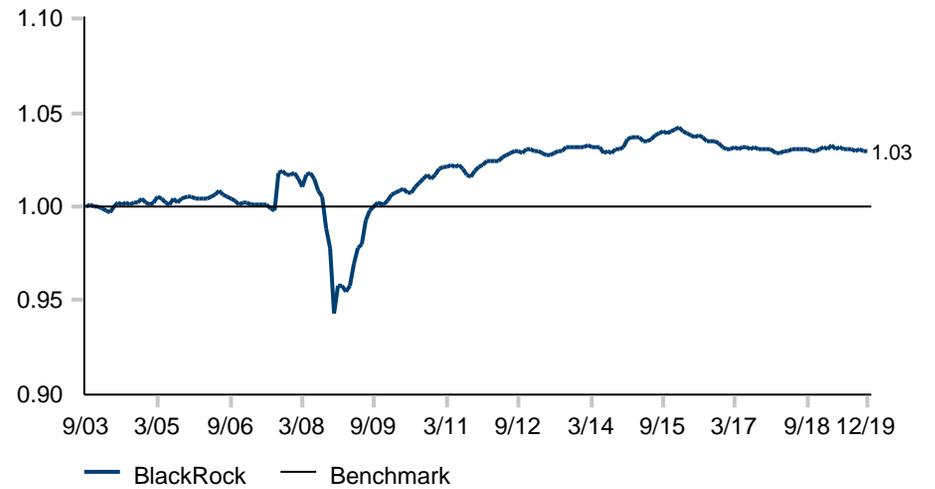
**Return Summary**



**Quarterly Excess Performance**

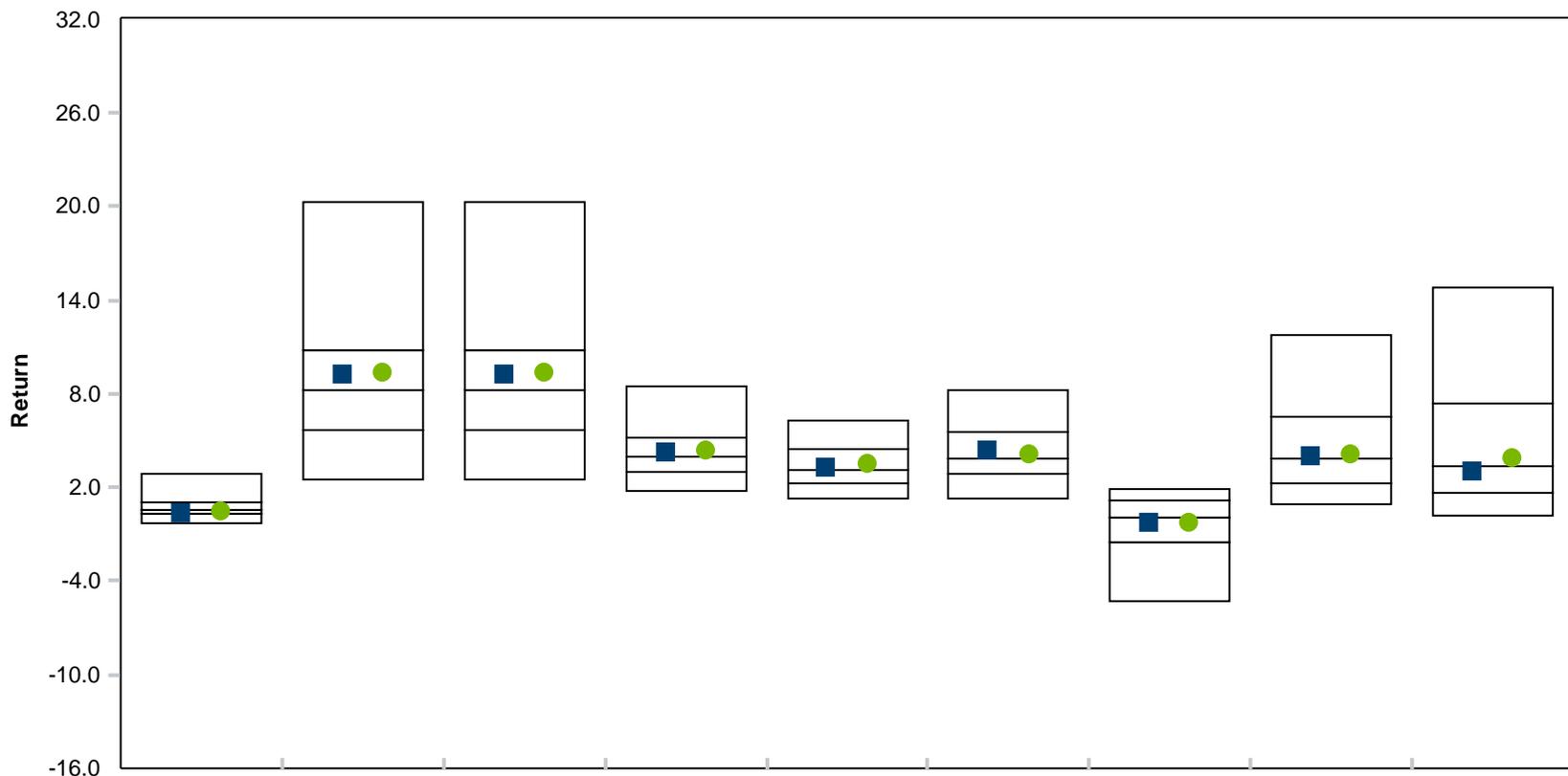


**Ratio of Cumulative Wealth - Since Inception**



Peer Group Analysis

IM U.S. Fixed Income (SA+CF)

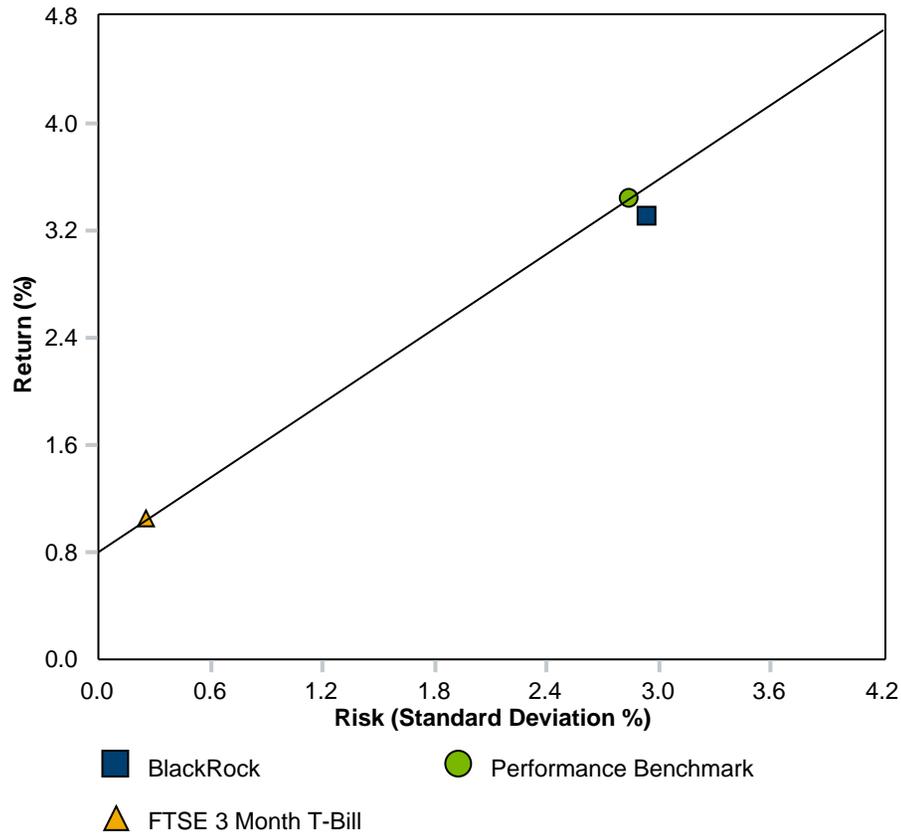


	1 Quarter	2019	1 Year	3 Years	5 Years	10 Years	2018	2017	2016
■ BlackRock	0.4 (68)	9.2 (39)	9.2 (39)	4.2 (42)	3.3 (44)	4.4 (40)	-0.3 (60)	4.0 (48)	3.0 (55)
● Performance Benchmark	0.5 (61)	9.3 (37)	9.3 (37)	4.3 (39)	3.4 (39)	4.1 (45)	-0.3 (58)	4.1 (46)	3.9 (45)
5th Percentile	2.9	20.3	20.3	8.5	6.3	8.2	2.0	11.7	14.9
1st Quartile	1.0	10.8	10.8	5.2	4.4	5.6	1.2	6.6	7.4
Median	0.5	8.2	8.2	4.0	3.1	3.9	0.1	3.9	3.4
3rd Quartile	0.3	5.7	5.7	2.9	2.3	2.9	-1.5	2.3	1.7
95th Percentile	-0.3	2.6	2.6	1.8	1.3	1.3	-5.3	0.9	0.2
Population	801	800	800	775	748	635	1,467	1,506	1,555

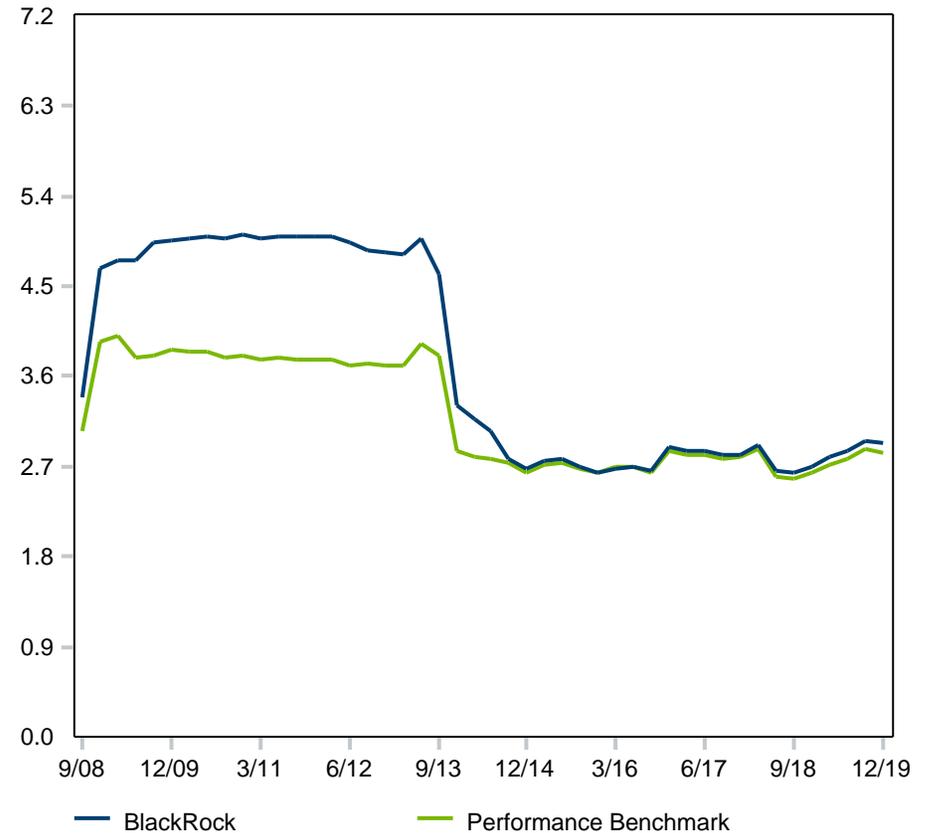
parentheses contain percentile rankings.

**BlackRock Risk Profile**

**Annualized Return vs. Annualized Standard Deviation 5 Years**



**Rolling 5 Years Standard Deviation**



**5 Years Historical Statistics**

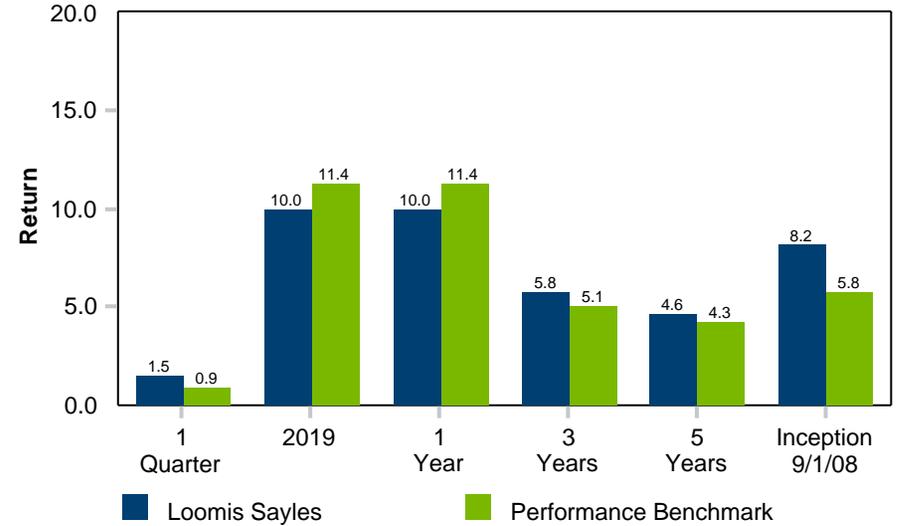
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
BlackRock	-0.12	0.31	-0.40	0.99	0.78	-0.22	1.03	3.31	2.94	0.99
Performance Benchmark	0.00	0.00	N/A	1.00	0.85	0.00	1.00	3.44	2.84	1.00
FTSE 3 Month T-Bill	-2.38	2.80	-0.85	0.04	N/A	0.98	0.02	1.05	0.26	0.20

Loomis Sayles Performance Summary

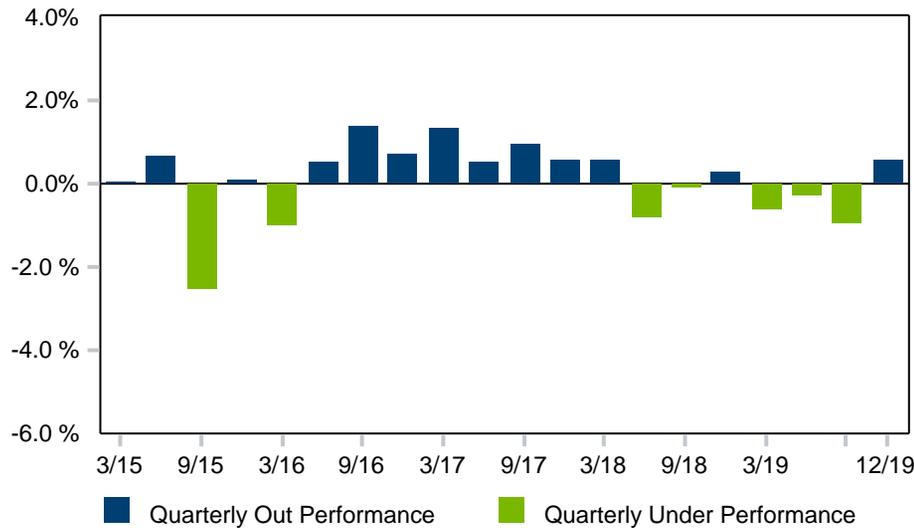
Account Information

Account Name: Loomis Sayles  
 Inception Date: 06/30/2008  
 Account Structure: Separate Account  
 Asset Class: US Fixed Income  
 Benchmark: Performance Benchmark  
 Peer Group: IM U.S. Fixed Income (SA+CF)

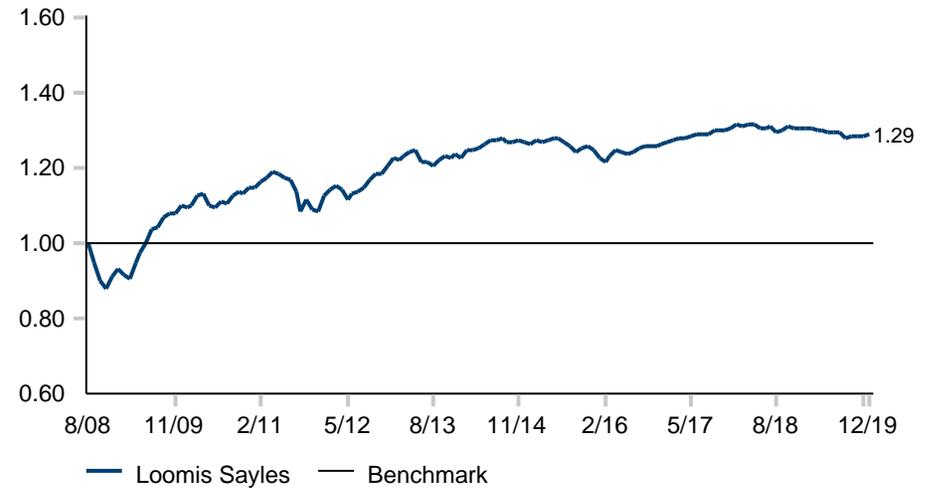
Return Summary



Quarterly Excess Performance

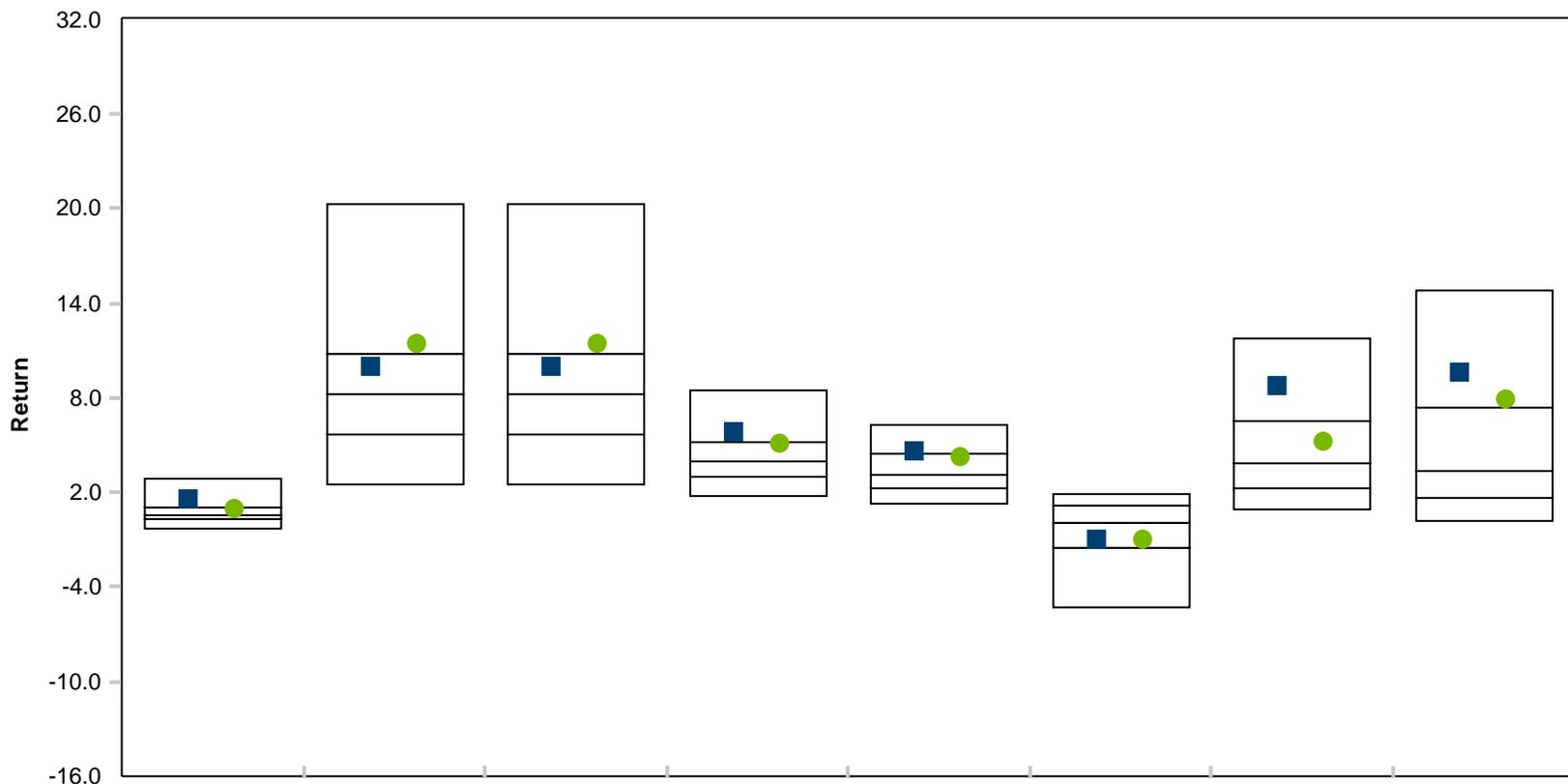


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM U.S. Fixed Income (SA+CF)

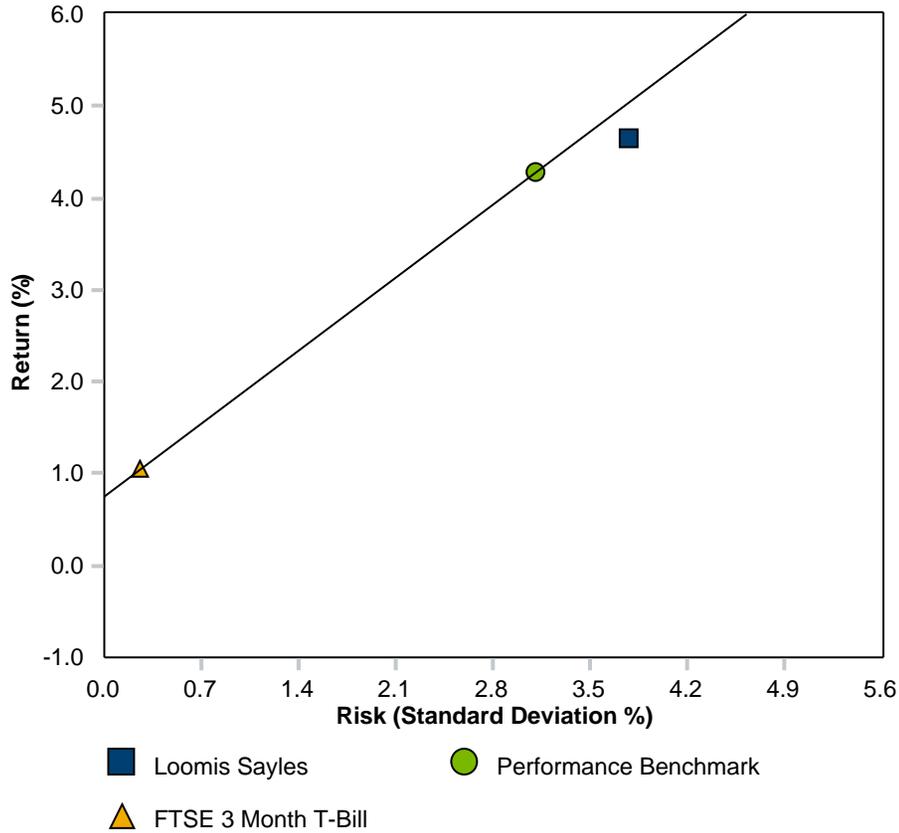


	1 Quarter	2019	1 Year	3 Years	5 Years	2018	2017	2016
■ Loomis Sayles	1.5 (18)	10.0 (30)	10.0 (30)	5.8 (22)	4.6 (24)	-1.1 (72)	8.8 (12)	9.5 (19)
● Performance Benchmark	0.9 (29)	11.4 (24)	11.4 (24)	5.1 (26)	4.3 (27)	-1.0 (71)	5.2 (33)	7.8 (24)
5th Percentile	2.9	20.3	20.3	8.5	6.3	2.0	11.7	14.9
1st Quartile	1.0	10.8	10.8	5.2	4.4	1.2	6.6	7.4
Median	0.5	8.2	8.2	4.0	3.1	0.1	3.9	3.4
3rd Quartile	0.3	5.7	5.7	2.9	2.3	-1.5	2.3	1.7
95th Percentile	-0.3	2.6	2.6	1.8	1.3	-5.3	0.9	0.2
Population	801	800	800	775	748	1,467	1,506	1,555

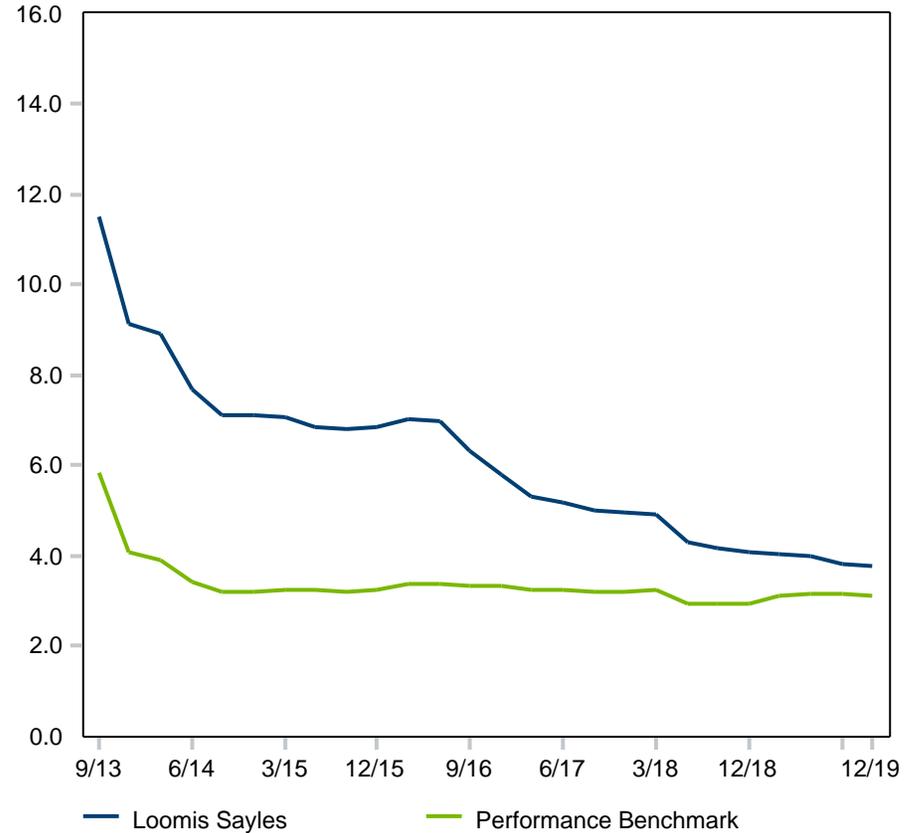
parentheses contain percentile rankings.

Loomis Sayles Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



Rolling 5 Years Standard Deviation



5 Years Historical Statistics

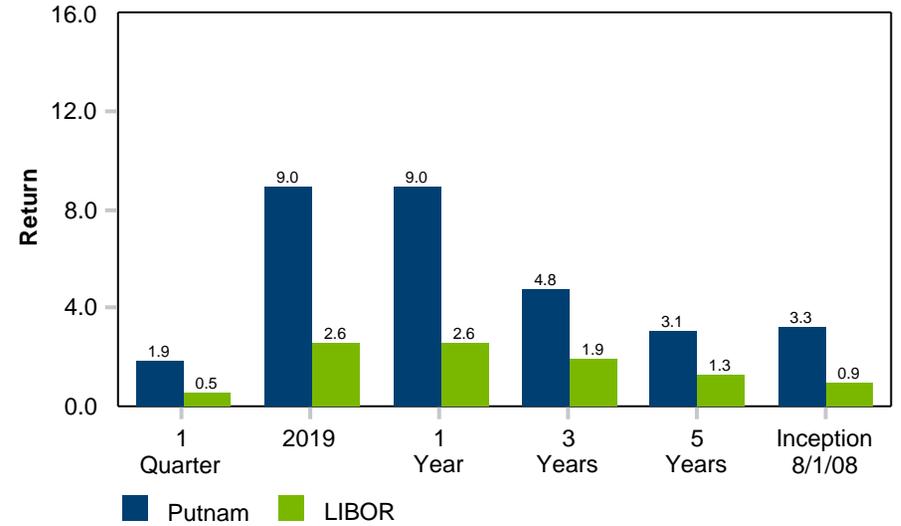
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Loomis Sayles	0.37	2.05	0.18	0.71	0.95	0.27	1.02	4.64	3.79	0.84
Performance Benchmark	0.00	0.00	N/A	1.00	1.04	0.00	1.00	4.28	3.12	1.00
FTSE 3 Month T-Bill	-3.21	3.08	-1.04	0.03	N/A	0.99	0.01	1.05	0.26	0.17

Putnam Performance Summary

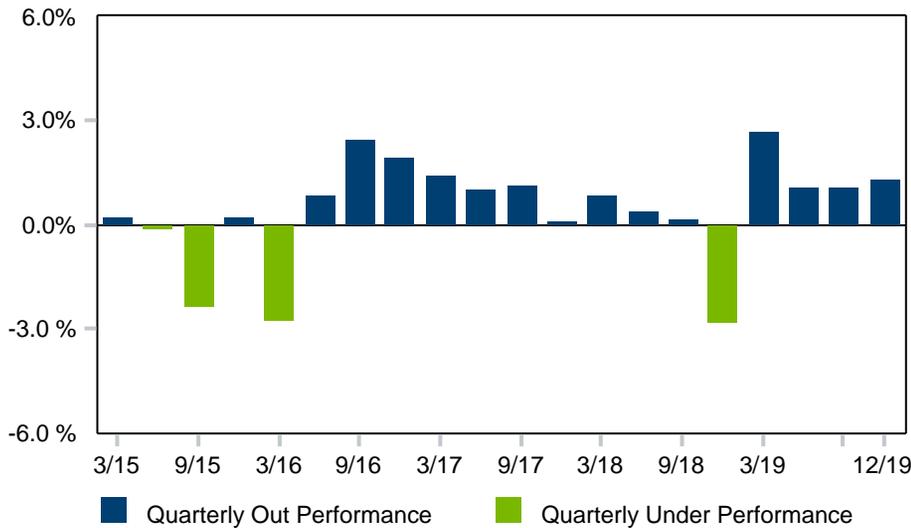
Account Information

Account Name: Putnam  
 Inception Date: 06/30/2008  
 Account Structure: Commingled Fund  
 Asset Class: US Fixed Income  
 Benchmark: LIBOR  
 Peer Group: IM U.S. Fixed Income (SA+CF)

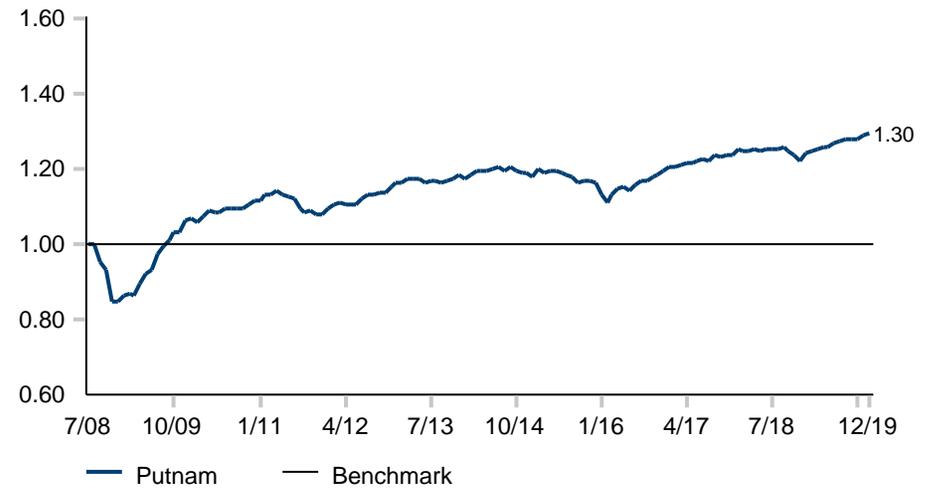
Return Summary



Quarterly Excess Performance

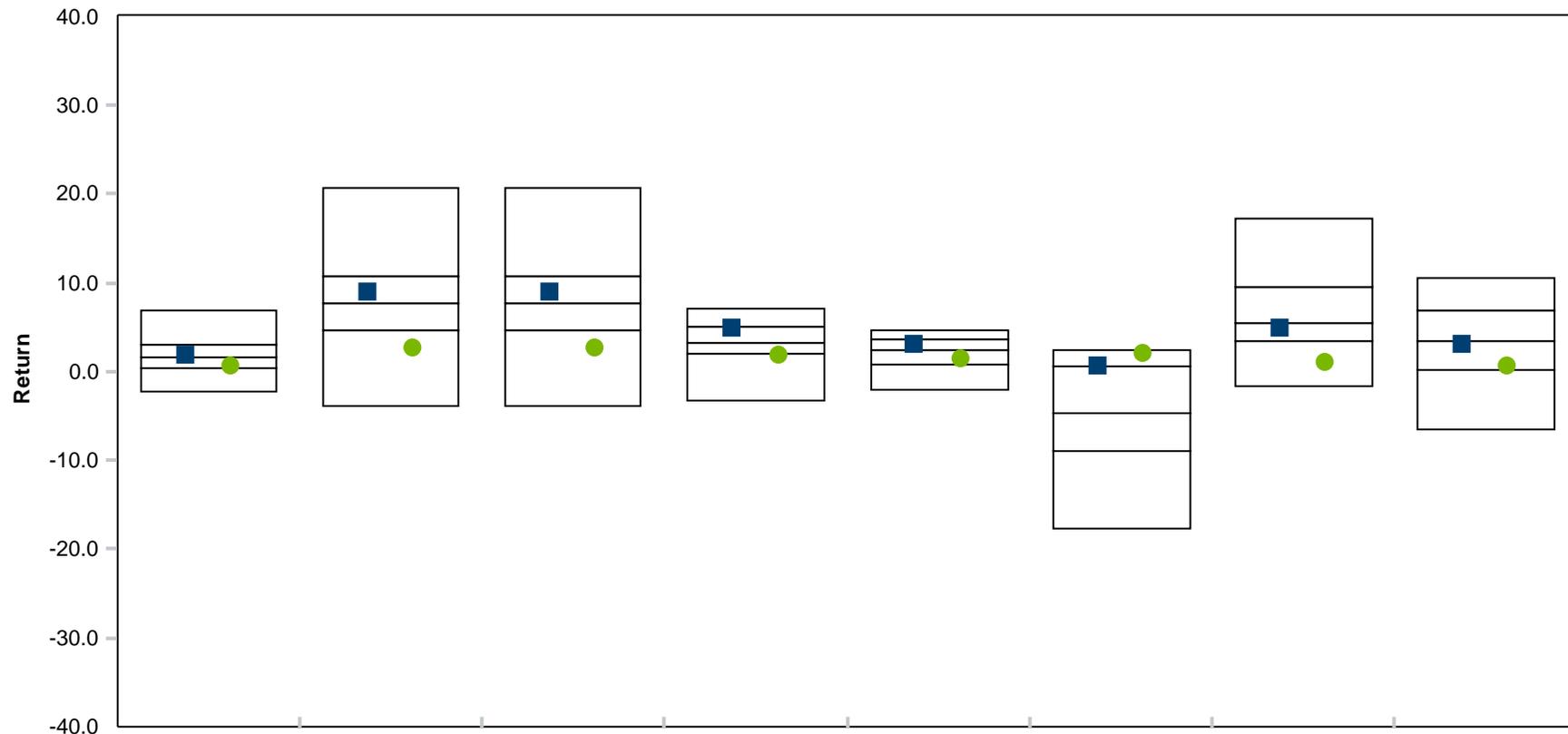


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM Absolute Return (MF)

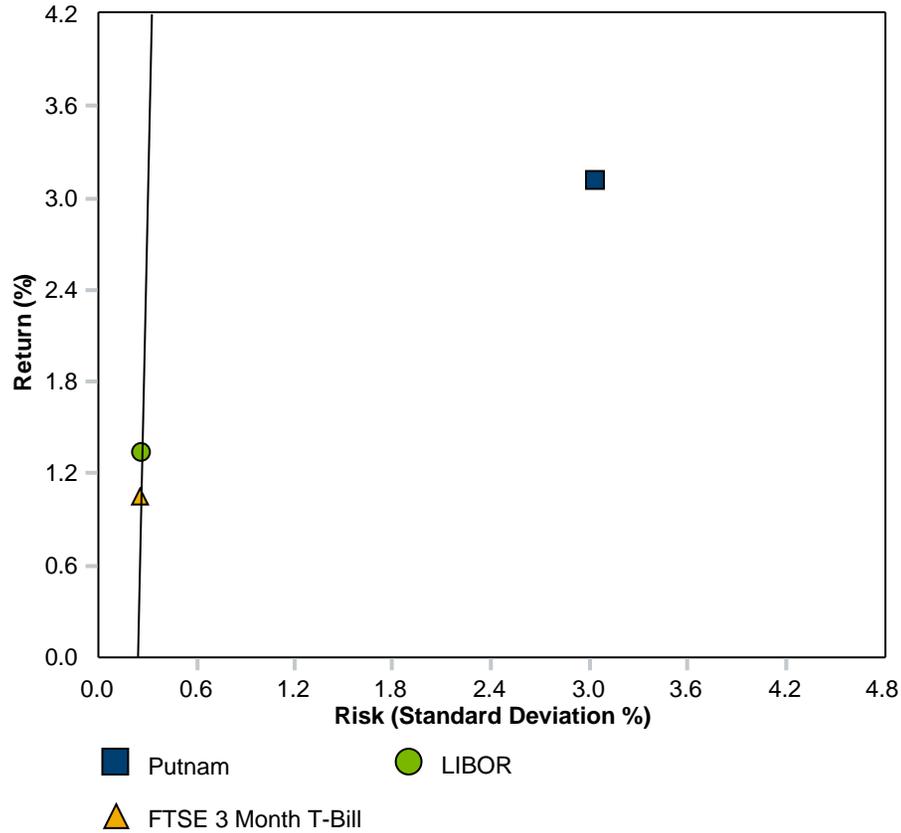


	1 Quarter	2019	1 Year	3 Years	5 Years	2018	2017	2016
■ Putnam	1.9 (43)	9.0 (31)	9.0 (31)	4.8 (31)	3.1 (31)	0.7 (23)	4.9 (57)	3.1 (55)
● LIBOR	0.5 (74)	2.6 (84)	2.6 (84)	1.9 (77)	1.3 (68)	2.1 (6)	1.1 (91)	0.7 (74)
5th Percentile	6.9	20.7	20.7	7.2	4.7	2.4	17.2	10.5
1st Quartile	3.0	10.7	10.7	5.2	3.6	0.5	9.5	6.9
Median	1.6	7.7	7.7	3.2	2.5	-4.6	5.5	3.5
3rd Quartile	0.4	4.6	4.6	2.0	0.8	-9.0	3.5	0.1
95th Percentile	-2.1	-3.8	-3.8	-3.3	-1.9	-17.6	-1.7	-6.4
Population	40	40	40	40	40	49	51	51

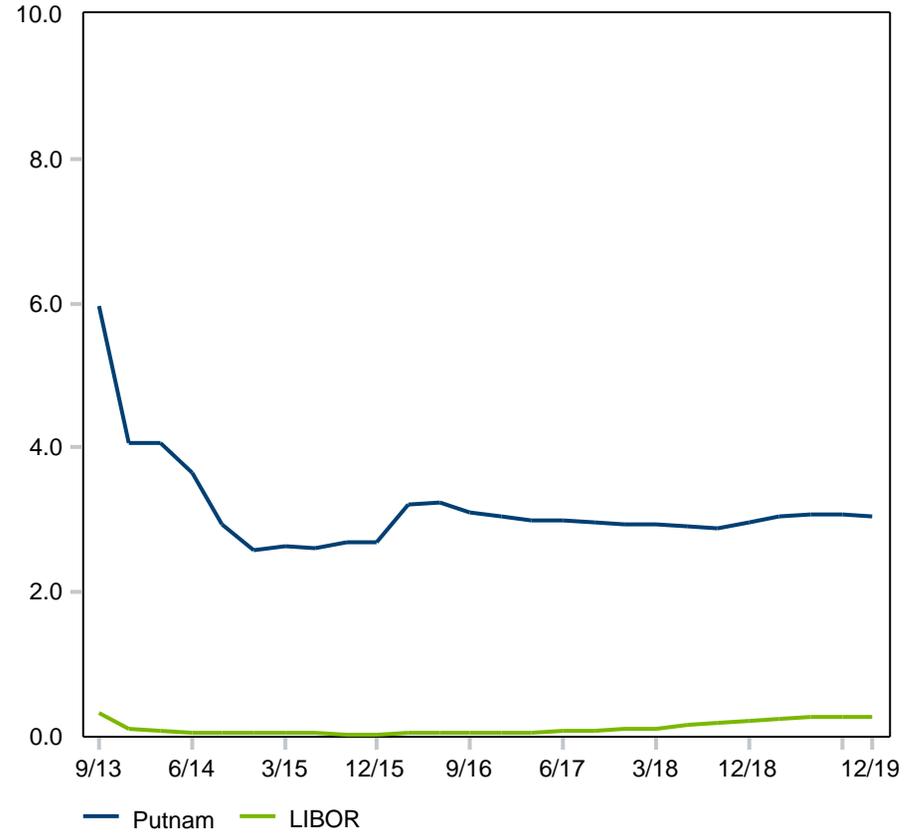
parentheses contain percentile rankings.

Putnam Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



Rolling 5 Years Standard Deviation



5 Years Historical Statistics

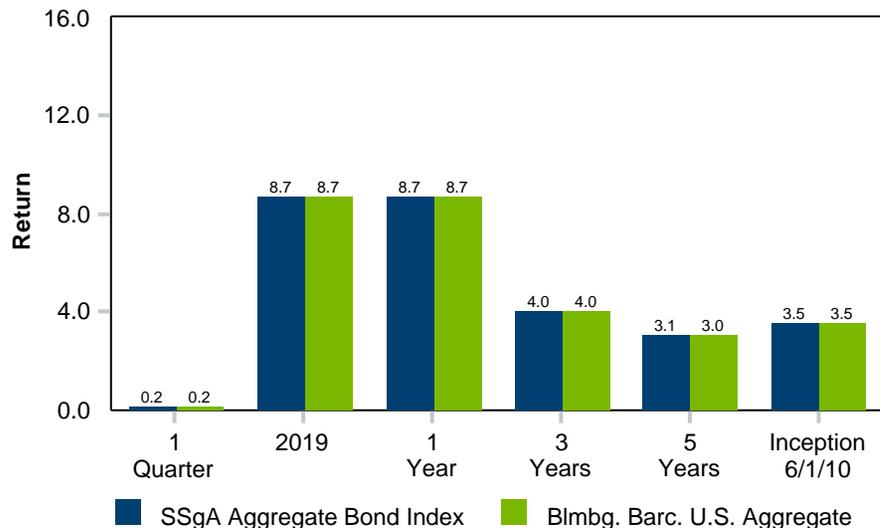
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Putnam	1.78	3.00	0.59	0.04	0.69	0.13	2.25	3.11	3.04	0.20
LIBOR	0.00	0.00	N/A	1.00	4.62	0.00	1.00	1.33	0.27	1.00
FTSE 3 Month T-Bill	-0.28	0.06	-4.62	0.95	N/A	-0.22	0.95	1.05	0.26	0.97

SSgA Aggregate Bond Index Performance Summary

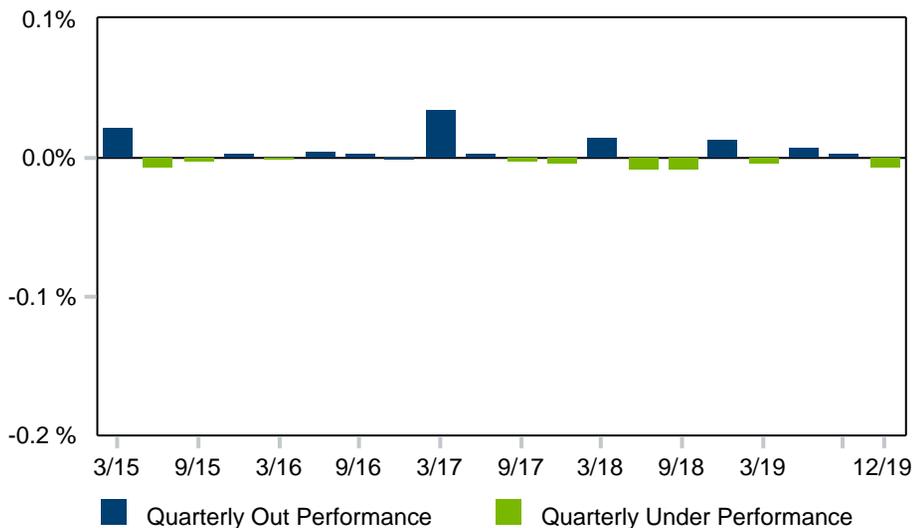
Account Information

Account Name: SSgA Aggregate Bond Index  
 Inception Date: 01/01/1901  
 Account Structure: Commingled Fund  
 Asset Class: US Fixed Income  
 Benchmark: Blmbg. Barc. U.S. Aggregate  
 Peer Group: IM U.S. Fixed Income (SA+CF)

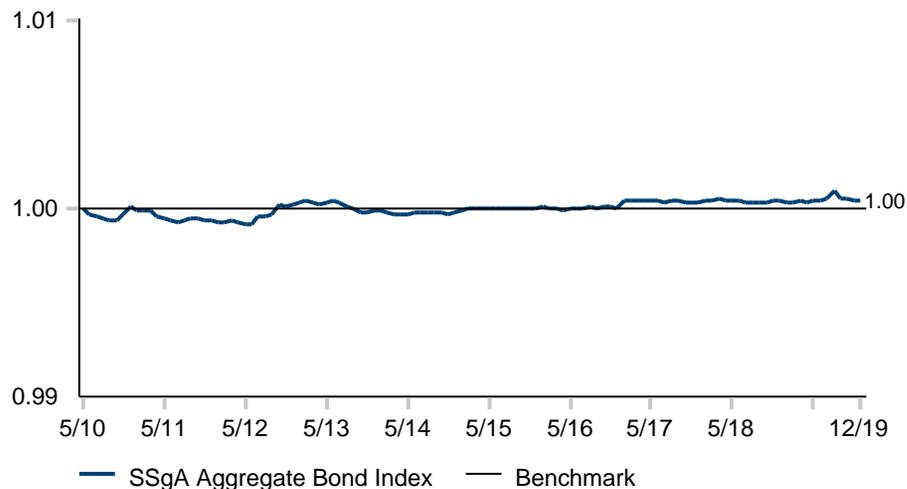
Return Summary



Quarterly Excess Performance

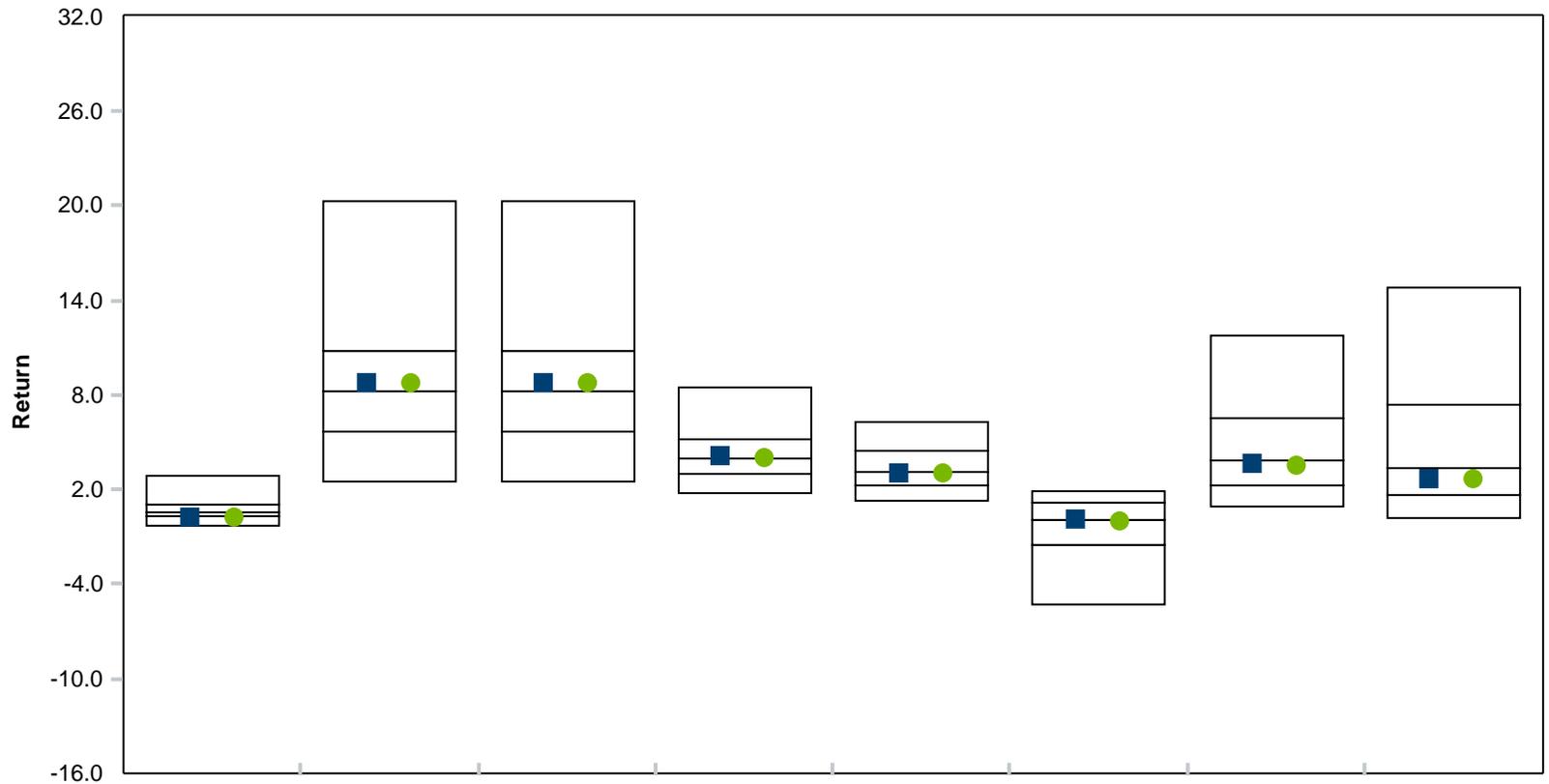


Ratio of Cumulative Wealth - Since Inception



Peer Group Analysis

IM U.S. Fixed Income (SA+CF)

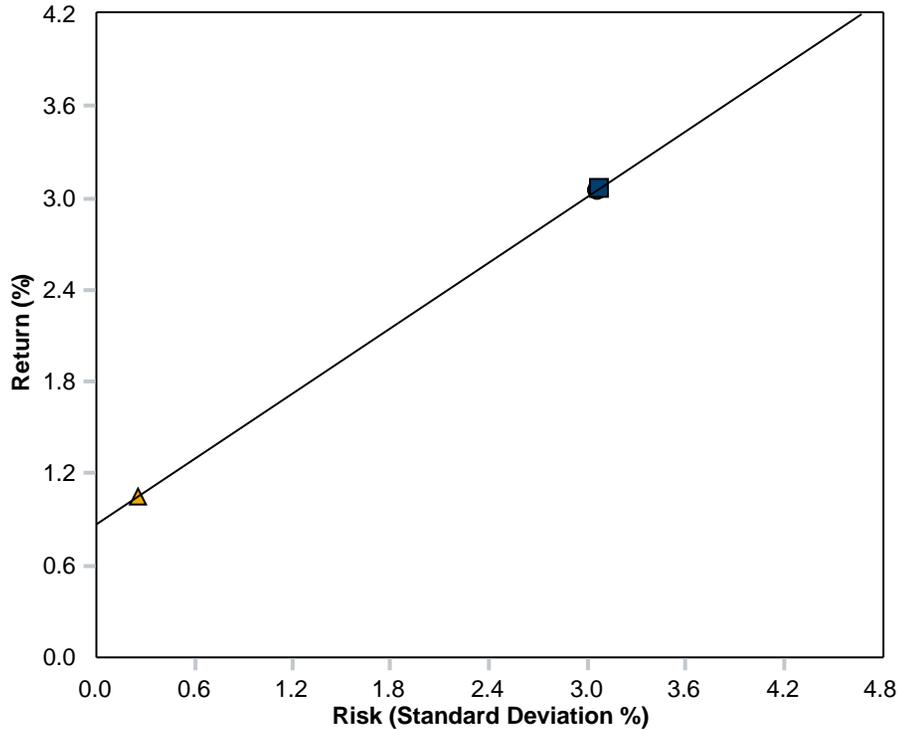


	1 Quarter	2019	1 Year	3 Years	5 Years	2018	2017	2016
■ SSgA Aggregate Bond Index	0.2 (83)	8.7 (45)	8.7 (45)	4.0 (48)	3.1 (51)	0.0 (52)	3.6 (56)	2.7 (60)
● Blmbg. Barc. U.S. Aggregate	0.2 (82)	8.7 (45)	8.7 (45)	4.0 (48)	3.0 (52)	0.0 (53)	3.5 (57)	2.6 (60)
5th Percentile	2.9	20.3	20.3	8.5	6.3	2.0	11.7	14.9
1st Quartile	1.0	10.8	10.8	5.2	4.4	1.2	6.6	7.4
Median	0.5	8.2	8.2	4.0	3.1	0.1	3.9	3.4
3rd Quartile	0.3	5.7	5.7	2.9	2.3	-1.5	2.3	1.7
95th Percentile	-0.3	2.6	2.6	1.8	1.3	-5.3	0.9	0.2
Population	801	800	800	775	748	1,467	1,506	1,555

parentheses contain percentile rankings.

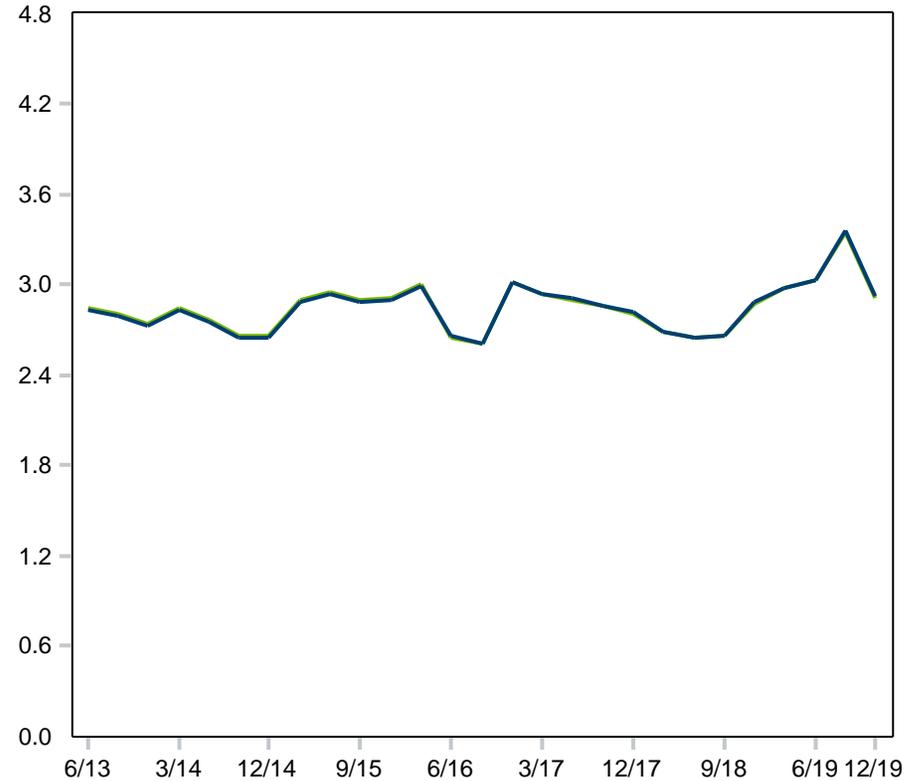
SSgA Aggregate Bond Index Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



■ SSgA Aggregate Bond Index    ● Blmbg. Barc. U.S. Aggregate  
 ▲ FTSE 3 Month T-Bill

Rolling 3 Years Standard Deviation



— SSgA Aggregate Bond Index    — Blmbg. Barc. U.S. Aggregate

5 Years Historical Statistics

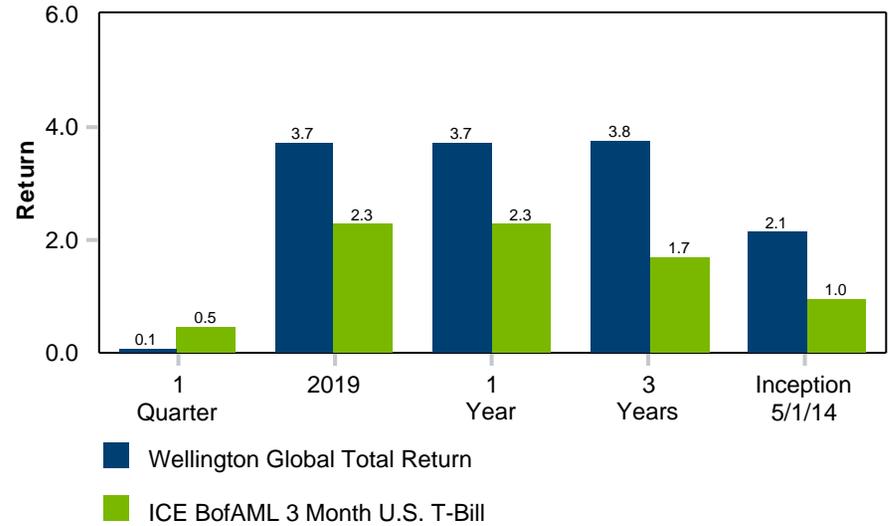
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
SSgA Aggregate Bond Index	0.01	0.04	0.32	1.00	0.67	0.00	1.00	3.06	3.08	1.00
Blmbg. Barc. U.S. Aggregate	0.00	0.00	N/A	1.00	0.67	0.00	1.00	3.05	3.06	1.00
FTSE 3 Month T-Bill	-2.01	3.02	-0.67	0.04	N/A	0.99	0.02	1.05	0.26	0.21

Wellington Global Total Return Performance Summary

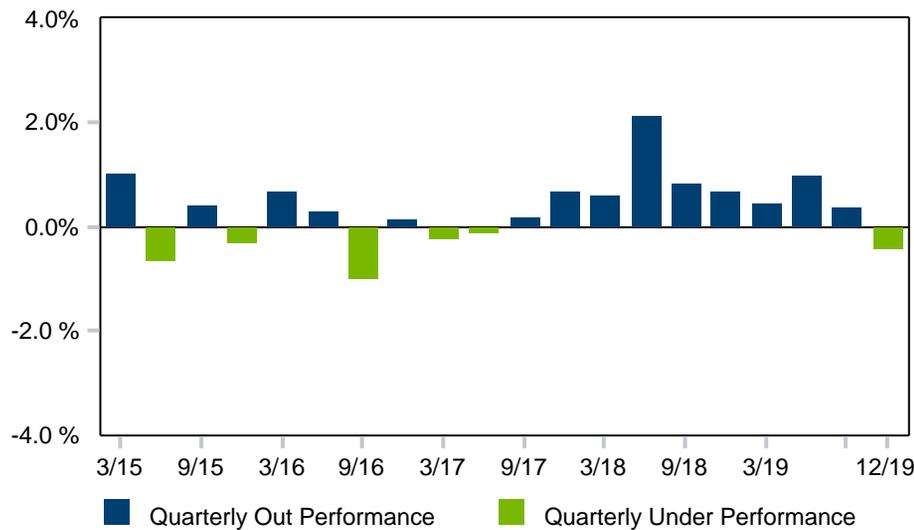
Account Information

Account Name: Wellington Global Total Return  
 Inception Date: 05/13/2014  
 Account Structure: Commingled Fund  
 Asset Class: Global Fixed Income  
 Benchmark: ICE BofAML 3 Month U.S. T-Bill  
 Peer Group: IM Absolute Return (MF)

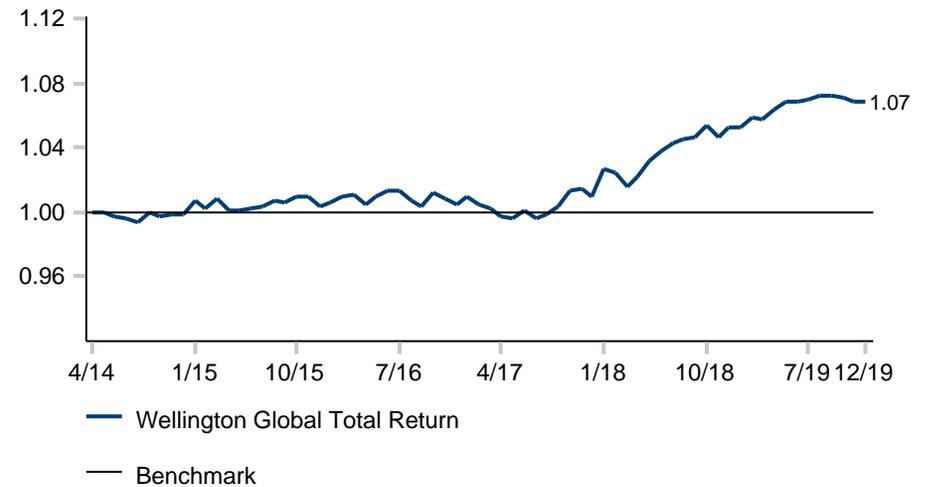
Return Summary



Quarterly Excess Performance



Ratio of Cumulative Wealth - Since Inception

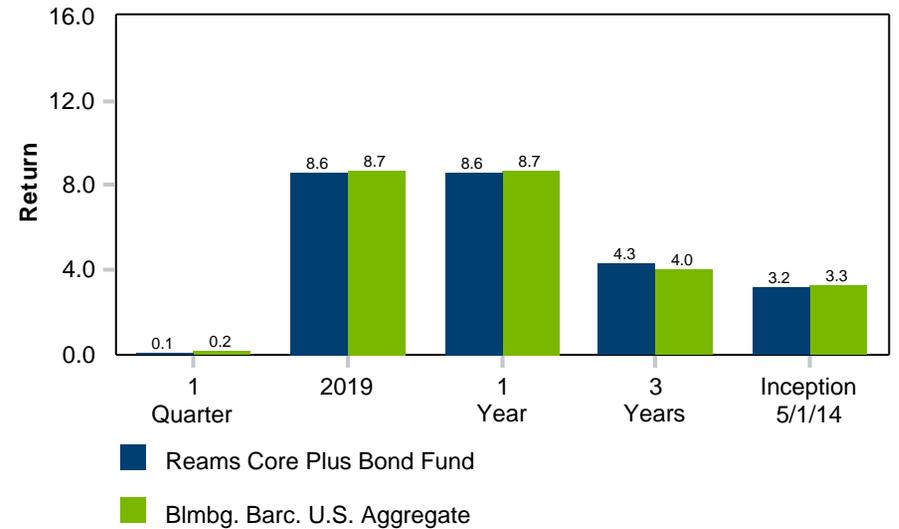


Reams Core Plus Bond Fund Performance Summary

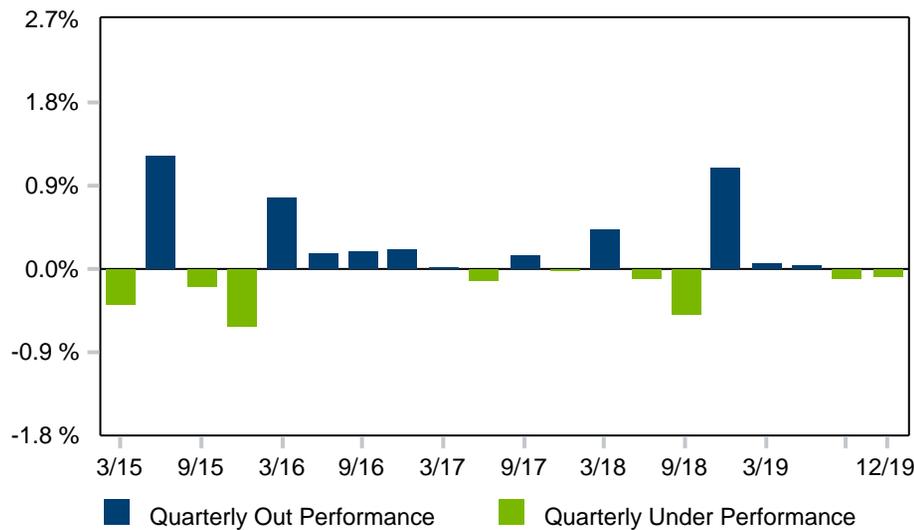
Account Information

Account Name: Reams Core Plus Bond Fund  
 Inception Date: 05/08/2014  
 Account Structure: Commingled Fund  
 Asset Class: US Fixed Income  
 Benchmark: Blmbg. Barc. U.S. Aggregate  
 Peer Group: IM U.S. Fixed Income (SA+CF)

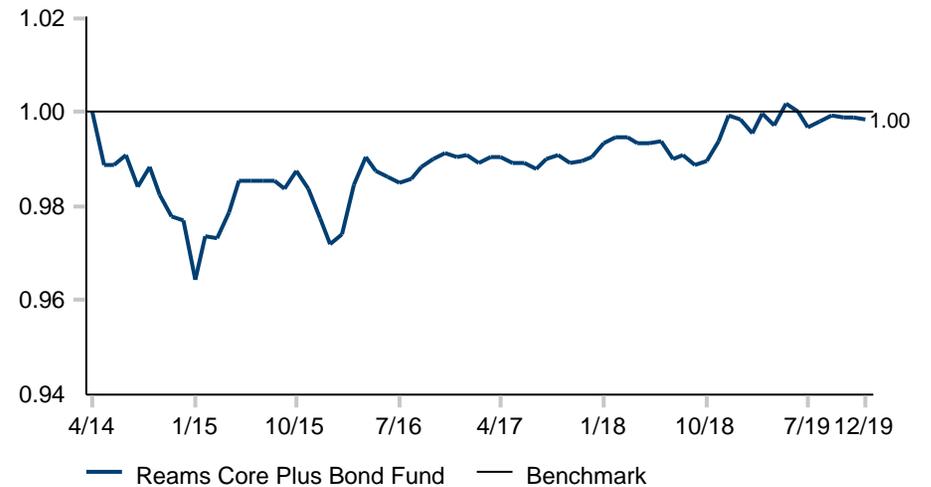
Return Summary

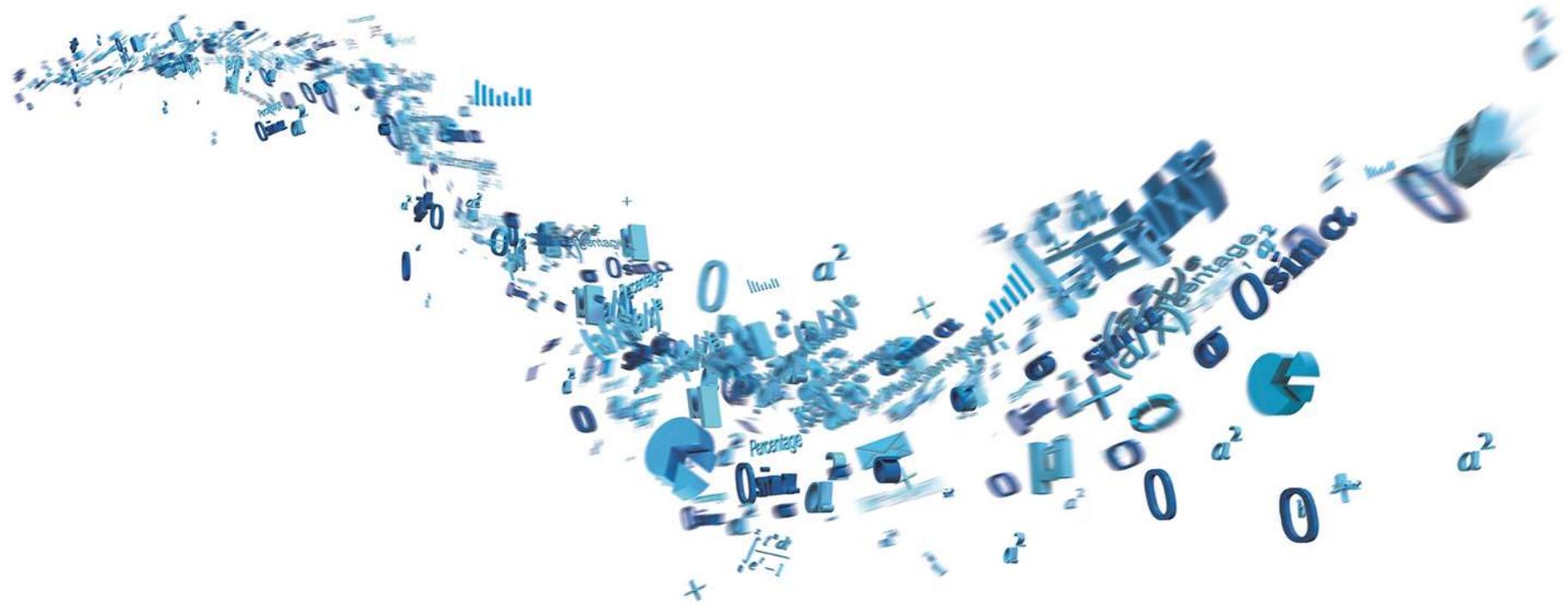


Quarterly Excess Performance



Ratio of Cumulative Wealth - Since Inception





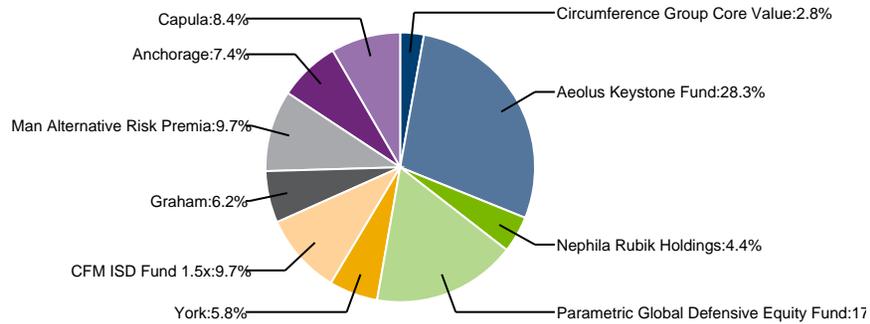
## Opportunistic/Alternatives

---

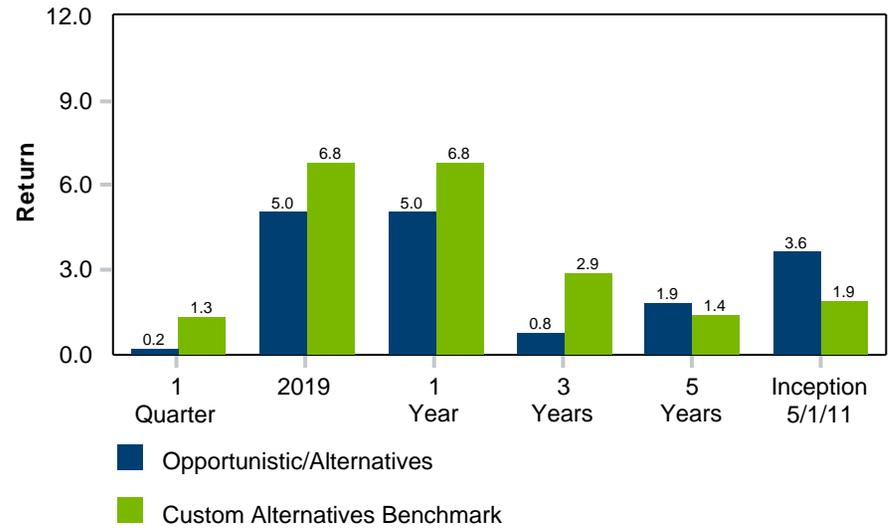
Opportunistic/Alternatives Portfolio Overview

Current Allocation

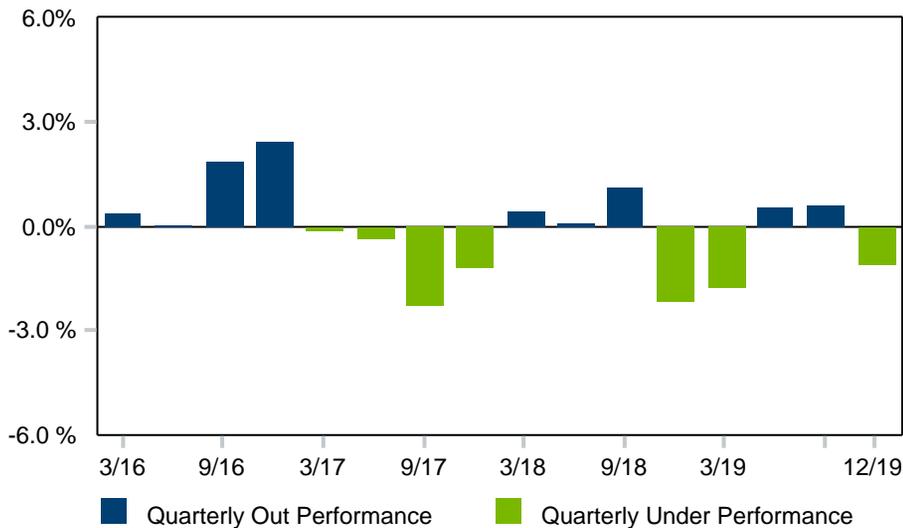
December 31, 2019 : \$1,012M



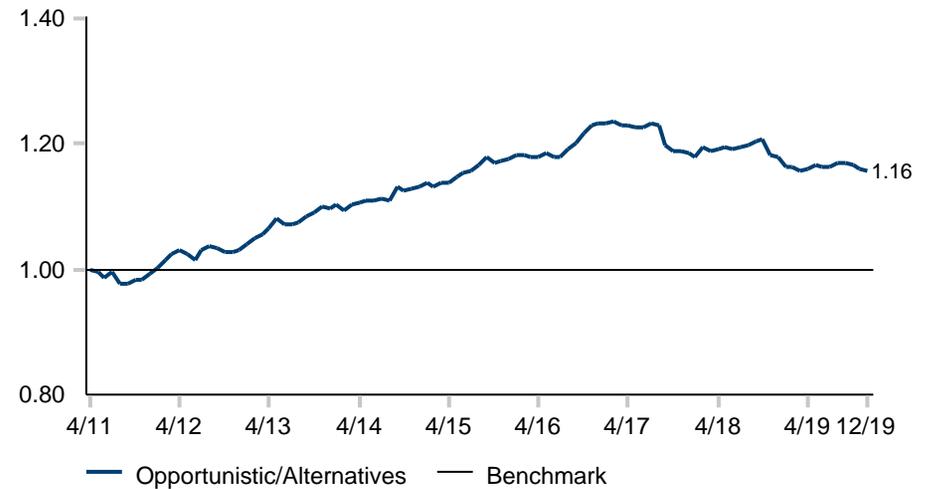
Return Summary



Quarterly Excess Performance

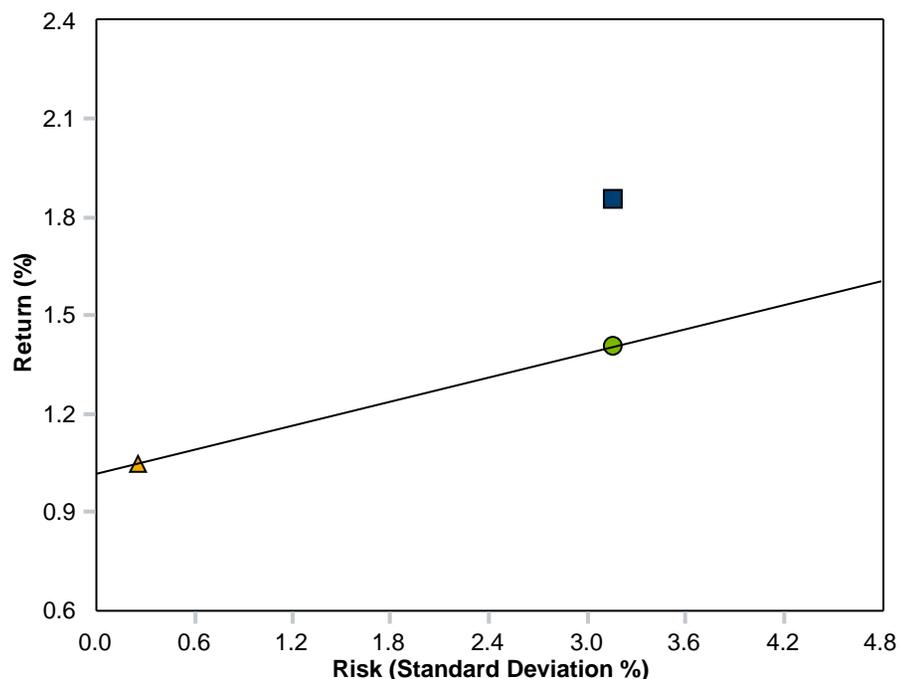


Ratio of Cumulative Wealth - Since Inception



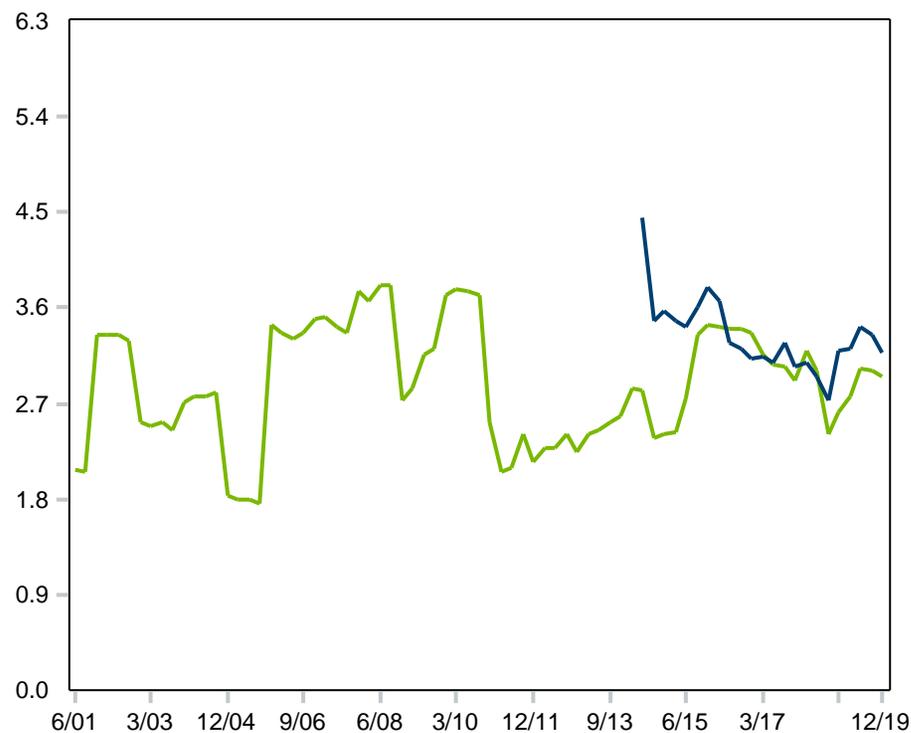
Opportunistic/Alternatives Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



- Opportunistic/Alternatives
- Custom Alternatives Benchmark
- ▲ FTSE 3 Month T-Bill

Rolling 3 Years Standard Deviation



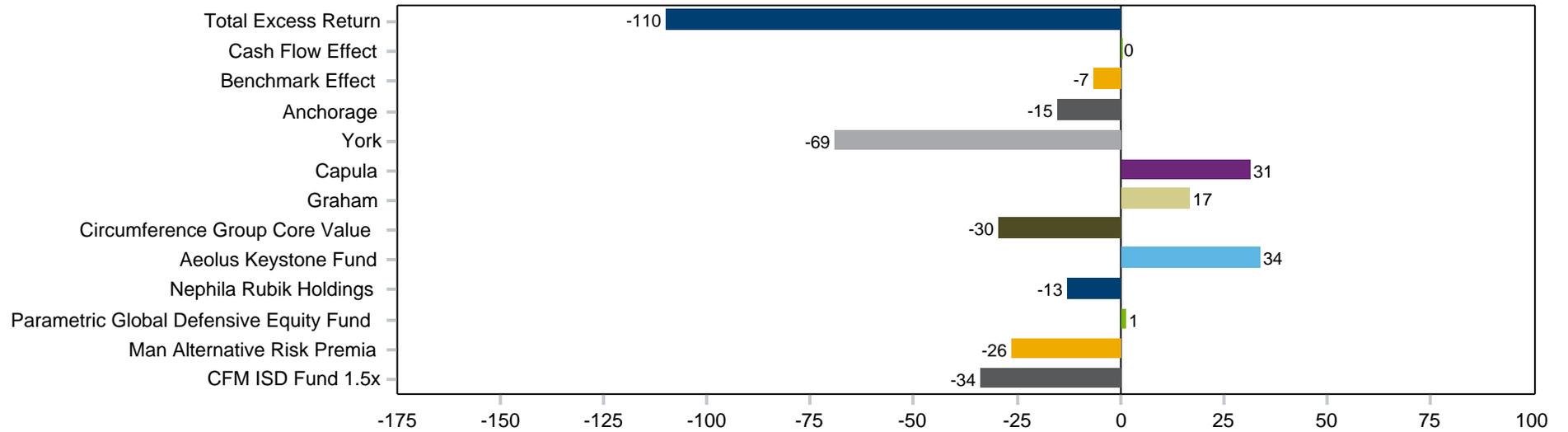
- Opportunistic/Alternatives
- Custom Alternatives Benchmark

5 Years Historical Statistics

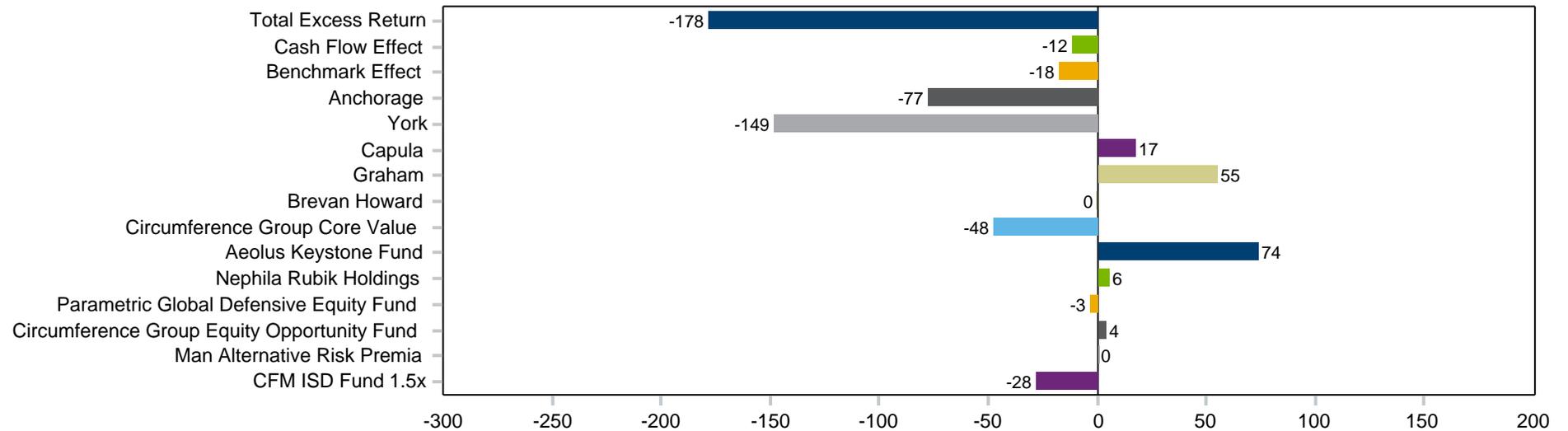
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Opportunistic/Alternatives	0.44	2.31	0.19	0.54	0.26	0.83	0.73	1.85	3.17	0.73
Custom Alternatives Benchmark	0.00	0.00	N/A	1.00	0.13	0.00	1.00	1.40	3.16	1.00
FTSE 3 Month T-Bill	-0.40	3.14	-0.13	0.02	N/A	1.03	0.01	1.05	0.26	0.14

Asset Class Attribution

1 Quarter



1 Year

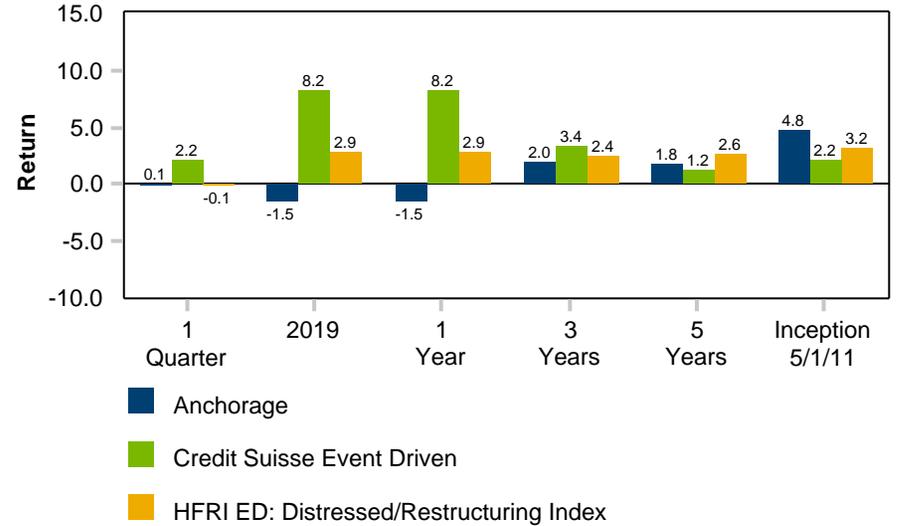


**Anchorage Performance Summary**

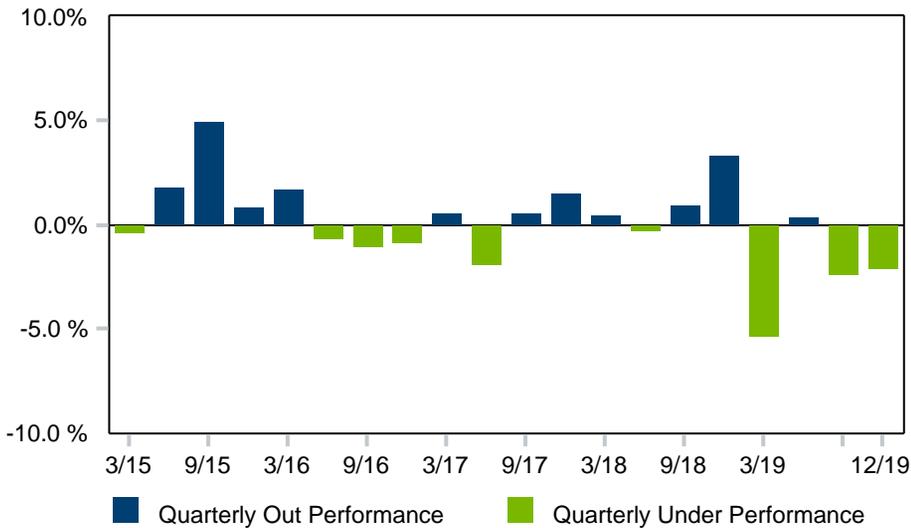
**Account Information**

Account Name: Anchorage  
 Inception Date: 05/01/2011  
 Account Structure: Hedge Fund  
 Asset Class: US Hedge Fund  
 Benchmark: Credit Suisse Event Driven  
 Peer Group:

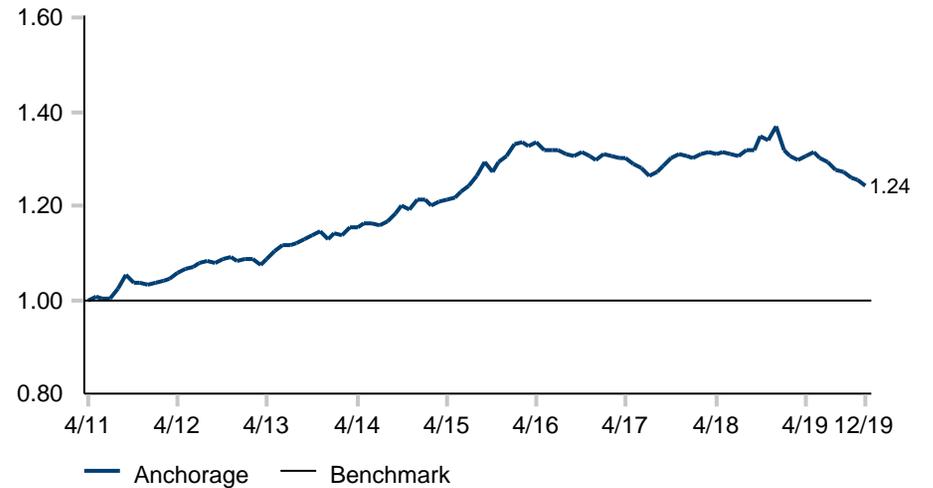
**Return Summary**



**Quarterly Excess Performance**

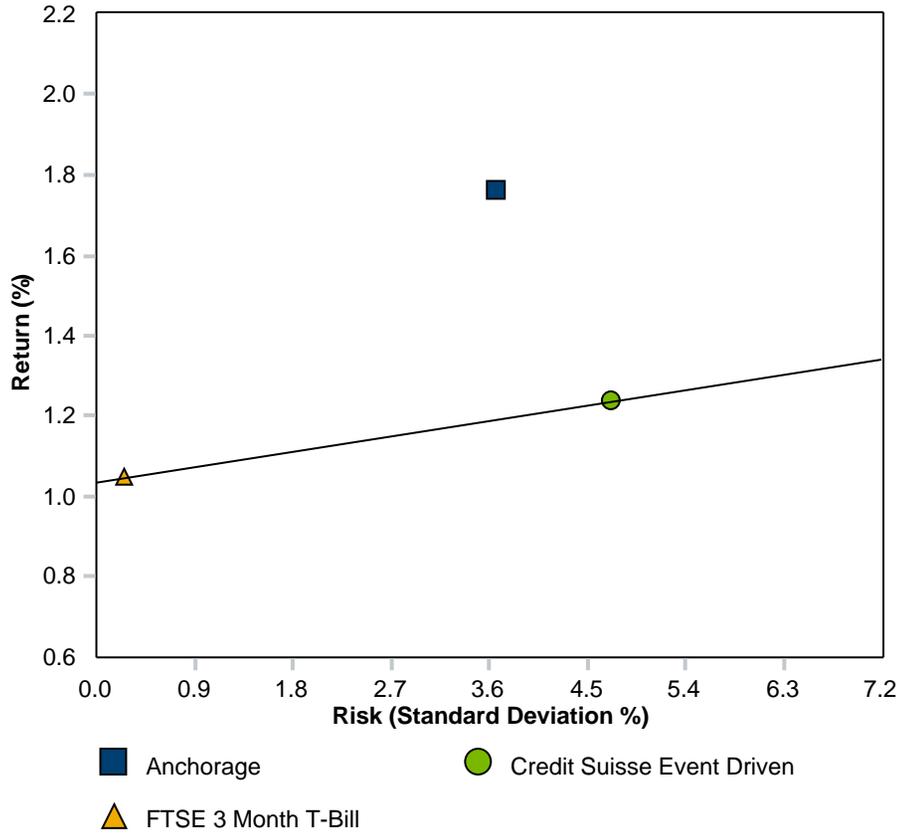


**Ratio of Cumulative Wealth - Since Inception**

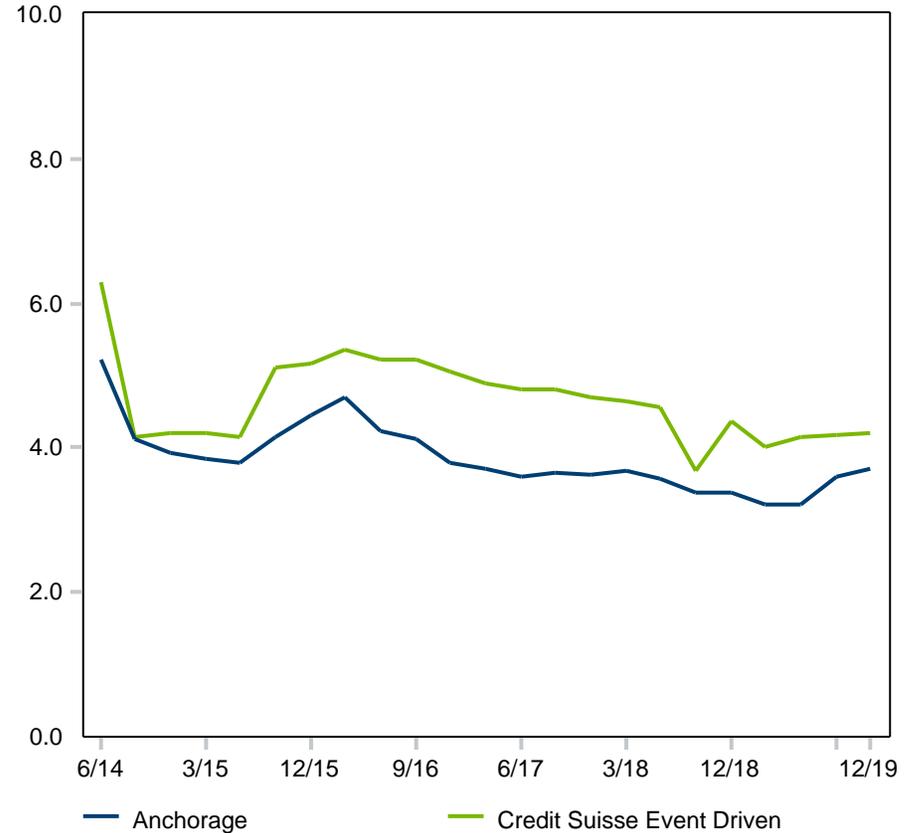


Anchorage Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



Rolling 3 Years Standard Deviation



5 Years Historical Statistics

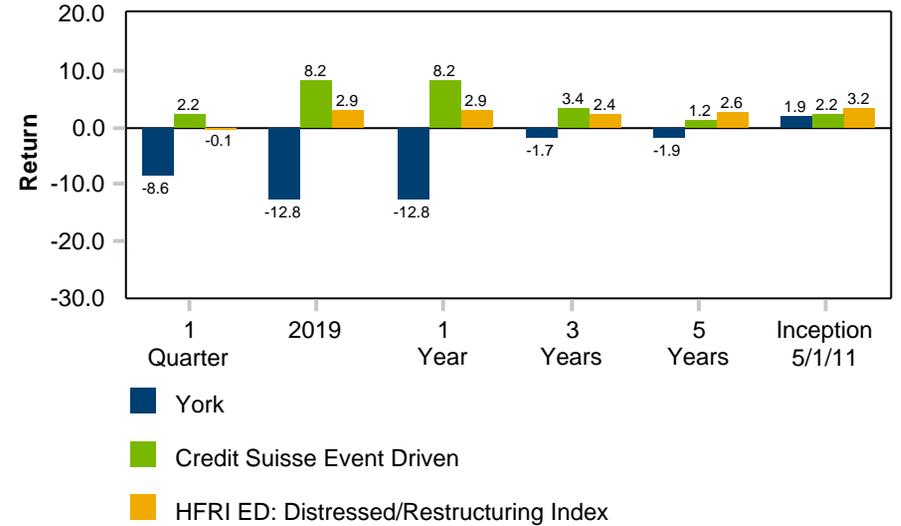
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Anchorage	0.47	3.71	0.13	0.40	0.21	1.16	0.49	1.76	3.68	0.63
Credit Suisse Event Driven	0.00	0.00	N/A	1.00	0.06	0.00	1.00	1.23	4.72	1.00
FTSE 3 Month T-Bill	-0.30	4.70	-0.06	0.01	N/A	1.04	0.00	1.05	0.26	0.09

York Performance Summary

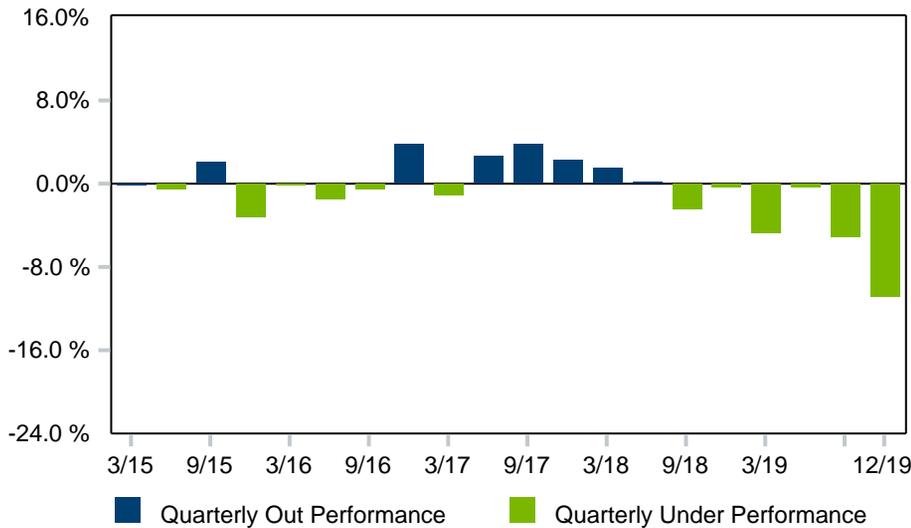
Account Information

Account Name: York  
 Inception Date: 05/01/2011  
 Account Structure: Hedge Fund  
 Asset Class: US Hedge Fund  
 Benchmark: Credit Suisse Event Driven  
 Peer Group:

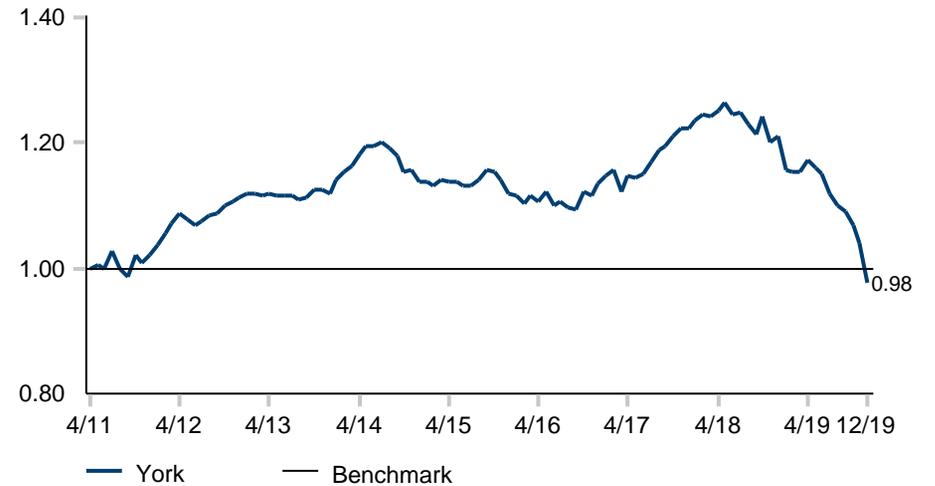
Return Summary



Quarterly Excess Performance

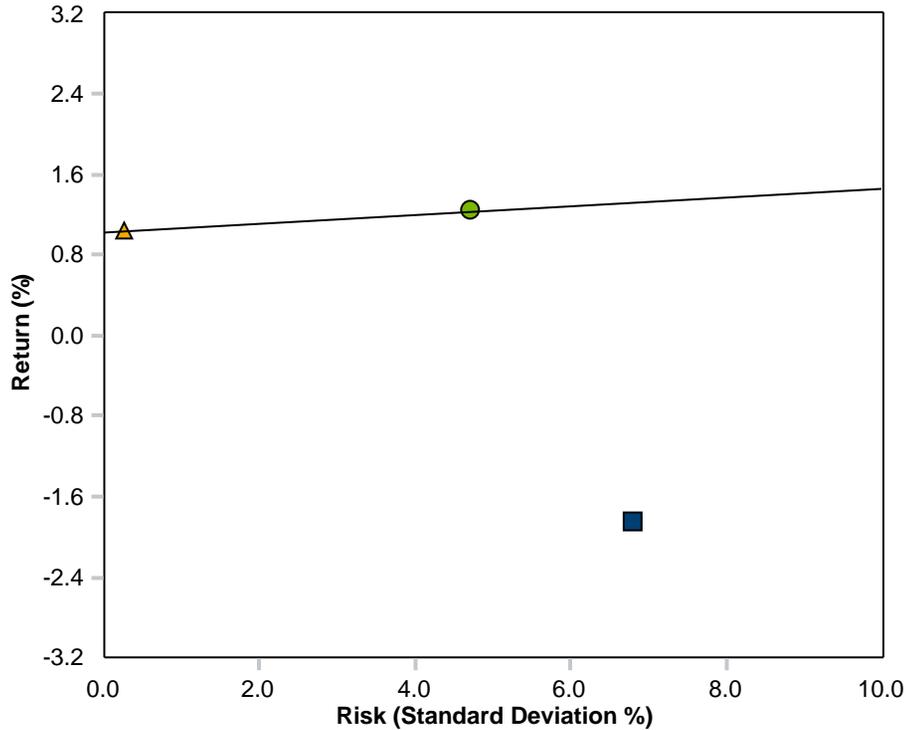


Ratio of Cumulative Wealth - Since Inception



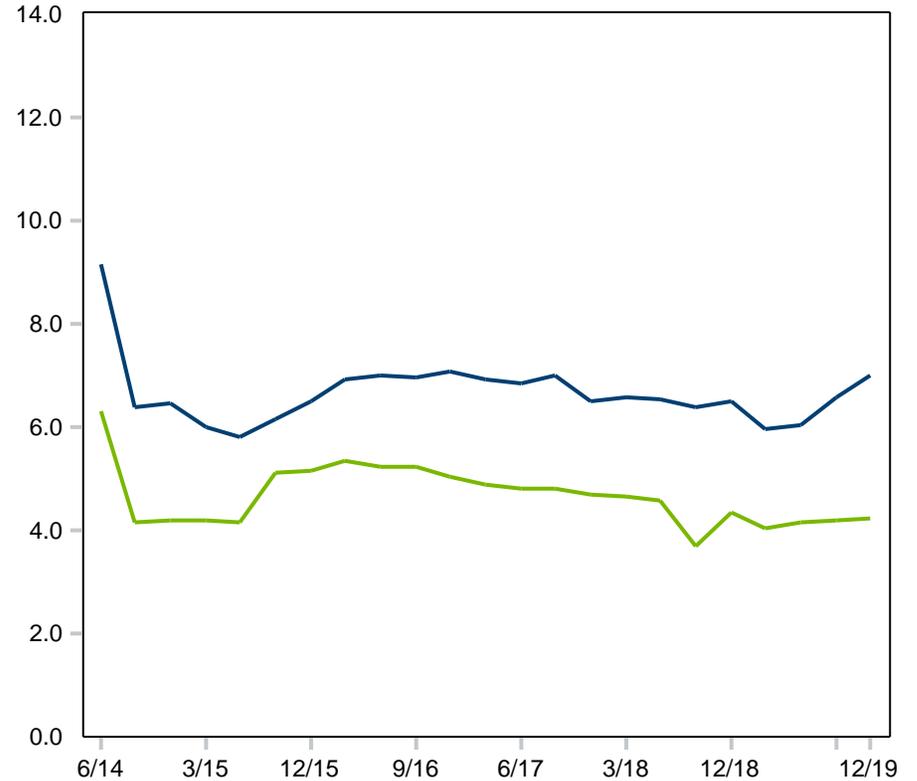
York Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



■ York  
● Credit Suisse Event Driven  
▲ FTSE 3 Month T-Bill

Rolling 3 Years Standard Deviation



— York  
— Credit Suisse Event Driven

5 Years Historical Statistics

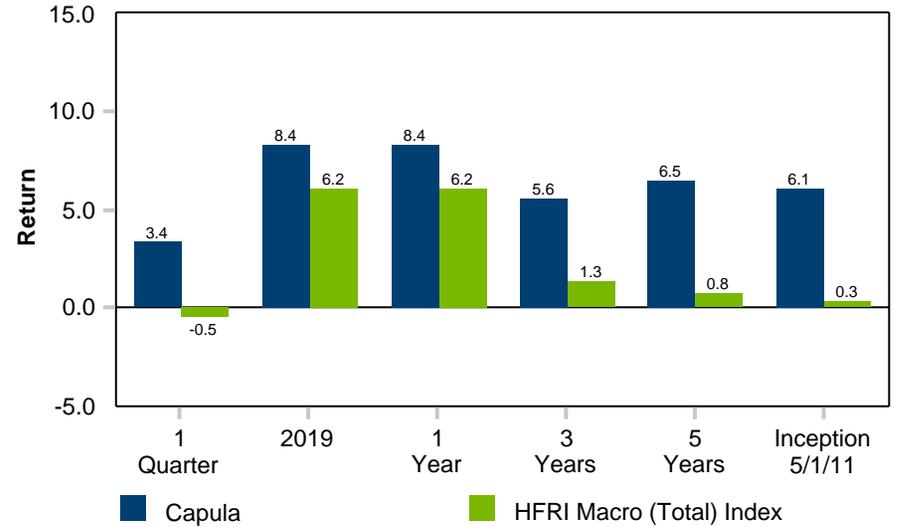
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
York	-2.98	5.66	-0.53	0.33	-0.39	-2.71	0.82	-1.85	6.82	0.57
Credit Suisse Event Driven	0.00	0.00	N/A	1.00	0.06	0.00	1.00	1.23	4.72	1.00
FTSE 3 Month T-Bill	-0.30	4.70	-0.06	0.01	N/A	1.04	0.00	1.05	0.26	0.09

Capula Performance Summary

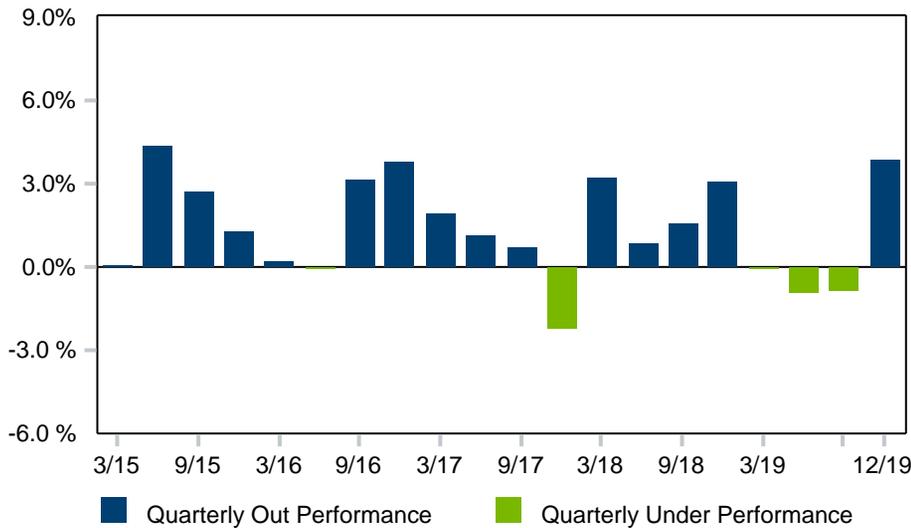
Account Information

Account Name: Capula  
 Inception Date: 05/01/2011  
 Account Structure: Hedge Fund  
 Asset Class: US Hedge Fund  
 Benchmark: HFRI Macro (Total) Index  
 Peer Group:

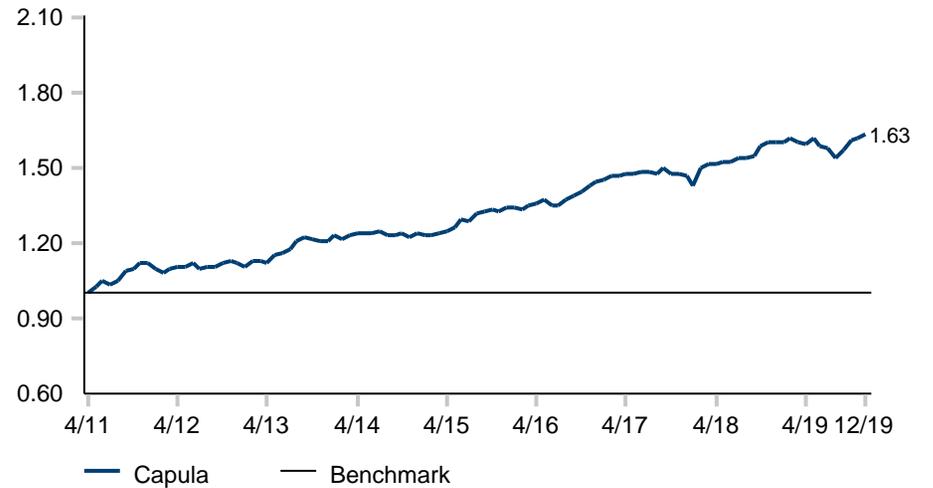
Return Summary



Quarterly Excess Performance

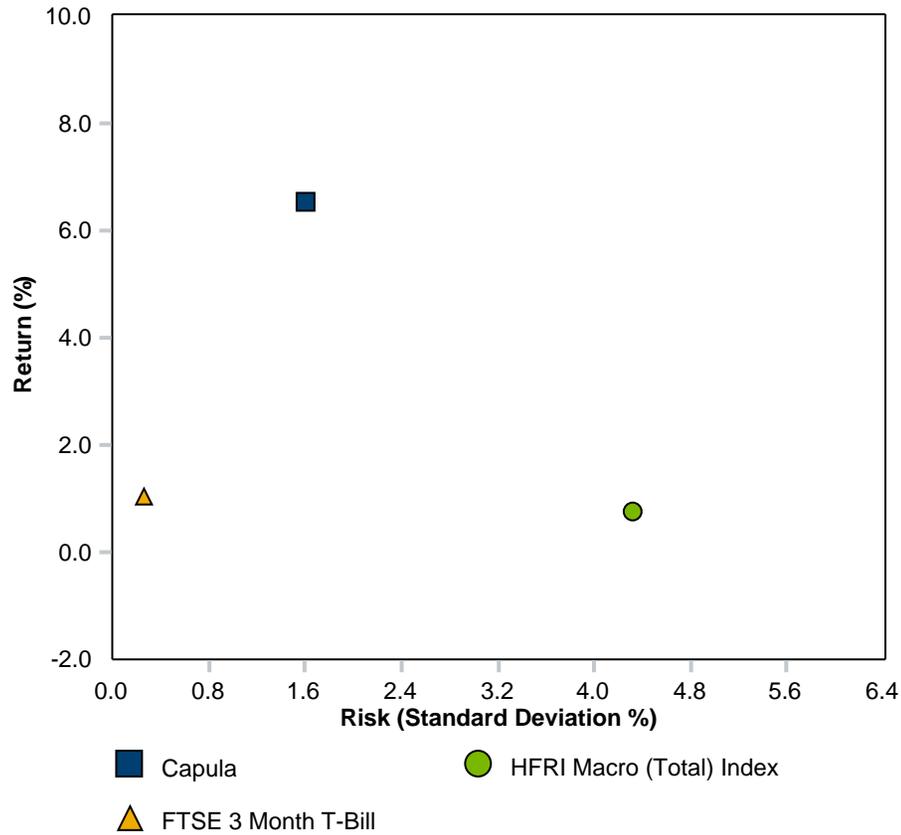


Ratio of Cumulative Wealth - Since Inception

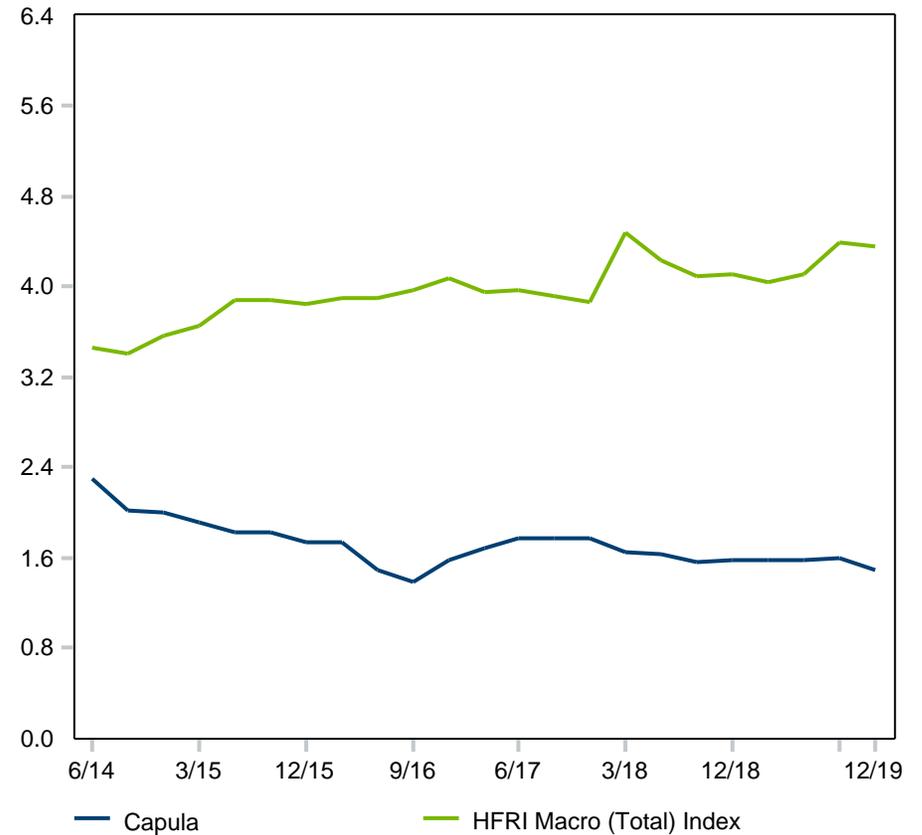


Capula Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



Rolling 3 Years Standard Deviation



5 Years Historical Statistics

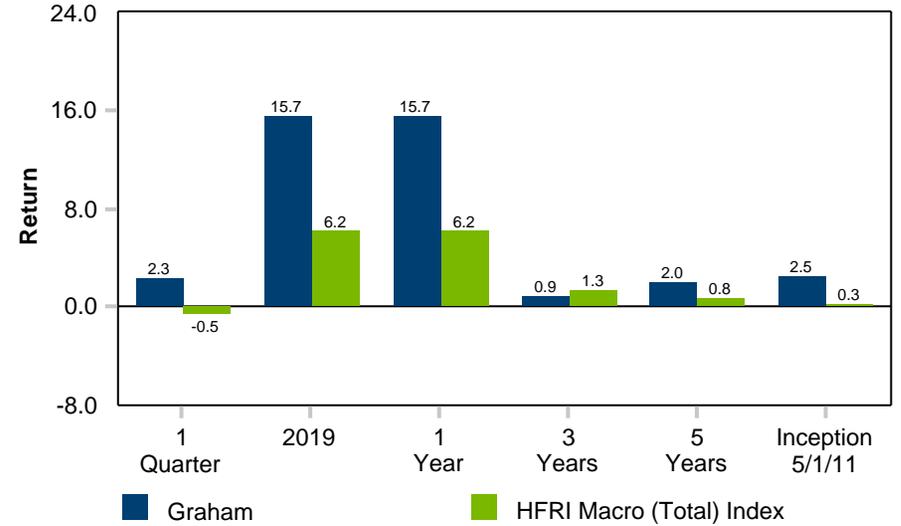
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Capula	5.49	4.42	1.24	0.02	3.19	6.48	0.05	6.51	1.61	0.12
HFRI Macro (Total) Index	0.00	0.00	N/A	1.00	-0.05	0.00	1.00	0.75	4.32	1.00
FTSE 3 Month T-Bill	0.20	4.30	0.05	0.01	N/A	1.04	0.01	1.05	0.26	0.09

Graham Performance Summary

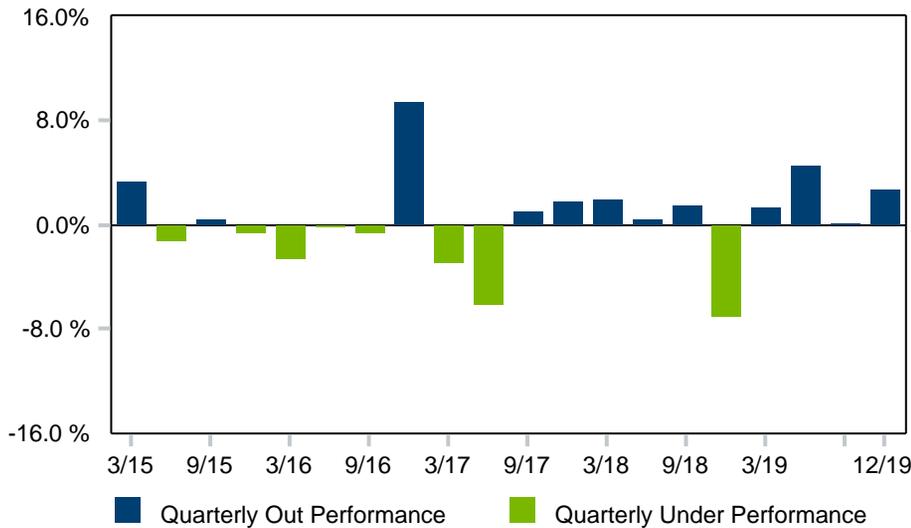
Account Information

Account Name: Graham  
 Inception Date: 05/01/2011  
 Account Structure: Hedge Fund  
 Asset Class: Hedge Fund  
 Benchmark: HFRI Macro (Total) Index  
 Peer Group:

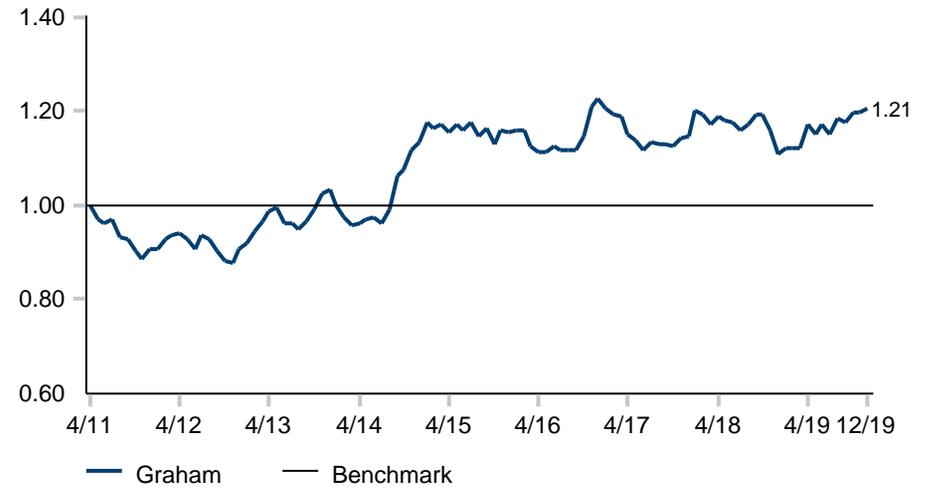
Return Summary



Quarterly Excess Performance

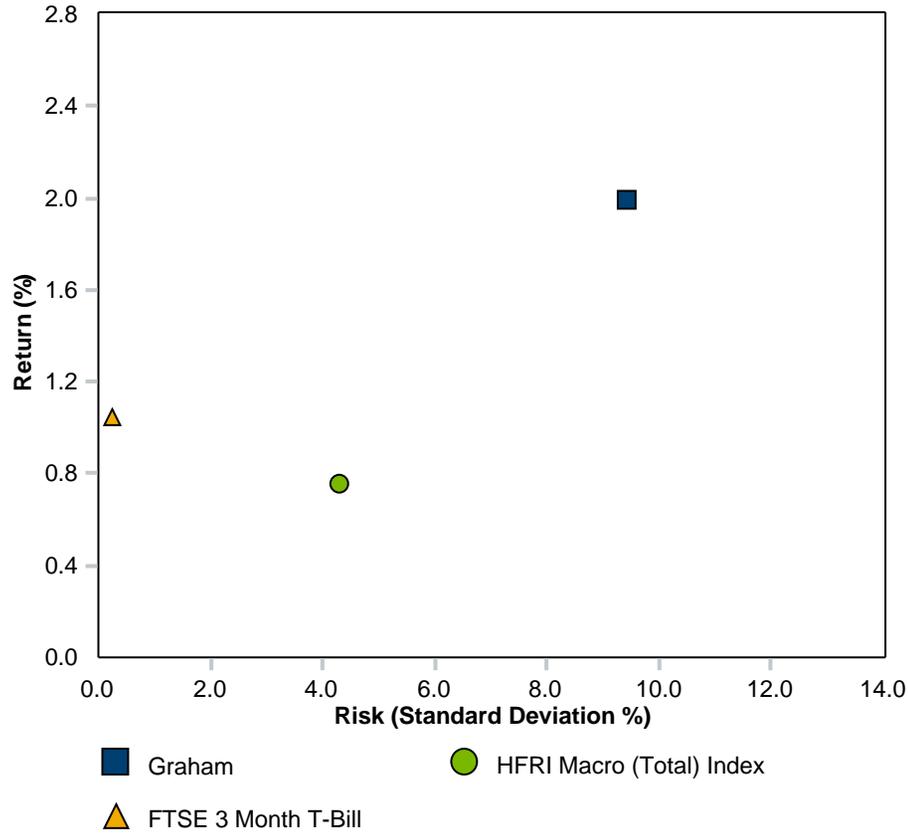


Ratio of Cumulative Wealth - Since Inception

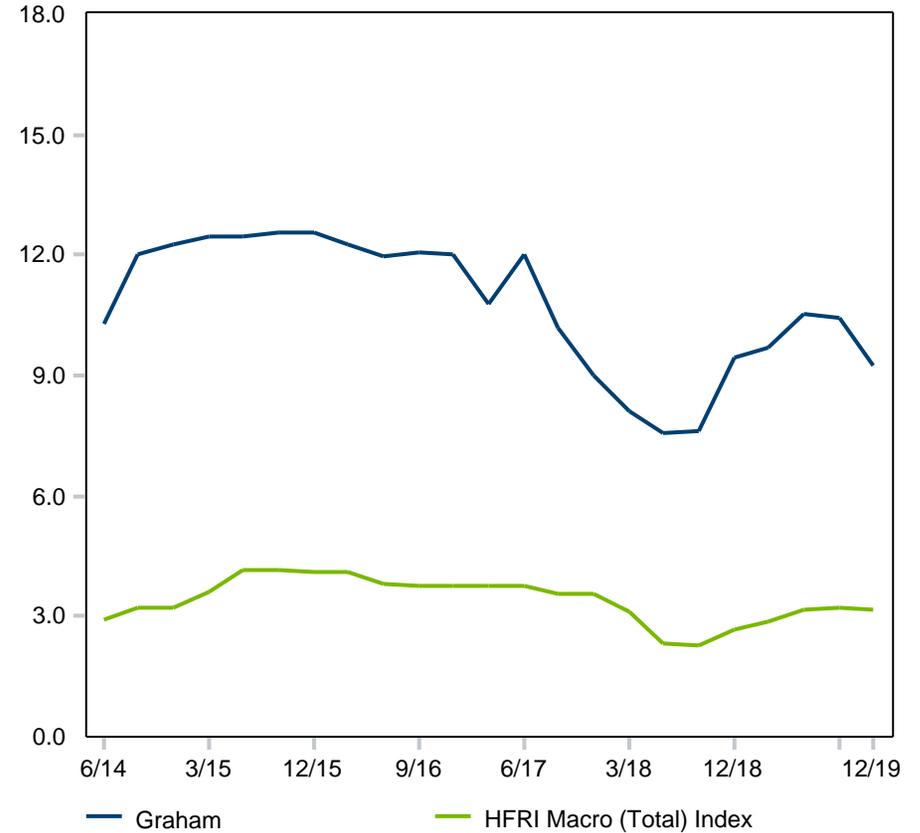


Graham Risk Profile

Annualized Return vs. Annualized Standard Deviation 5 Years



Rolling 3 Years Standard Deviation



5 Years Historical Statistics

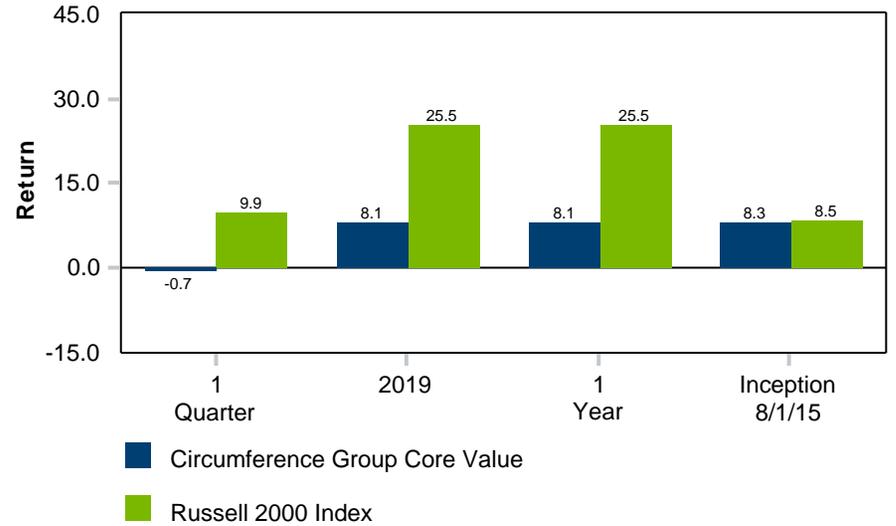
	Active Return	Tracking Error	Information Ratio	R-Squared	Sharpe Ratio	Alpha	Beta	Return	Standard Deviation	Actual Correlation
Graham	1.56	6.81	0.23	0.56	0.14	1.03	1.64	1.99	9.43	0.75
HFRI Macro (Total) Index	0.00	0.00	N/A	1.00	-0.05	0.00	1.00	0.75	4.32	1.00
FTSE 3 Month T-Bill	0.20	4.30	0.05	0.01	N/A	1.04	0.01	1.05	0.26	0.09

Circumference Group Core Value Performance Summary

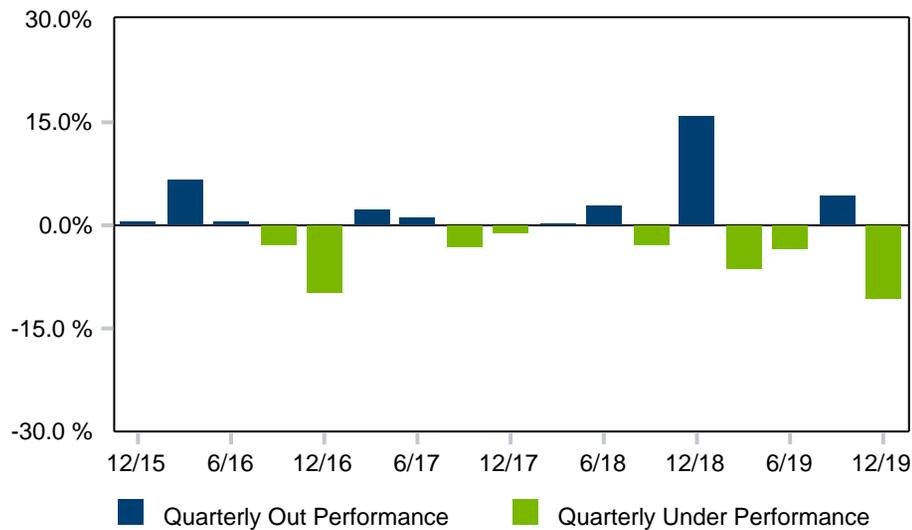
Account Information

Account Name: Circumference Group Core Value  
 Inception Date: 08/31/2015  
 Account Structure: Hedge Fund  
 Asset Class: US Hedge Fund  
 Benchmark: Russell 2000 Index  
 Peer Group:

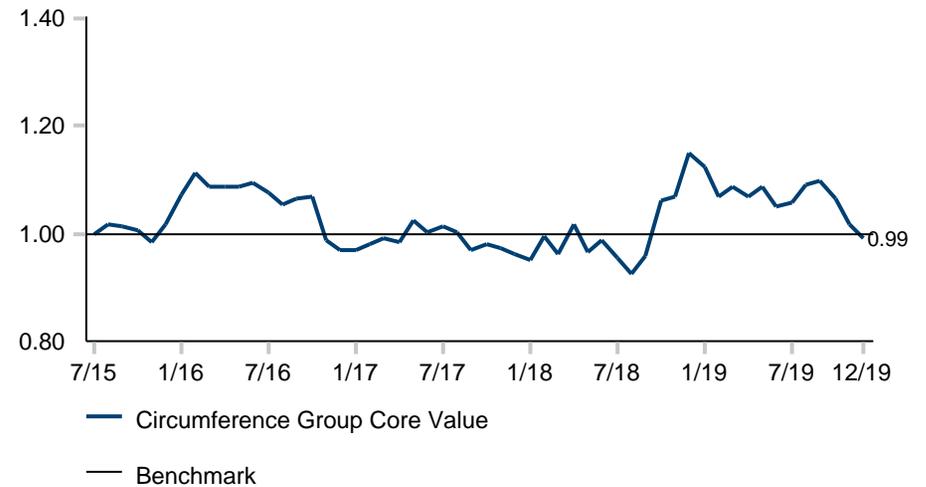
Return Summary



Quarterly Excess Performance



Ratio of Cumulative Wealth - Since Inception

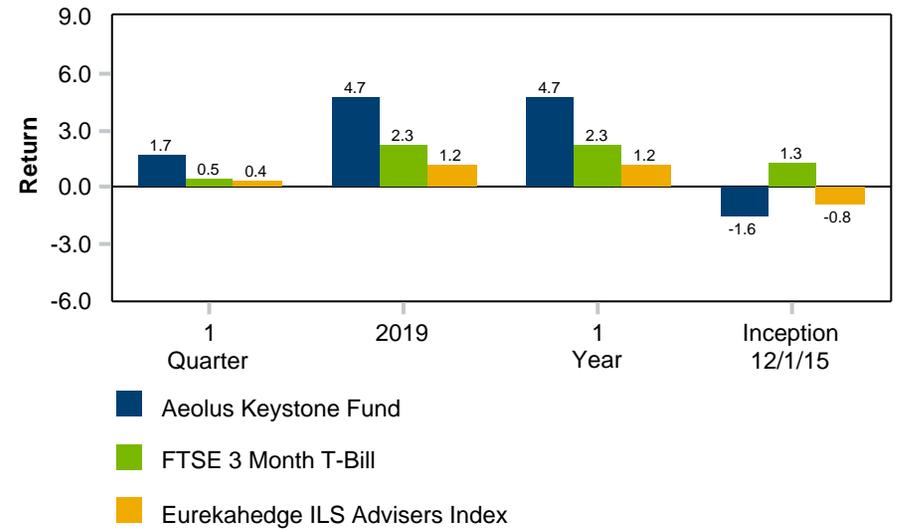


**Aeolus Keystone Fund Performance Summary**

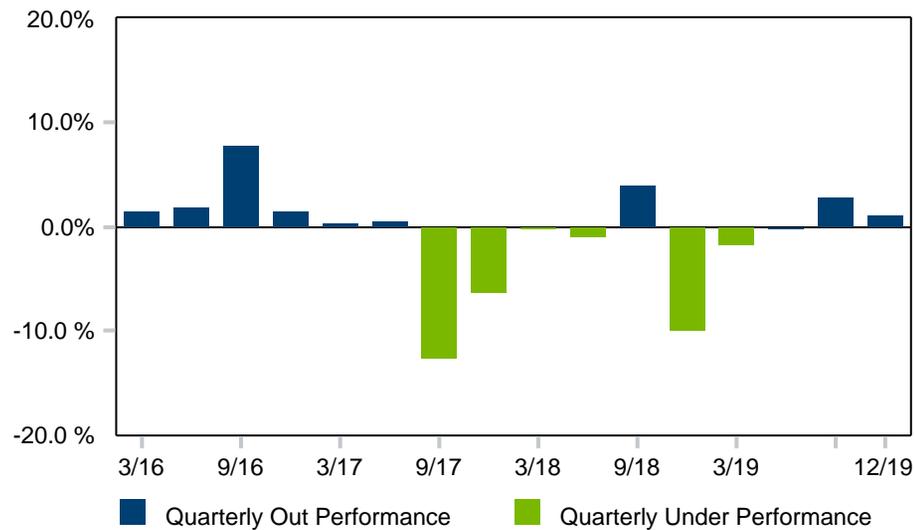
**Account Information**

Account Name: Aeolus Keystone Fund  
 Inception Date: 12/01/2015  
 Account Structure: Hedge Fund  
 Asset Class: Hedge Fund  
 Benchmark: FTSE 3 Month T-Bill  
 Peer Group:

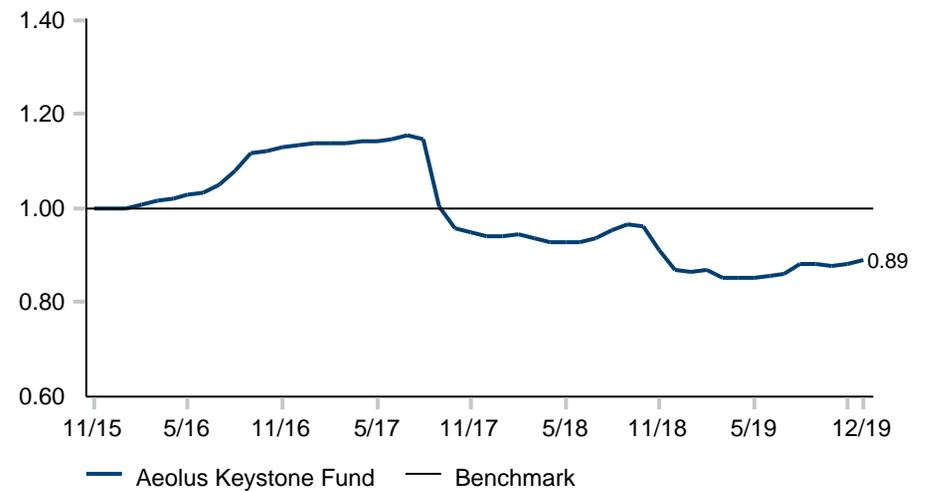
**Return Summary**



**Quarterly Excess Performance**



**Ratio of Cumulative Wealth - Since Inception**

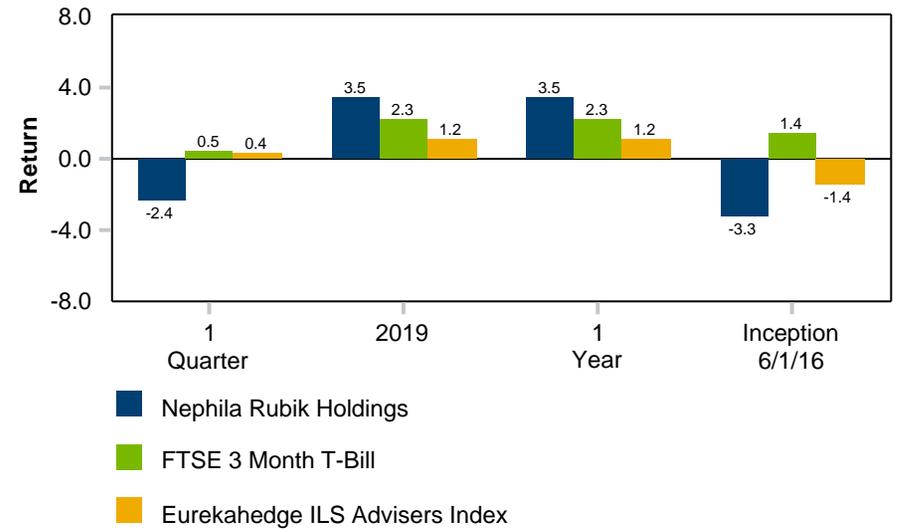


**Nephila Rubik Holdings Performance Summary**

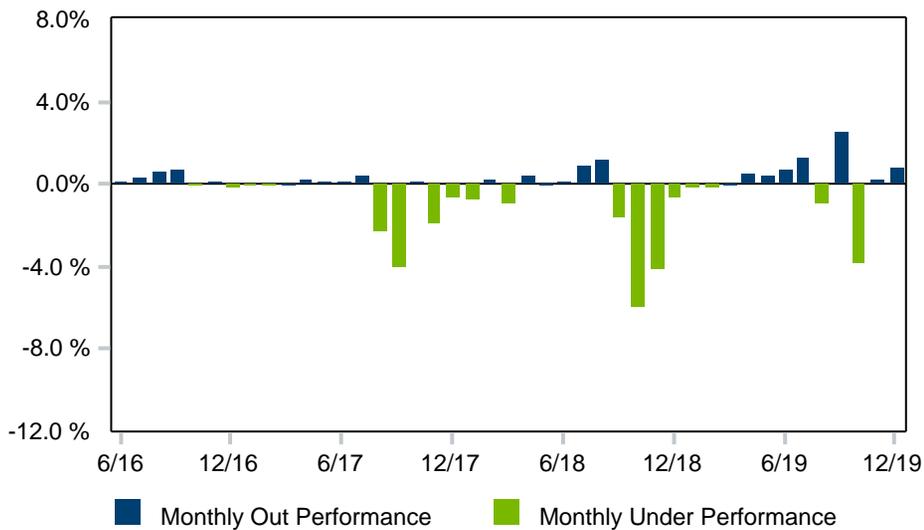
**Account Information**

Account Name: Nephila Rubik Holdings  
 Inception Date: 06/01/2016  
 Account Structure:  
 Asset Class: Hedge Fund  
 Benchmark: FTSE 3 Month T-Bill  
 Peer Group:

**Return Summary**



**Monthly Excess Performance**



**Ratio of Cumulative Wealth - Since Inception**

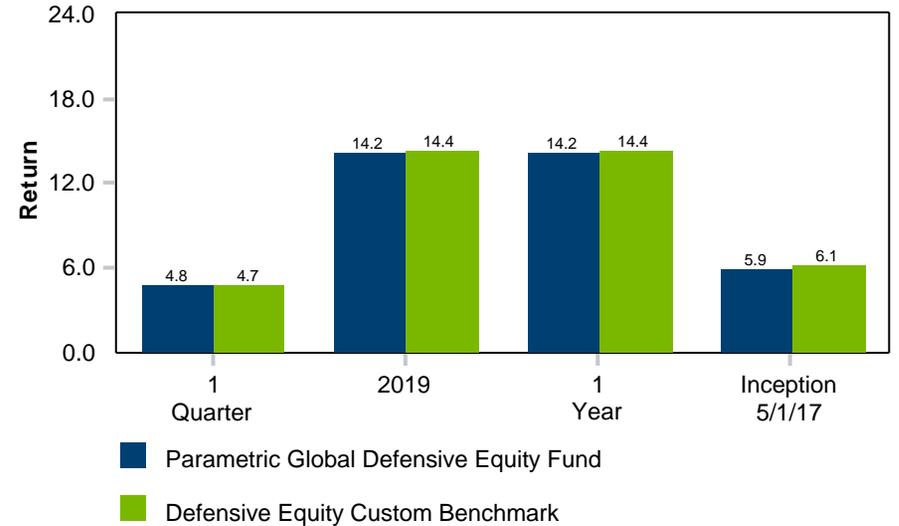


Parametric Global Defensive Equity Fund Performance Summary

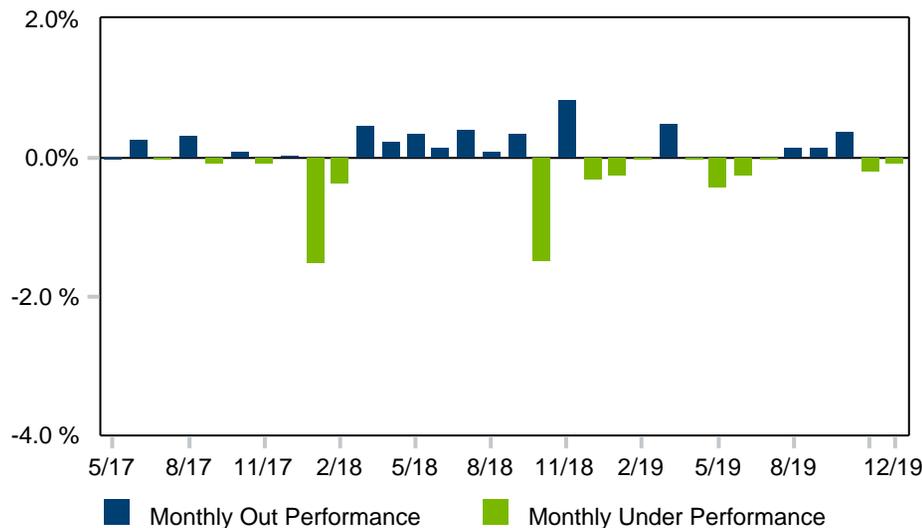
Account Information

Account Name: Parametric Global Defensive Equity Fund  
 Inception Date: 06/01/2017  
 Account Structure: Commingled Fund  
 Asset Class: Global Equity  
 Benchmark: Defensive Equity Custom Benchmark  
 Peer Group:

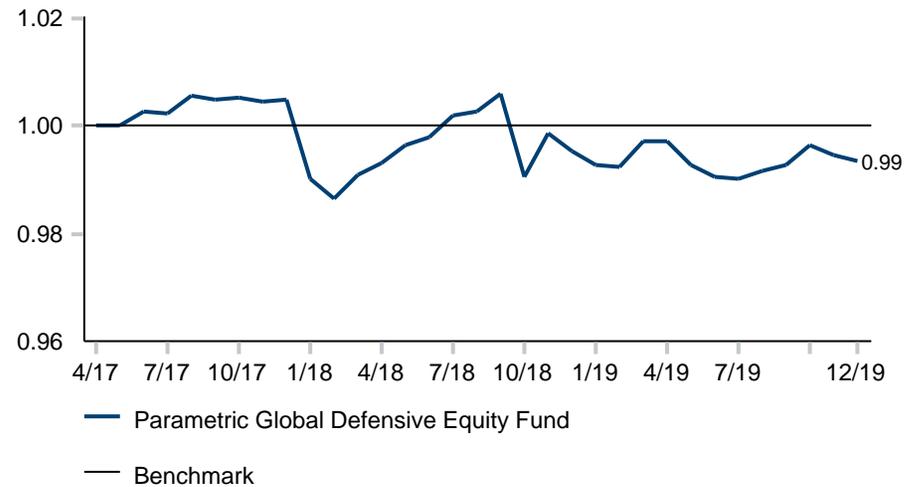
Return Summary



Monthly Excess Performance



Ratio of Cumulative Wealth - Since Inception

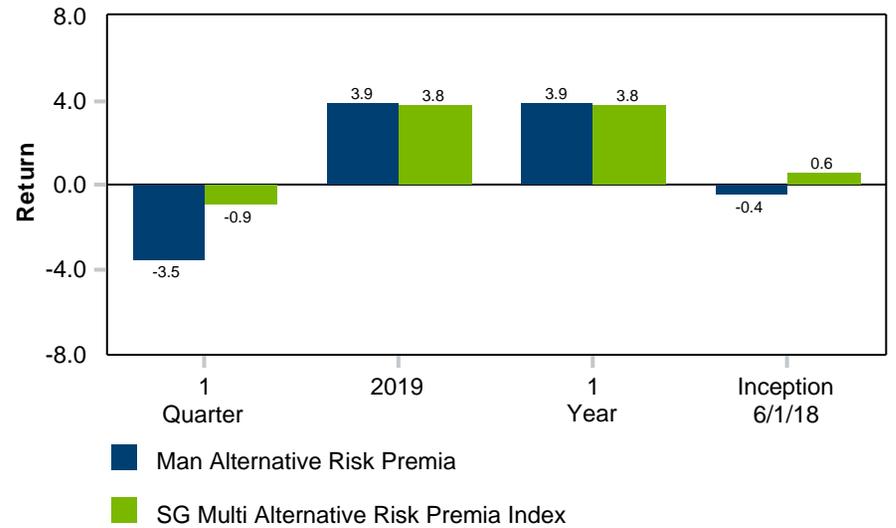


Man Alternative Risk Premia Performance Summary

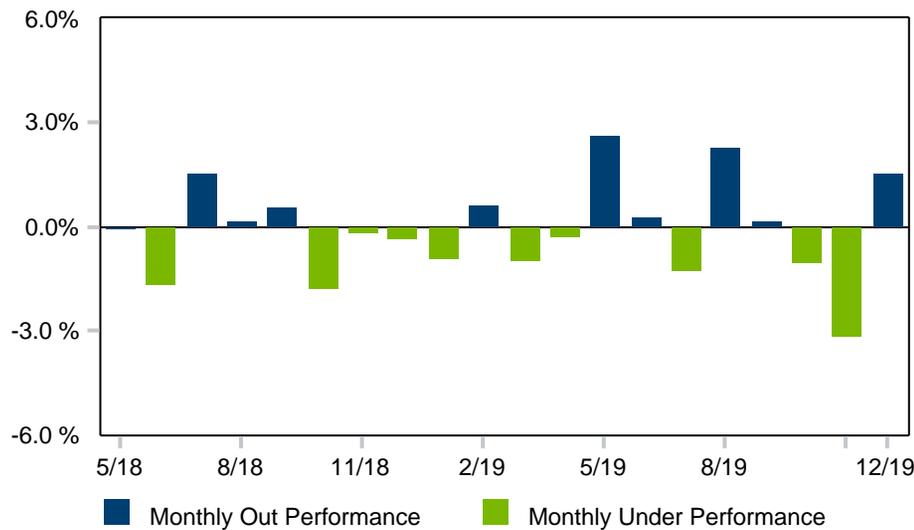
Account Information

Account Name: Man Alternative Risk Premia  
 Inception Date: 06/01/2018  
 Account Structure: Commingled Fund  
 Asset Class: US Equity  
 Benchmark: SG Multi Alternative Risk Premia Index  
 Peer Group:

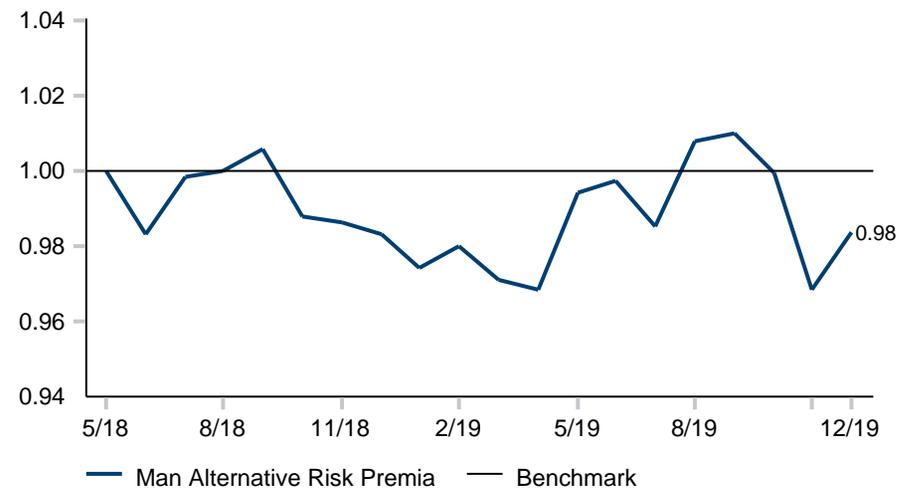
Return Summary



Monthly Excess Performance



Ratio of Cumulative Wealth - Since Inception

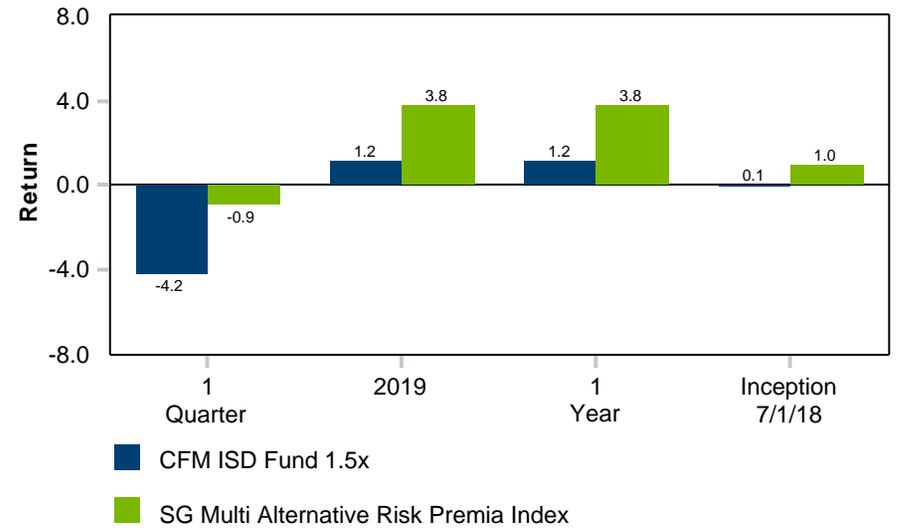


**CFM ISD Fund 1.5x Performance Summary**

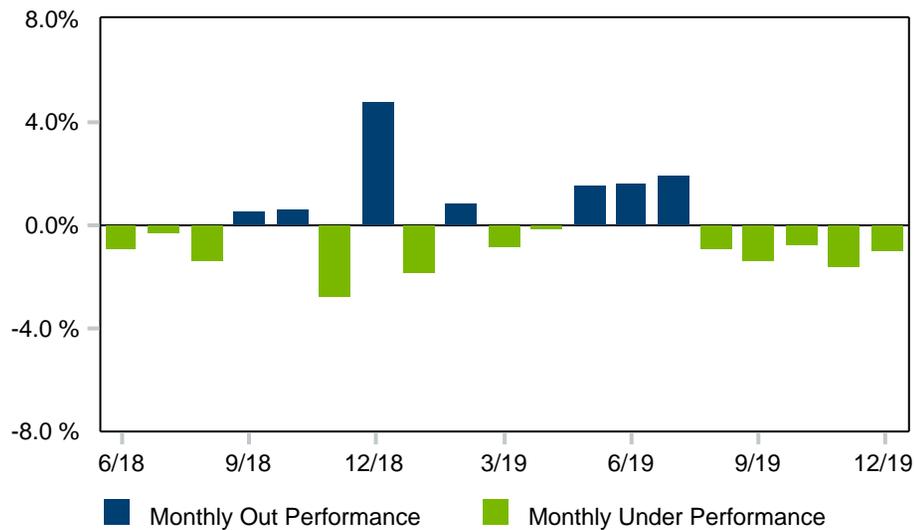
**Account Information**

Account Name: CFM ISD Fund 1.5x  
 Inception Date: 07/01/2018  
 Account Structure: Commingled Fund  
 Asset Class: US Equity  
 Benchmark: SG Multi Alternative Risk Premia Index  
 Peer Group:

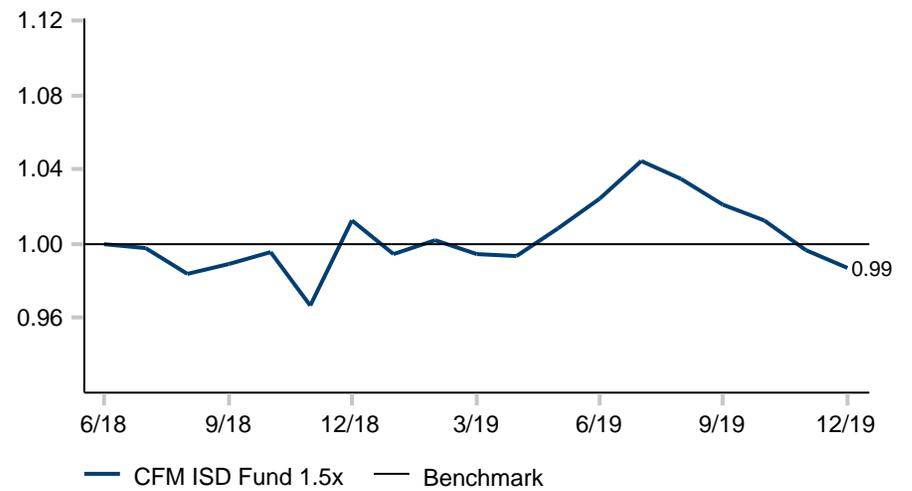
**Return Summary**



**Monthly Excess Performance**



**Ratio of Cumulative Wealth - Since Inception**





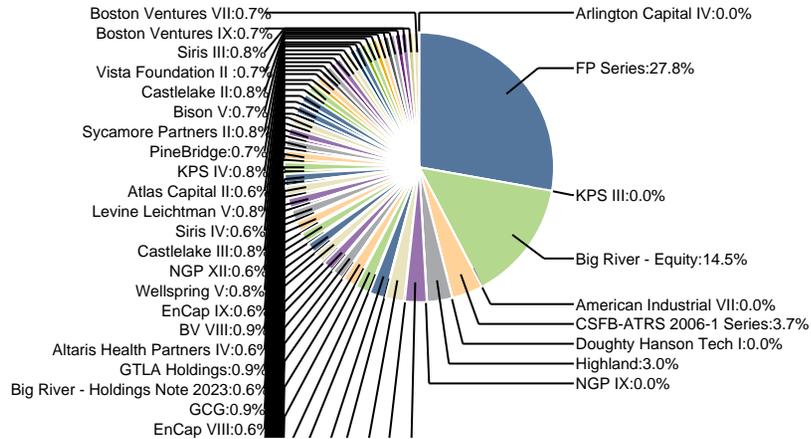
## Private Equity

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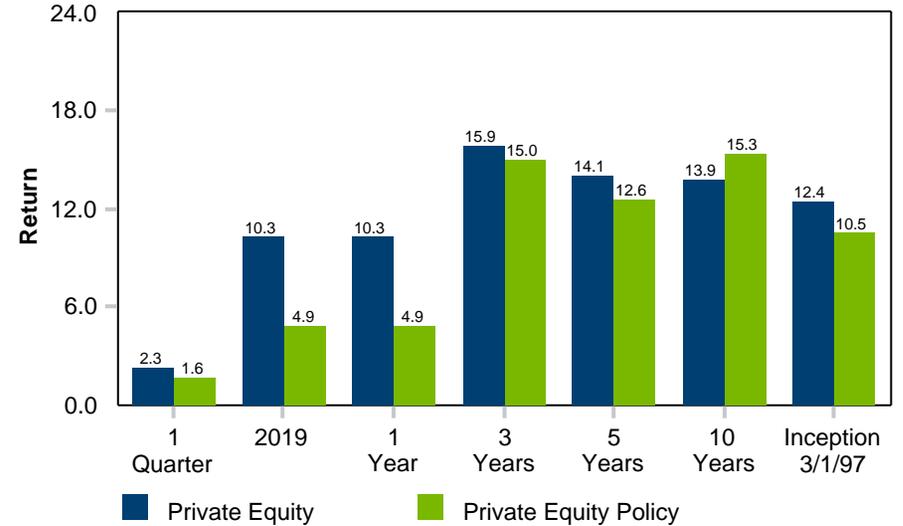
Private Equity Portfolio Overview

Current Allocation

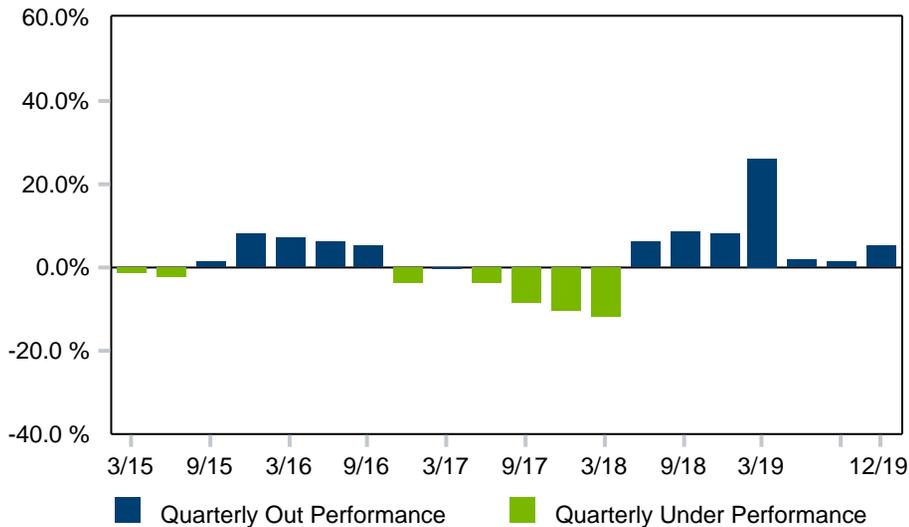
December 31, 2019 : \$2,254M



Return Summary

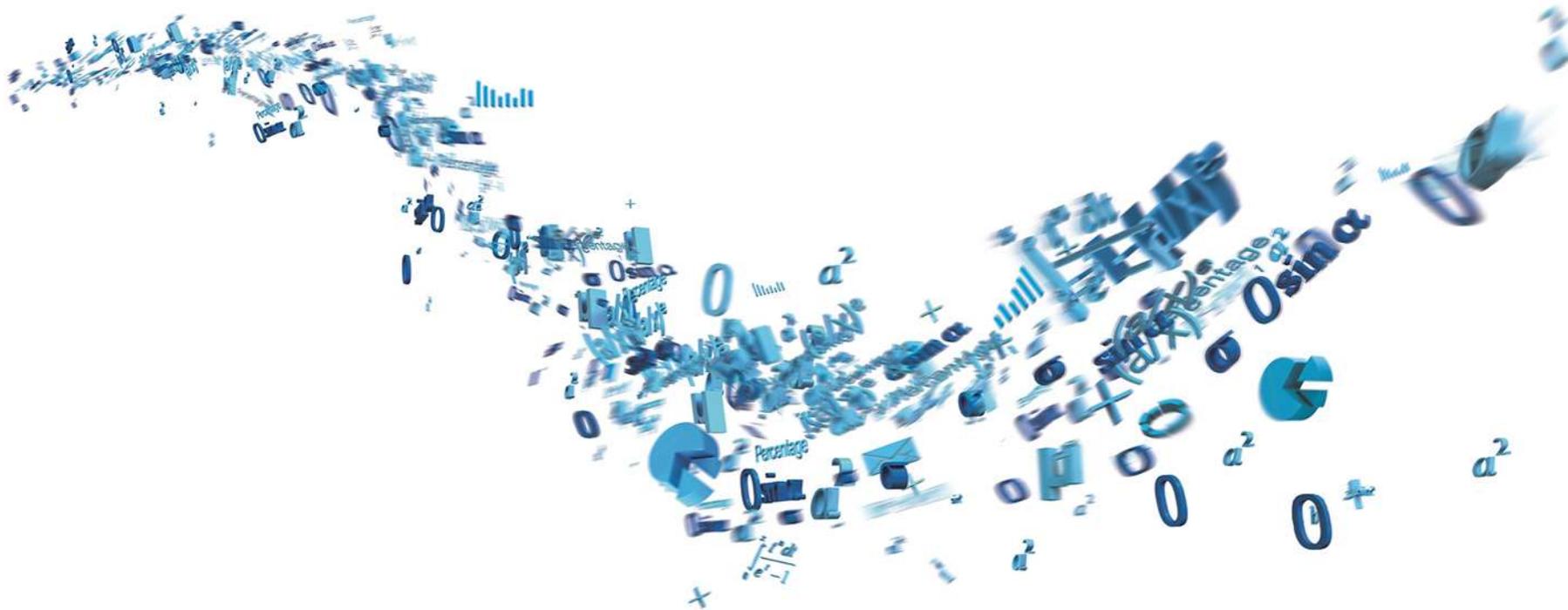


Quarterly Excess Performance



Ratio of Cumulative Wealth - Since Inception





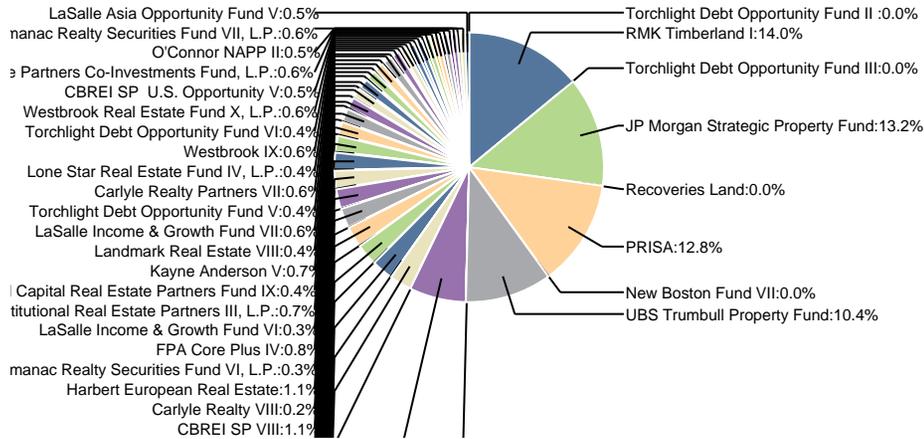
## Real Assets

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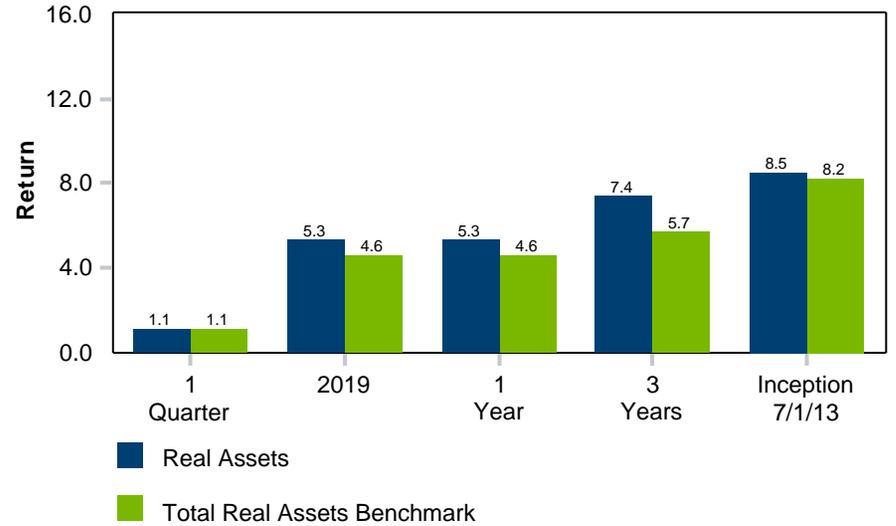
Real Assets Portfolio Overview

Current Allocation

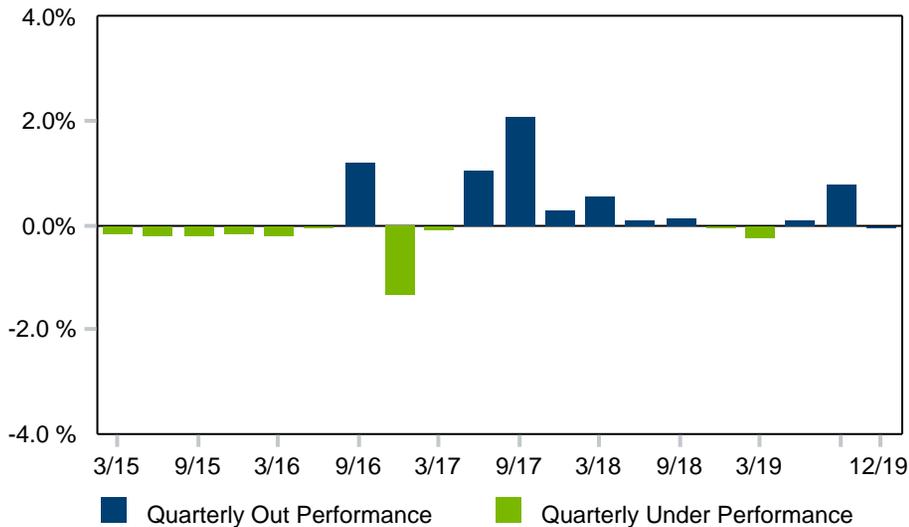
December 31, 2019 : \$2,133M



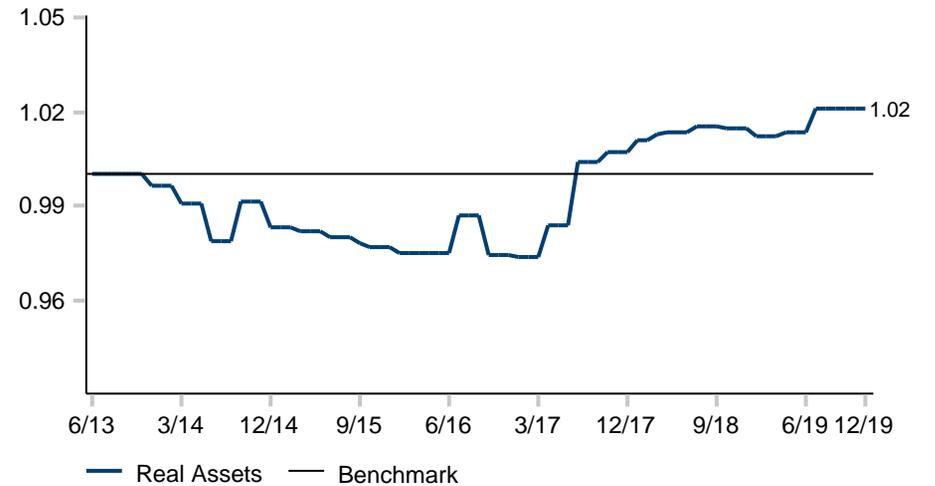
Return Summary

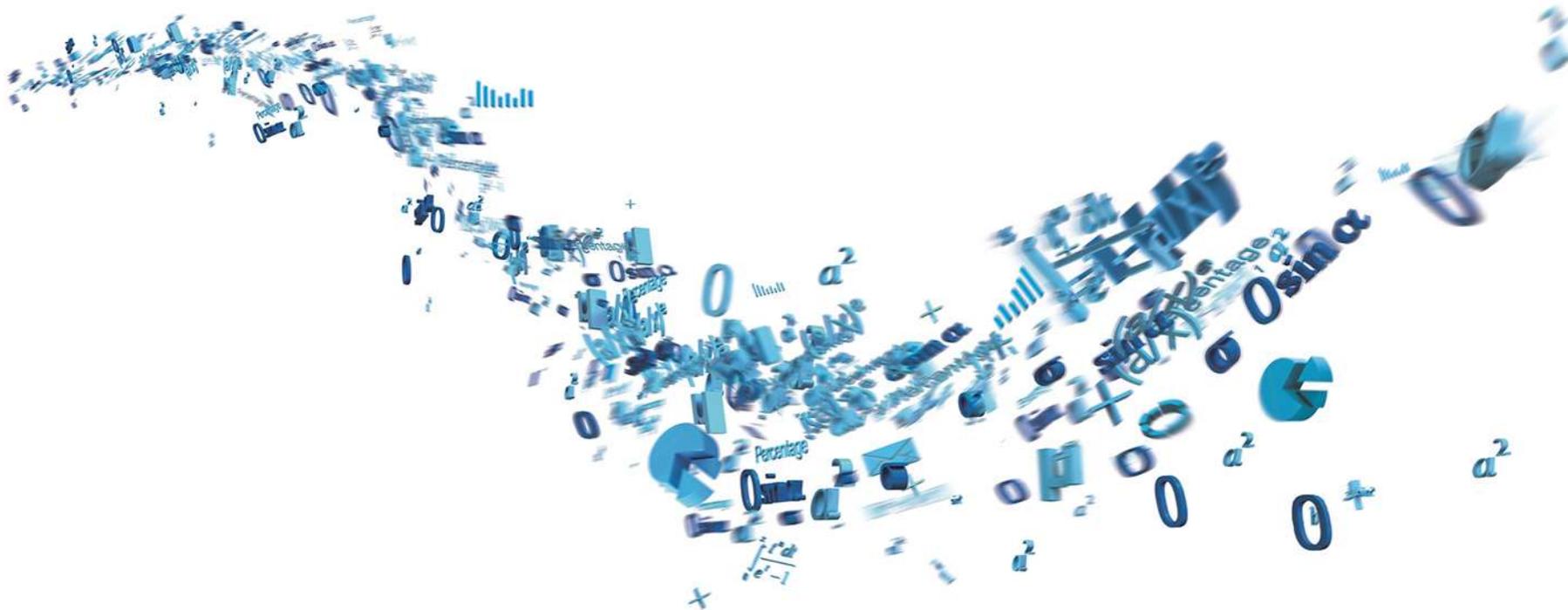


Quarterly Excess Performance



Ratio of Cumulative Wealth - Since Inception



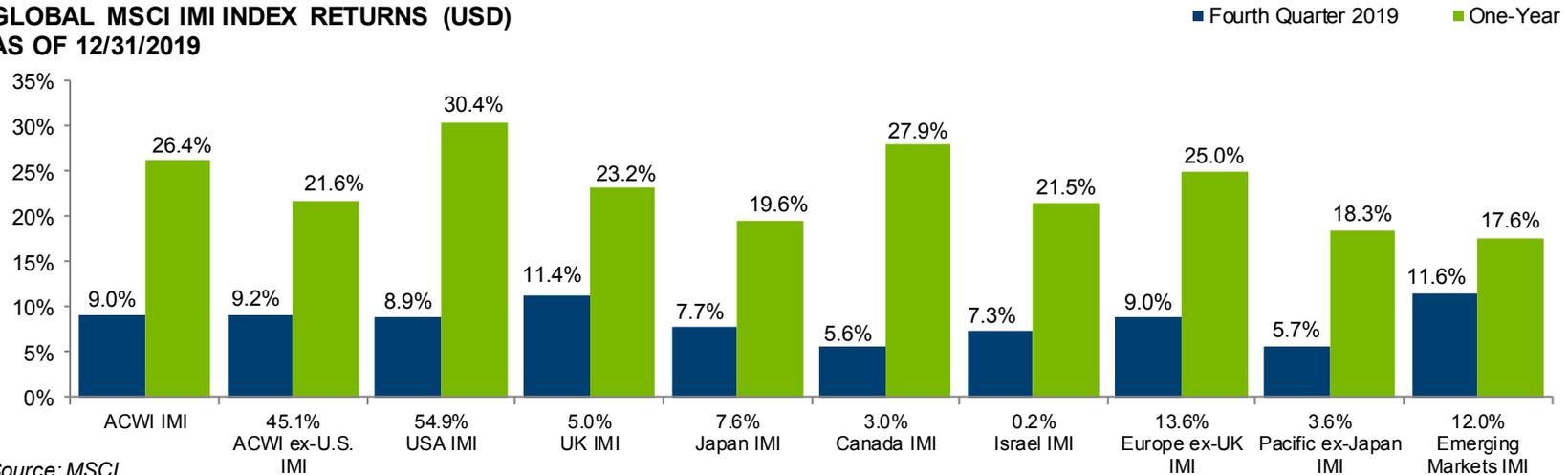


## Market Environment

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## Global Equity Markets

### GLOBAL MSCI IMI INDEX RETURNS (USD) AS OF 12/31/2019

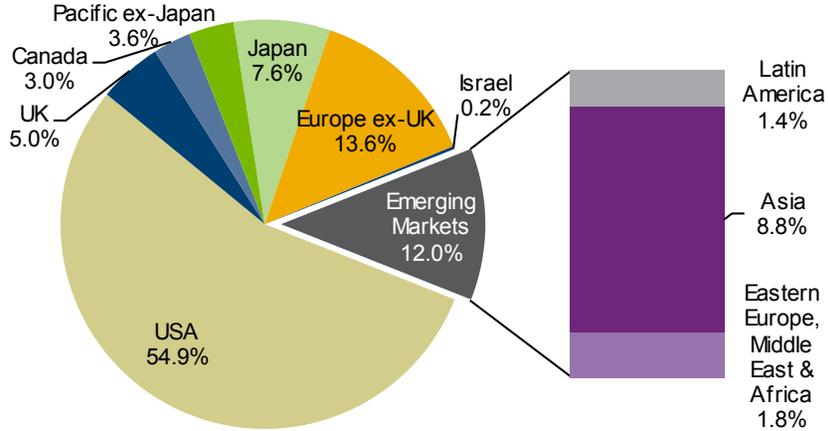


Source: MSCI

- The announcement of a “phase one” U.S.-China trade deal, progress on the U.S.-Mexico-Canada agreement (USMCA) and easing Brexit fears led to a resurgence in risk appetite and boosted equity markets. Accommodative monetary policies from major central banks meanwhile continue to provide further support for risk assets. In local currency terms, the MSCI AC World Investable Market Index returned 7.8% in Q4 2019 and the depreciation of the U.S. dollar provided an additional boost to 9.0% in USD terms.
- Previous laggards in terms of 2019 performance, Emerging Markets (EM) equities, were the strongest performers (11.6%) over the quarter benefiting from the “risk-on” environment and the thawing of trade tensions. With the exception of Indian equities, all other major EM regions delivered double-digit returns. This did, however, come against a backdrop where China recorded the slowest economic growth rate in nearly 30 years as their economy expanded by 6.0% year-on-year in the third quarter.
- Canadian equities markets returned the least with a still respectable quarterly return of 5.6% in USD-terms. Canadian Prime Minister Justin Trudeau’s Liberal party retained power after winning general election but fell short of a majority.

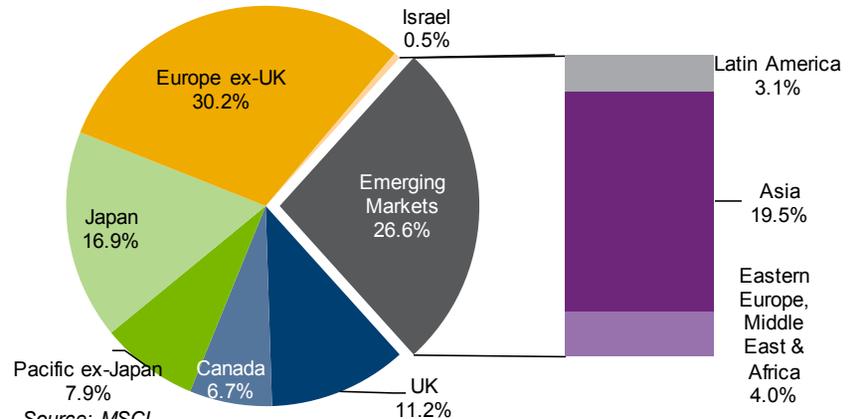
# Global Equity Markets

**MSCI ALL COUNTRY WORLD IMI INDEX  
GEOGRAPHIC ALLOCATION AS OF 12/31/2019**



Source: MSCI

**MSCI ALL COUNTRY WORLD EX-U.S. IMI INDEX  
GEOGRAPHIC ALLOCATION AS OF 12/31/2019**

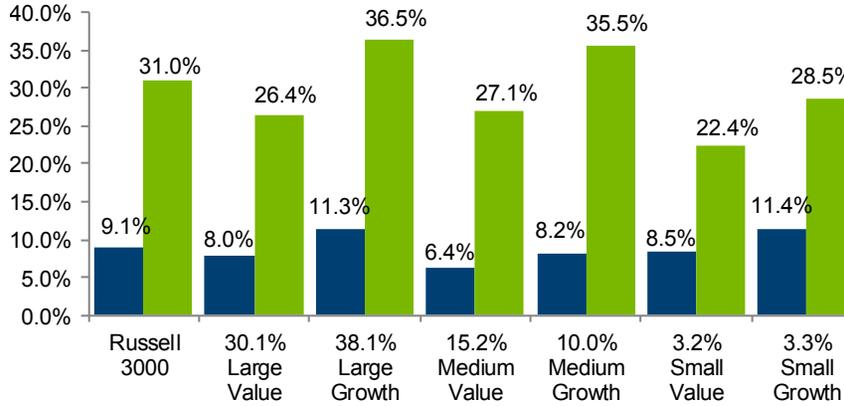


Source: MSCI

- The two exhibits on this slide illustrate the percentage that each country/region represents of the global and international equity markets as measured by the MSCI All Country World IMI Index and the MSCI All Country World ex-U.S. IMI Index, respectively.

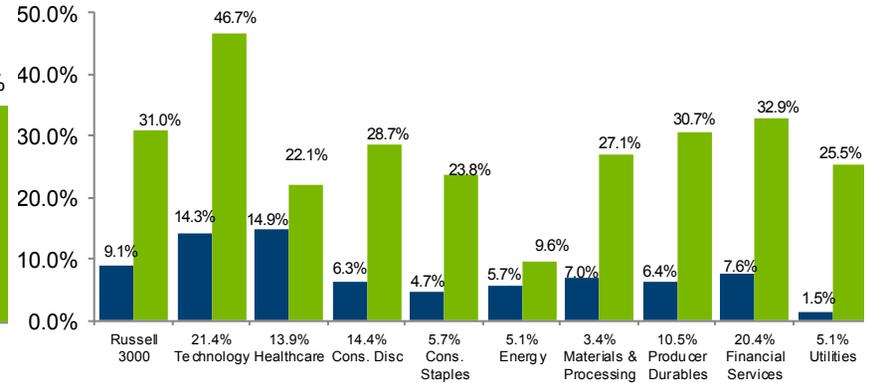
## U.S. Equity Markets

**RUSSELL STYLE RETURNS  
AS OF 12/31/2019**



Source: Russell Indexes

**RUSSELL GICS SECTOR RETURNS  
AS OF 12/31/2019**

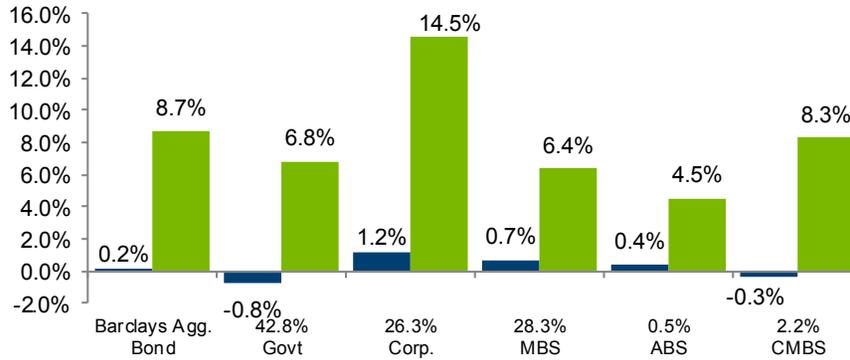


Source: Russell Indexes

- Three major U.S. equity indices (S&P 500, Dow Jones Industrial Average and Nasdaq Composite) touched record highs over the quarter; the truce in the U.S.-China trade war providing a significant tailwind. The Russell 3000 Index rose 9.1% during the fourth quarter and 31.0% over the one-year period.
- Healthcare (14.9%) and Technology (14.3%) were the best performers over the quarter. The former benefited from the falling popularity of Democratic Presidential candidate Elizabeth Warren whom advocated significant healthcare reform which has previously been a headwind for pharmaceuticals. As economic data stabilized over the quarter, more defensive sectors underperformed with Utilities (1.5%) and Consumer Staples (4.7%) the worst performing sectors.
- Performance was positive across the market capitalization spectrum over the quarter. Small cap stocks outperformed both large and medium cap stocks over the quarter. Growth stocks outperformed their Value counterparts in Q4 2019 and over the last year.

# U.S. Fixed Income Markets

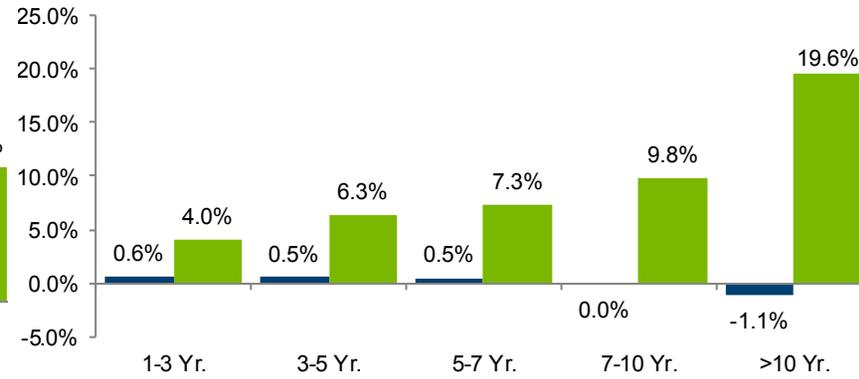
**BLOOMBERG BARCLAYS AGGREGATE RETURNS BY SECTOR AS OF 12/31/2019**



Source: FactSet

■ Fourth Quarter 2019 ■ One-Year

**BLOOMBERG BARCLAYS AGGREGATE RETURNS BY MATURITY AS OF 12/31/2019**

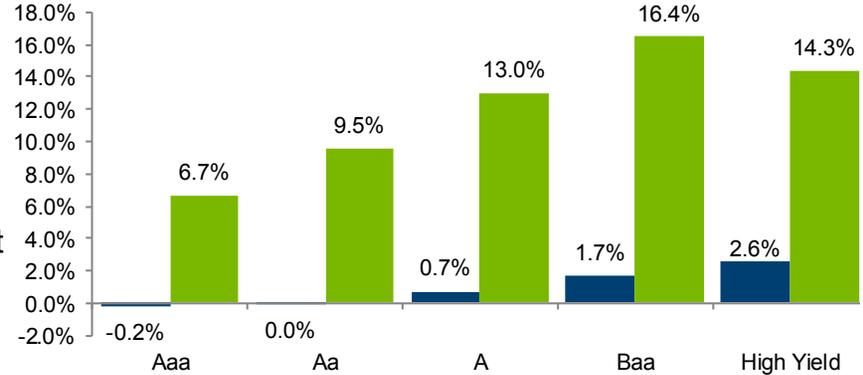


Source: FactSet

■ Fourth Quarter 2019 ■ One-Year

- Against a backdrop of rising yields, the Bloomberg Barclays U.S. Aggregate Bond Index rose by 0.2% over the quarter. Corporate bonds were the best performers, returning 1.2% while Government bonds underperformed with a return of -0.8%.
- Within credit, greater risk appetite led to outperformance of lower quality corporate bonds. High yield bonds returned 2.6% with spread narrowing offsetting the impact of higher underlying government bond yields while AAA-rated bonds underperformed with a return of -0.2%.
- Short-maturity bonds outperformed intermediate and long-maturity bonds over the quarter. Short-maturity bonds returned 0.6% while long-maturity bonds fell by 1.1% in Q4 2019.

**BLOOMBERG BARCLAYS AGGREGATE RETURNS BY QUALITY AND HIGH YIELD RETURNS AS OF 12/31/2019**



Source: FactSet

■ Fourth Quarter 2019 ■ One-Year

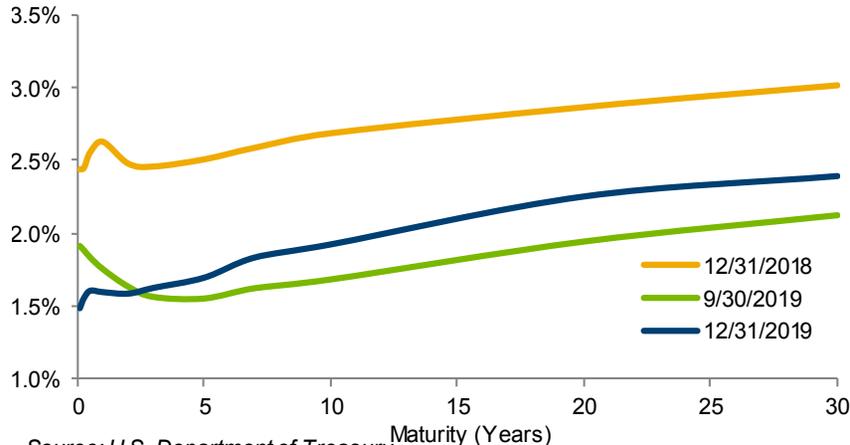
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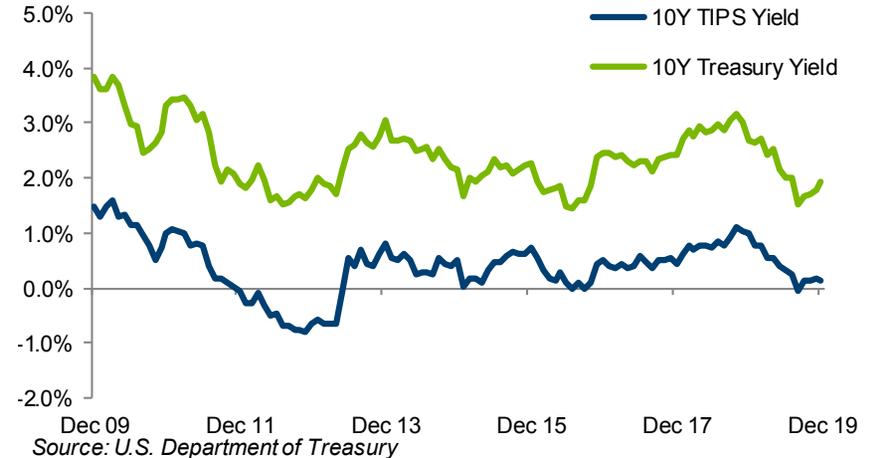
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## U.S. Fixed Income Markets

**U.S. TREASURY YIELD CURVE**



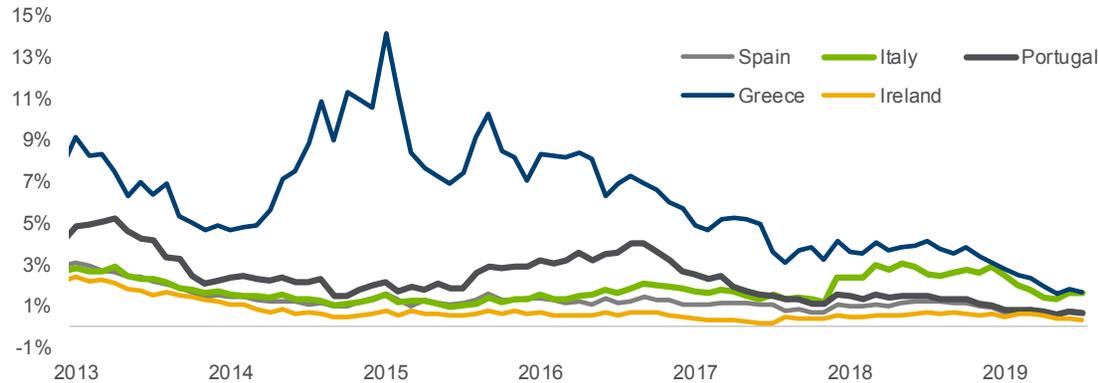
**U.S. 10-YEAR TREASURY AND TIPS YIELDS**



- The U.S. nominal yield curve steepened over the quarter with yields falling at the short end of the curve and rising at longer maturities. As a result, the yield curve is no longer inverted.
- The 10-year U.S. Treasury yield retraced most of the prior quarter's fall with a 24bps increase over the quarter to 1.92%. The 10-year TIPS yield remained unchanged over the quarter at 0.15%.
- With real yields broadly unchanged over the quarter, it became evident that yield movements were triggered not by growth expectations (which remain low) but instead by increasing inflation expectations. This follows sustained central bank easing, prospects of debt-financed fiscal stimulus and potential changes to inflation-targeting policies; all of which are supportive for higher inflation.
- The US Federal Reserve (Fed) cut the interest rate by 25bps to 1.50% from 1.75%. Meanwhile, in the latest "dot plot", the majority of the Federal Open Market Committee believed that interest rates will stay at current levels for at least the next year, with the next 25bps hike not anticipated until 2021.

## European Fixed Income Markets

**EUROZONE PERIPHERAL BOND SPREADS  
(10-YEAR SPREADS OVER GERMAN BUNDS)**



Source: FactSet

- German government bond yields rose in line with over developed market government bond yields, rising by 40bps to -0.19% over the quarter. Germany unexpectedly avoided a recession after growing by 0.1% in Q3, buoyed by increased consumer and public sector spending, which mitigated the impact of a weakening manufacturing sector. Italian government bond yields rose by 60bps to 1.42% over the quarter.
- Greek government bond yields rose by comparatively less than other European government bond yields. An increase in the country's sovereign credit rating to BB- from B+ lessened the risk of default and led to a relatively modest 9bps increase in government bond yields to 1.43%.
- Spanish government bond yields rose by 33bps to 0.46% over a quarter in which Pedro Sanchez's Socialist party won the most seats in general election, but fell short of a majority.
- European government bond spreads over 10-year German bunds generally fell across the Euro Area with the exception of Italian government bonds. The European Central Bank (ECB) kept its monetary policy unchanged over the quarter. In what was Christine Lagarde's first rate-setting meeting as President, she sought to calm fears that the Euro Area could have ultra low rates, growth and inflation for an extended period.

## Credit Spreads

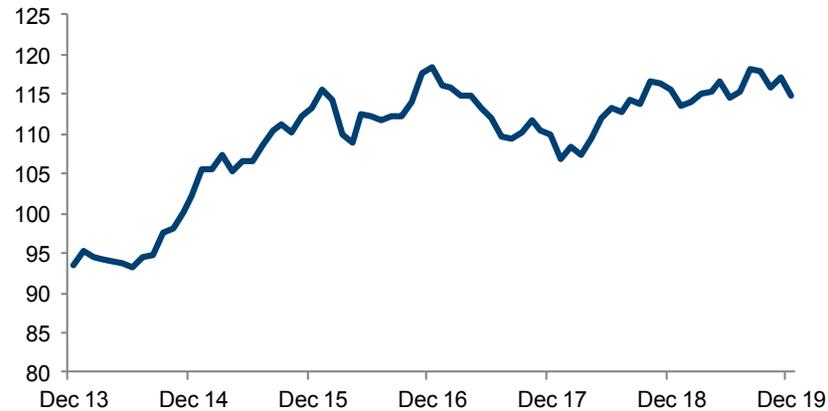
Spread (bps)	12/31/2019	09/30/2019	12/31/2018	Quarterly Change (bps)	One-Year Change (bps)
U.S. Aggregate	39	46	54	-7	-15
Long Govt	0	1	2	-1	-2
Long Credit	139	167	200	-28	-61
Long Govt/Credit	79	95	113	-16	-34
MBS	39	46	35	-7	4
CMBS	72	70	86	2	-14
ABS	44	37	53	7	-9
Corporate	93	115	153	-22	-60
High Yield	336	373	526	-37	-190
Global Emerging Markets	287	312	330	-25	-43

Source: FactSet, Bloomberg Barclays

- Credit spreads over U.S. Treasuries generally narrowed over the quarter. Greater risk appetite saw spreads fall across the board but mostly in non-investment grade areas such as high yield and emerging market debt where greater yields are on offer.
- High yield bond spreads narrowed significantly by 37bps over the quarter. This was followed by long-duration corporate bond spreads, which narrowed by 28bps.
- Areas within securitized credit in the U.S. underperformed in comparison. While credit spreads in general narrowed over the quarter, spreads on CMBS and ABS securities widened by 2bps and 7bps respectively.

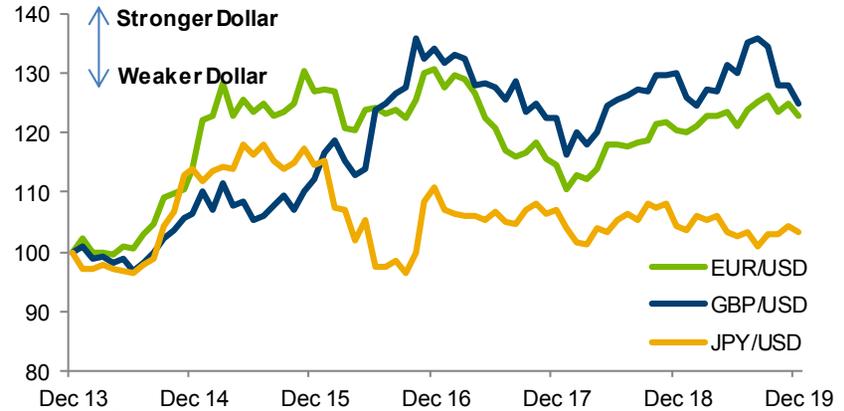
## Currency

**TRADE WEIGHTED U.S. DOLLAR INDEX  
(1973 = 100)**



Source: Federal Reserve

**U.S. DOLLAR RELATIVE TO EUR, GBP AND JPY  
REBASED TO 100 AT 12/31/2013**

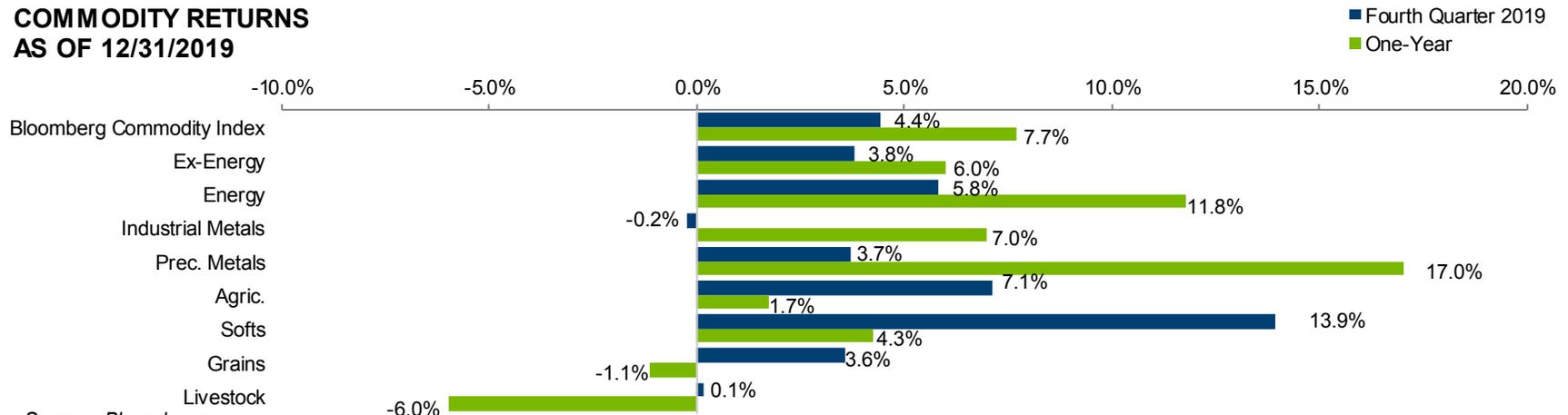


Source: FactSet

- The upward trend in the US dollar was halted with cyclical supports of higher interest rates and relative economic strength fading to some extent. Returning risk appetite also upended the 'greenback' which had benefited from safe-haven activity. The U.S. dollar slipped by 2.8% on a trade-weighted basis over the quarter with notable underperformance against sterling.
- The removal of Hard Brexit risks following a sizeable majority gained by the incumbent Conservative Party in the UK general election led sterling significantly higher over the quarter. Sterling appreciated by 7.5% against the U.S. dollar.
- Economic data releases stabilized in the Euro Area over the quarter but the outlook for the manufacturing sector still appears murky with activity shrinking for the eleventh successive month. Despite these economic headwinds, the euro found support against the U.S. dollar from tighter interest rate differentials, appreciating by 2.9% against the U.S. dollar.
- The U.S. dollar moderately appreciated against the Japanese yen, which had appreciated during risk-off episodes earlier in the year. The yen weakened by 0.6% against the U.S. dollar over the quarter.

# Commodities

## COMMODITY RETURNS AS OF 12/31/2019



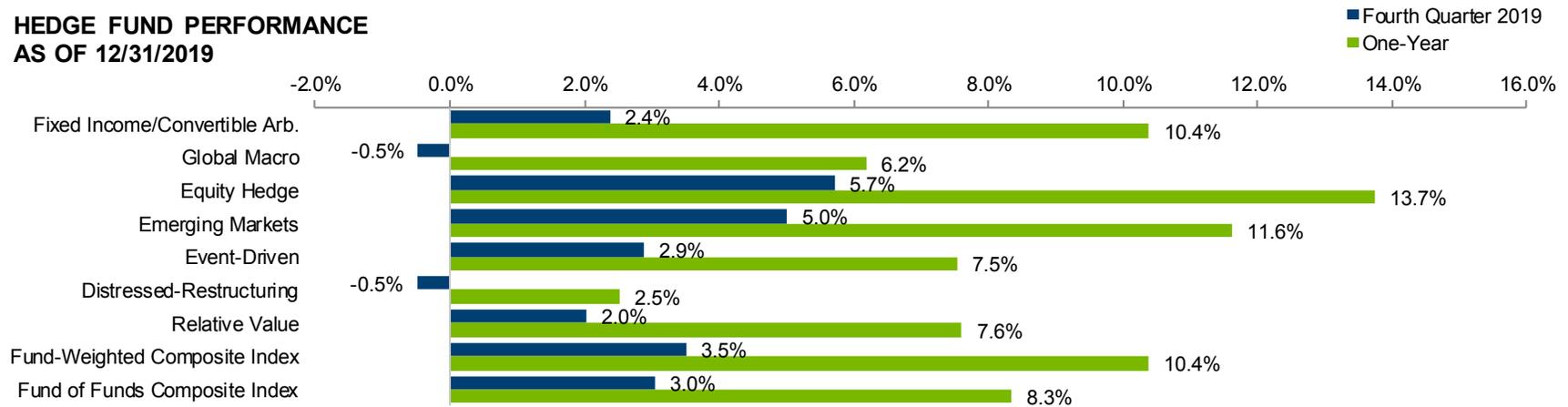
Source: Bloomberg

Note: Softs and Grains are part of the wider Agriculture sector

- Additional supply cuts proposed by OPEC+ as well as a less pessimistic economic outlook helped crude oil prices rebound while the latter also provided firmer footing for commodity prices which saw Bloomberg Commodity Index return 4.4%.
- The price of Brent crude oil rose by 8.6% to \$66/bbl and WTI crude oil spot prices rose by 12.9% to \$61/bbl. Higher crude oil prices helped the Energy sector return 5.8%.
- Industrial Metals was the worst performing sector to post a negative return over the quarter. Remaining headwinds of declines in manufacturing output depressed prices and ultimately led to a return of -0.2%.
- Agriculture (7.1%) was the best performing sector in Q4 2019. Within the Agriculture sector, Softs rose by 13.9% while Grains rose by 3.6%.

## Hedge Fund Markets Overview

### HEDGE FUND PERFORMANCE AS OF 12/31/2019

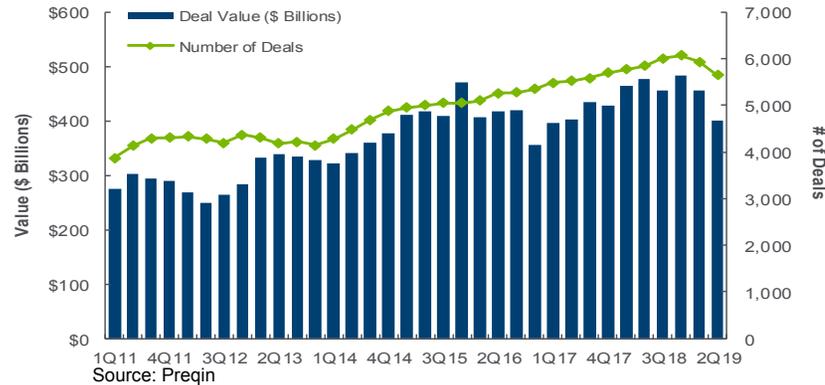


*Note: Latest 5 months of HFR data are estimated by HFR and may change in the future.  
Source: HFR*

- Hedge fund performance was generally positive across all strategies in the fourth quarter. HFRI Fund-Weighted Composite Index and the HFRI Fund of Funds Composite Index produced returns of 3.5% and 3.0% respectively.
- Over the quarter, Equity Hedge and Emerging Markets strategies were the best performers with returns of 5.7% and 5.0% respectively, with these strategies benefiting from long equity positions amidst an equity market rally.
- Conversely, Global Macro and Distressed-Restructuring were the only strategies to generate negative returns of -0.5% each. Trend-following Global Macro strategies experienced a difficult quarter, while their discretionary counterparts performed better.

## Private Equity Market Overview – Q2 2019 Slide 1 of 2

LTM Global Private Equity-Backed Buyout Deal Volume



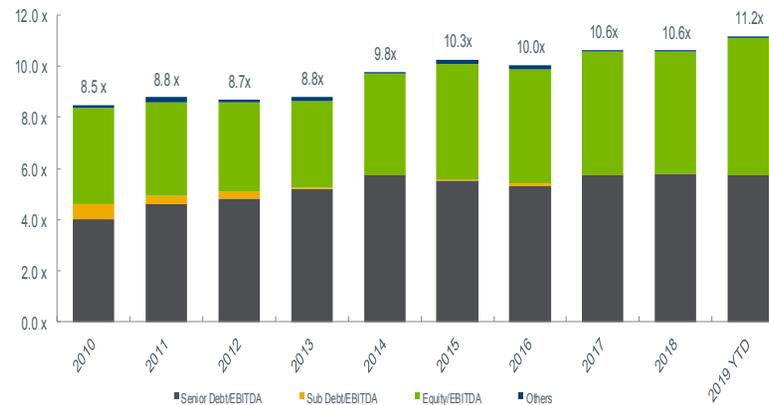
- Fundraising:** In Q2 2019, \$178.1 billion was raised by 366 funds, which was an increase of 25.8% on a capital basis and an increase of 0.3% by number of funds over the prior quarter. Dry powder stood at nearly \$2.0 trillion at the end of the quarter, a modest increase compared to the previous quarter<sup>1</sup>.
- Buyout:** Global private equity-backed buyout deals totaled \$77.7 billion in Q2 2019, which was up 6.8% on a number of deals basis and down 27.0% on a capital basis from Q1 2019<sup>1</sup>. Through the end of Q2 2019, the average purchase price multiple for all U.S. LBOs was 11.2x EBITDA, an increase of 0.6x over year-end 2018 and up from the five-year average (10.2x)<sup>2</sup>. Large cap purchase price multiples stood at 11.0x, up compared to the full-year 2018 level of 10.6x<sup>2</sup>. The weighted average purchase price multiple across all European transaction sizes averaged 11.1x EBITDA for Q2 2019, up from the 10.9x multiple seen at the end of Q1 2019. Purchase prices for transactions of €1.0 billion remained at 11.3x at the end of Q2 2019, a drop from the 11.7x seen at year-end 2018. Transactions between €500.0 million and €1.0 billion were down 0.3x from the end of 2018, and stood at 11.0x at the end of the quarter<sup>2</sup>. Globally, exit value totaled \$104.7 billion from 453 deals during the second quarter, significantly higher than the \$40.8 billion in exits from 460 deals during Q1 2019<sup>1</sup>.
- Venture:** During the second quarter, 1,409 venture-backed transactions totaling \$28.7 billion were completed in the U.S., which was an increase on a capital and deal basis over the prior quarter's total of \$26.1 billion across 1,362 deals. This was 41.4% higher than the five-year quarterly average of \$20.3 billion<sup>3</sup>. Total U.S. venture-backed exit activity totaled approximately \$138.3 billion across 198 completed transactions in Q2 2019, up slightly on a capital basis from the \$50.1 billion across 185 exits in Q1 2019<sup>4</sup>.
- Mezzanine:** Four funds closed on \$1.2 billion during the second quarter. This was an increase from the prior quarter's total of \$1.0 billion raised by three funds, but represented a decrease of 76.7% from the five-year quarterly average of \$5.1 billion. Estimated dry powder was \$51.5 billion at the end of Q2 2019, down from the \$58.8 billion seen at the end of Q1 2019<sup>1</sup>.

Sources: <sup>1</sup> Preqin <sup>2</sup> Standard & Poor's <sup>3</sup> PwC/CB Insights MoneyTree Report <sup>4</sup> PitchBook/NVCA Venture Monitor <sup>5</sup> Fitch Ratings <sup>6</sup> Thomson Reuters <sup>7</sup> UBS

Notes: FY=Fiscal year ended 12/31; YTD=Year to date; LTM=Last 12 months (aka trailing 12 months); PPM=Purchase Price Multiples: Total Purchase Price ÷ EBITDA.

## Private Equity Market Overview – Q2 2019 Slide 2 of 2

### U.S. LBO Purchase Price Multiples – All Transactions Sizes



Source: S&P

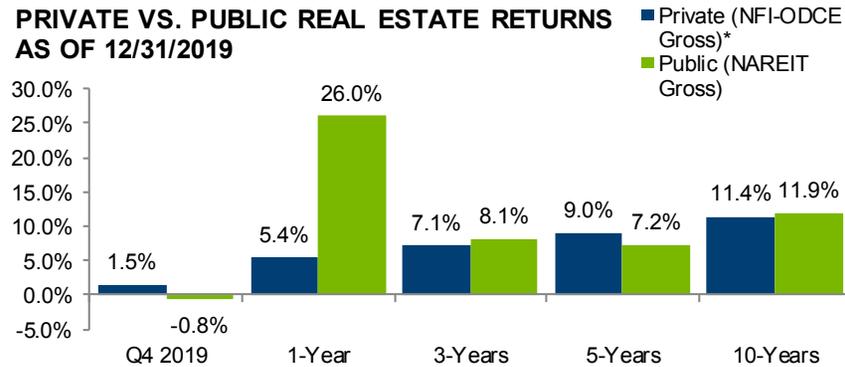
- Distressed Debt:** The LTM U.S. high-yield default rate was 1.9% as of July 2019, which was down from year-end 2018's LTM rate of 2.4%<sup>5</sup>. During the quarter, \$15.3 billion was raised by 15 funds, higher than both the \$5.0 billion raised by 14 funds in Q1 2019 and the five-year quarterly average of \$11.0 billion<sup>1</sup>. Dry powder was estimated at \$119.4 billion at the end of Q2 2019, which was up slightly from the \$118.0 billion seen at the end of Q1 2019. This remained above the five-year annual average level of \$103.3 billion<sup>1</sup>.
- Secondaries:** Four funds raised \$1.5 billion during the quarter, down from the \$2.2 billion raised by nine funds in Q1 2019 and the \$9.0 billion raised by ten funds in Q4 2018<sup>1</sup>. At the end of Q2 2019, there were an estimated 58 secondary and direct secondary funds in market targeting roughly \$74.6 billion<sup>1</sup>. The average discount rate for all private equity sectors finished the quarter at 9.2%, lower than the 9.5% discount at the end of Q1 2019<sup>6</sup>.
- Infrastructure:** \$23.1 billion of capital was raised by 29 funds in Q2 2019 compared to \$18.3 billion of capital raised by 21 partnerships in Q1 2019. At the end of the quarter, dry powder stood at an estimated \$217.0 billion, up significantly from Q1 2019's total of \$175.0 billion. Infrastructure managers completed 582 deals with an estimated aggregate deal value of \$155.0 billion in Q2 2019 compared to 552 deals totaling \$63.0 billion a quarter ago<sup>1</sup>.
- Natural Resources:** During Q2 2019, two funds closed on \$0.4 billion compared to five funds totaling \$1.5 billion in Q1 2019. Energy and utilities industry managers completed approximately 80 deals totaling an estimated \$12.4 billion through Q2 2019, which represents 36.1% of the full year capital deployment in 2018<sup>1</sup>.

Sources: <sup>1</sup> Preqin <sup>2</sup> Standard & Poor's <sup>3</sup> PwC/CB Insights MoneyTree Report <sup>4</sup> PitchBook/NVCA Venture Monitor <sup>5</sup> Fitch Ratings <sup>6</sup> Thomson Reuters <sup>7</sup> UBS  
 Notes: FY=Fiscal year ended 12/31; YTD=Year to date; LTM=Last 12 months (aka trailing 12 months); PPM=Purchase Price Multiples: Total Purchase Price ÷ EBITDA.

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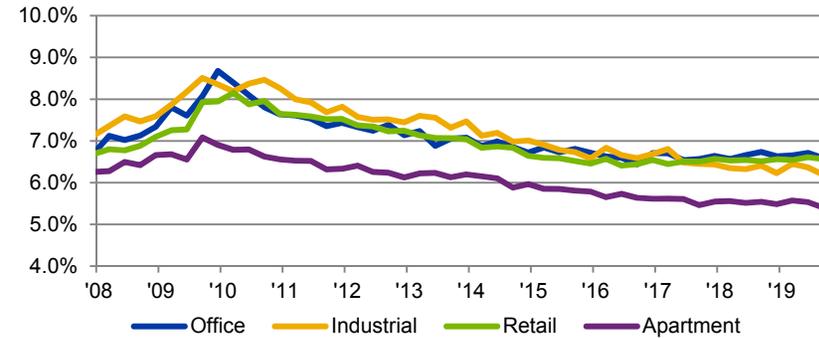
# U.S. Commercial Real Estate Markets

## PRIVATE VS. PUBLIC REAL ESTATE RETURNS AS OF 12/31/2019



\*Fourth quarter returns are preliminary  
Sources: NCREIF, FactSet

## CAPITALIZATION RATES BY SECTOR



Sources: RCA, AON HEWITT 9/30/2019

- U.S. Core Real Estate returned 1.5%\* over the fourth quarter, equating to a 5.4% total gross return year-over-year, including a 4.2% income return. Debt mark to market was a flat for the quarter. The industrial sector was once again the best performing sector, while retail continues perform poorly relative to other major property types. E-commerce continues to be the primary force driving the bifurcation of performance between the industrial and retail sectors. Going forward, income and income growth are expected to be the larger drivers of return, given the current point of the real estate cycle.
- Global property markets, as measured by the FTSE EPRA/NAREIT Developed Real Estate Index, returned 2.0% (USD) in aggregate during the fourth quarter. REIT market performance was driven by Asia Pacific (6.4% USD), North America (-0.9% USD) and Europe (13.8% USD). The U.S. REIT markets (FTSE NAREIT Equity REITs Index) declined -0.8% in the fourth quarter. The U.S. 10-year treasury bond yield increased 25bps to 1.92%.
- According to RCA through November 2019, the U.S. property market has experienced price growth of 8.7% year-over-year across major sectors. The industrial sector pricing appreciated 13.6% year-over-year, leading all sectors. The apartment sector was the second strongest, appreciating 9.3% year-over-year. Transaction volume was down -3% over the same period.
- Return expectations have normalized, with go forward expectations in line with historical norms. During 2019, the market benefited from three rate cuts by the Federal Reserve, and declining interest rates led to a rally across asset classes. According to Prequin, there remains a record amount of dry powder (\$338 billion) in closed-end vehicles seeking real estate exposure, which should continue to lend support to valuations and liquidity in the commercial real estate market.
- Aon prefers investments that offer relatively strong rental income growth, or value-add potential with near-term income generation prospects. It is critical to identify secular driven investment themes in the current environment. Real estate is uniquely positioned in this economic environment, because high quality real estate has the ability to leverage an improving economy, while at the same time high quality income generation offers downside protection.

\*Indicates preliminary NFI-ODCE data gross of fees

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## Fee Schedule

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## Total Equity

As of December 31, 2019

## Fee Schedule

	Fee Schedule	Market Value As of 12/31/2019 \$000	Estimated Annual Fee \$000	Estimated Annual Fee (%)
<b>Total Equity</b>		<b>10,102,339</b>	<b>42,577</b>	<b>0.42</b>
Jacobs Levy 130/30	0.60 % of First \$200 M 0.35 % of Next \$300 M 0.30 % Thereafter	682,002	2,796	0.41
Allianz Structured Alpha U.S. 250		198,135	-	-
Allianz Structured Alpha Global 500		929,321	-	-
Allianz Structured Alpha Global 350		489,935	-	-
Kennedy Capital Management	0.60 % of First \$100 M 0.50 % Thereafter	576,241	2,981	0.52
Stephens	0.75 % of First \$150 M 0.70 % of Next \$50 M 0.65 % Thereafter	431,496	2,980	0.69
Voya Absolute Return	0.60 % of First \$250 M 0.40 % Thereafter	593,407	2,874	0.48
Allianz (Nicholas Applegate)	0.40 % of First \$100 M 0.30 % of Next \$100 M 0.25 % of Next \$100 M 0.20 % Thereafter	643,162	1,636	0.25
Pershing Square International	1.50 % of Assets	95,482	1,432	1.50
Pershing Square Holdings	1.50 % of Assets	136,824	2,052	1.50
Triam Partners	1.50 % of Assets	72,891	1,093	1.50
Triam Co-Investments	0.50 % of Assets	76,926	385	0.50
SSgA Global Index	0.04 % of First \$1000 M 0.03 % Thereafter	967,350	387	0.04
BlackRock MSCI ACWI IMI Fund	0.05 % of First \$250 M 0.04 % Thereafter	347,324	164	0.05
Wellington Global Perspectives	0.80 % of Assets	569,135	4,553	0.80
T. Rowe Price Global Equity	0.43 % of First \$500 M 0.40 % Thereafter	997,676	4,116	0.41
Lazard	0.68 % of First \$300 M 0.65 % Thereafter	604,043	4,016	0.66
D.E. Shaw	0.84 % of First \$100 M 0.80 % of Next \$100 M 0.76 % Thereafter	749,252	5,814	0.78
GMO Global All Country Equity	0.64 % of Assets	452,512	2,896	0.64
Harris Global Equity	0.60 % of First \$100 M 0.50 % of Next \$100 M 0.45 % Thereafter	489,152	2,401	0.49

320 Above fees reflect only the current base management fee and excludes any performance fee arrangement.

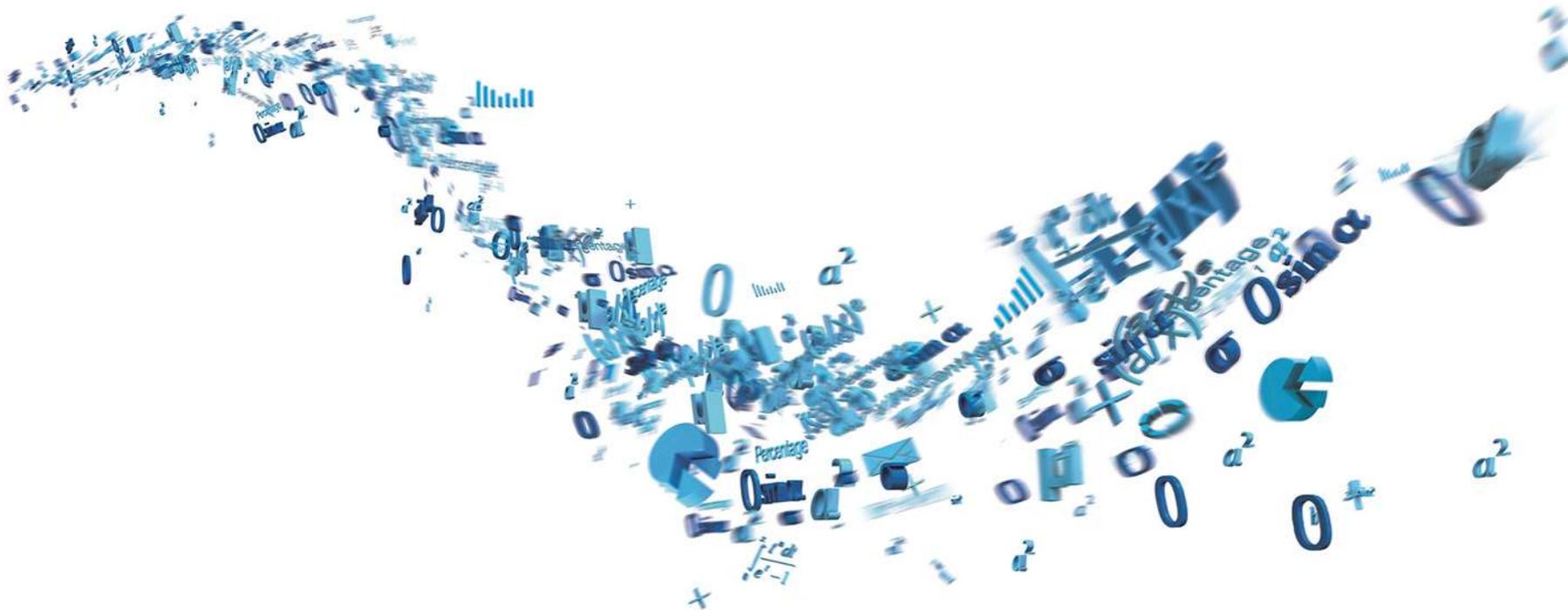
## Total Equity

As of December 31, 2019

## Fee Schedule

	Fee Schedule	Market Value As of 12/31/2019 \$000	Estimated Annual Fee \$000	Estimated Annual Fee (%)
<b>Fixed Income</b>		<b>2,698,633</b>	<b>5,282</b>	<b>0.20</b>
BlackRock	0.20 % of First \$200 M 0.15 % of Next \$200 M 0.10 % of Next \$400 M 0.08 % Thereafter	416,342	716	0.17
Loomis Sayles	0.50 % of First \$20 M 0.40 % of Next \$30 M 0.30 % Thereafter	435,781	1,377	0.32
Putnam	0.40 % of First \$100 M 0.35 % of Next \$150 M 0.30 % of Next \$250 M 0.25 % Thereafter	381,300	1,319	0.35
SSgA Aggregate Bond Index	0.04 % of First \$100 M 0.02 % Thereafter	489,695	113	0.02
Wellington Global Total Return	0.30 % of Assets	343,309	1,030	0.30
Reams Core Plus Bond Fund	0.20 % of Assets	363,174	726	0.20
BRS Recycling Tax Credit		192,000	-	-
BRS Recycling Tax Credit Phase 2		77,032	-	-
<b>Opportunistic/Alternatives</b>		<b>1,012,430</b>	<b>14,264</b>	<b>1.41</b>
Anchorage	2.00 % of Assets	74,469	1,489	2.00
York	1.50 % of Assets	59,056	886	1.50
Capula	2.00 % of Assets	84,551	1,691	2.00
Graham	2.00 % of Assets	62,960	1,259	2.00
Circumference Group Core Value	1.50 % of Assets	28,726	431	1.50
Aeolus Keystone Fund	2.00 % of Assets	286,278	5,726	2.00
Nephila Rubik Holdings	1.50 % of Assets	44,392	666	1.50
Parametric Global Defensive Equity Fund	0.40 % of First \$150 M 0.35 % Thereafter	174,713	686	0.39
Man Alternative Risk Premia	0.85 % of Assets	98,605	838	0.85
CFM ISD Fund 1.5x	0.60 % of Assets	98,680	592	0.60

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## Disclaimers and Notes

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## Arkansas Teacher Retirement System

## Appendix

## Description of Benchmarks

**Total Fund** - The Performance Benchmark for the Total Fund reflects a weighted average of the underlying asset class benchmarks, weighted as follows: Opportunistic/Alternatives and Real Assets at the weight of the previous month's ending market values, Fixed Income at its long-term Policy Target of 15%, and Total Equity at its long-term Policy Target of 55% plus the balance of the unfunded or uncommitted assets of the Opportunistic/Alternatives and Real Assets categories. These targets can be found on page 21 of this report. From October 2007 to July 2013, the Performance Benchmark was the performance of the asset class benchmarks as a weighted average of the previous month's ending market values. The historical components of the benchmark are shown in the table below. Returns prior to September 30, 1996, consist of the actual allocations to the seven different asset classes included in the Arkansas Teacher Retirement System over time. The historical benchmarks used for each asset class are noted below.

Date	DJ Total Stock Market Index	Russell 3000 Index	MSCI ACW ex-U.S. Index	MSCI All Country World Index	BC Universal Bond Index	BC Aggregate Bond Index	Alternative Policy*
03/2004-9/2007	40.0 %	--	17.5 %	--	25.0 %	--	17.5 %
06/2003-02/2004	40.0	--	17.5	--	--	25.0 %	17.5
10/2001-07/2003	--	40.0 %	17.5	--	--	25.0	17.5
08/1998-09/2001	--	40.0	17.0	--	--	28.0	15.0
10/1996-07/1998	--	40.0	20.0	--	--	28.0	12.0

\*Historically, the Alternative Policy was comprised of the weighted averages of the Private Equity, Real Estate, and Alternatives policy benchmarks. Prior to July 31, 2003 the alternative benchmark consisted of 57.0% of the Russell 3000 + a 2% Premium per year, 8.5% of the NCREIF Southeast Timberland Index, 28.5% of the Real Estate Index, 6% of the EnnisKnupp STIF Index.

## Benchmark Descriptions

**Total Equity** - A weighted average of the Dow Jones U.S. Total Stock Market Index and the MSCI All Country World IMI Index based on weights of the underlying investment manager allocations. As of December 1, 2019, the Total Equity Performance Benchmark was comprised of 29.1% DJ U.S. Total Stock Market Index and 70.9% MSCI ACWI IMI.

**Fixed Income** - The Barclays U.S. Universal Bond Index as of March 1, 2004.

**Opportunistic/Alternatives** - A custom benchmark consisting of 25% DJ/CS Event-Driven Index, 25% HFR Macro Index, and 50% South Timberland NCREIF Index until June 30, 2013; 60% HFRI Macro Index and 40% DJ/CS Event-Driven Index until July 31, 2015; 56% HFRI Macro Index, 38% DJ/CS Event-Driven Index, and 6% Russell 2000 Index until March 31, 2016; 45% HFRI Macro Index, 30% DJ/CS Event-Driven Index, 5% Russell 2000 Index, and 20% Citigroup 3 Month T-bill until May 31, 2016; 37% HFRI Macro Index, 25% DJ/CS Event-Driven Index, 5% Russell 2000 Index, and 33% Citigroup 3 Month T-bill until May 31, 2017; 28% HFRI Macro Index, 20% DJ/CS Event-Driven Index, 4% Russell 2000 Index, 25% Citigroup 3 Month T-bill, and 23% Parametric Performance Benchmark thereafter.

**Real Assets** - A custom benchmark consisting of a weighted average of the net asset values at previous month's end of the sub-categories' benchmarks, defined as Real Estate Benchmark, Timber Benchmark, Agriculture Benchmark and Infrastructure Benchmark.

**Real Estate**- NFI-ODCE - NCREIF Fund Index Open-end Diversified Core Equity Index is an index of investment returns reporting on both a historical and current basis the results of 33 open-end commingled funds pursuing a core investment strategy; underlying funds are leveraged with gross and net returns available.

**Timber Property Benchmark** - NCREIF Timberland Property Index (NTPI) weighted according to ATRS' regional exposure based on net asset value.

**Agriculture Benchmark** - NCREIF Farmland Index (NFI) weighted according to ATRS' regional and crop type exposure based on net asset value.

**Infrastructure Benchmark** - Consumer Price Index (CPI) plus 500 basis points annually.

**Private Equity** - The Dow Jones U.S. Total Stock Market Index + a 2% premium per year.

**Cash Equivalents** - The Citigroup 90 day T-bill.

## Benchmark Descriptions

**Allianz (Convertibles) Performance Benchmark** - On January 1, 2005, the benchmark for the portfolio was changed to the Merrill Lynch Convertible Bond (All Quality) Index. Prior to January 1, 2005, the performance benchmark for the Allianz (previously Nicholas Applegate) portfolio was the CSFB Convertible Securities Index. Prior to May 1, 2004, the performance benchmark consisted of 90% CSFB Convertible Securities Index and 10% Salomon High Yield Index.

**BlackRock Performance Benchmark** - The Barclays Universal Bond Index as of March 1, 2004. Previously it was the Barclays Aggregate Bond Index.

**Jacobs Levy Performance Benchmark** - On January 1, 2008, the benchmark for the portfolio was changed to the Russell 3000 Index. Prior to January 1, 2008, the portfolio benchmark was the Russell 1000 Growth Index.

**Loomis Sayles Performance Benchmark** - An Index that splices 65% of the Barclays Government/Credit Index and 35% Barclays High Yield Index.

**Nicholas Applegate Performance Benchmark** - On January 1, 2005, the benchmark for the portfolio was changed to the Merrill Lynch Convertible Bond (All Quality) Index. Prior to January 1, 2005, the performance benchmark for the Nicholas Applegate portfolio was the CSFB Convertible Securities Index. Prior to May 1, 2004, the performance benchmark consisted of 90% CSFB Convertible Securities Index and 10% Salomon High Yield Index.

**Parametric Performance Benchmark** - 50% MSCI All Country World Index and 50% Citigroup 90 day T-Bill Index as of June 1, 2017.

**Wellington Global Performance Benchmark** - As of July 1, 2012 the benchmark was changed to MSCI All Country World Small Cap Index. Prior to July 1, 2012, the benchmark was MSCI All Country World Small/Mid Cap Index.

**Voya Absolute Return Performance Benchmark** - As of December 1, 2015 the benchmark was changed to MSCI All Country World Index. Prior to December 1, 2015, the benchmark was the S&P 500 Stock Index.

**Barclays Aggregate Bond Index** - A market-value weighted index consisting of the Barclays Corporate, Government and Mortgage-Backed Securities Indices. The Index also includes credit card-, auto- and home equity loan-backed securities, and is the broadest available measure of the aggregate U.S. fixed income market.

**Barclays Government/Credit Index** - The Barclays Government/Credit Index measures the investment return of all medium and larger public issues of U.S. Treasury, agency, investment-grade corporate, and investment-grade international dollar-denominated bonds.

**Barclays High Yield Index** - The Barclays High Yield Index covers the universe of fixed rate, non-investment grade debt. Pay-in-kind (PIK) bonds, Eurobonds, and debt issues from countries designated as emerging markets (e.g., Argentina, Brazil, Venezuela, etc.) are excluded, but Canadian and global bonds (SEC registered) of issuers in non-EMG countries are included.

**Barclays U.S. Universal Bond Index** - A market-value weighted index consisting of the components of the Barclays Aggregate Bond Index, plus EuroDollar bonds, emerging markets bonds, 144A fixed income securities, and U.S. corporate high yield securities.

## Benchmark Descriptions

**Barclays Mortgage Index** - A market value-weighted index consisting of the mortgage pass-through securities of Ginnie Mae (GNMA), Fannie Mae (FNMA) and Freddie Mac (FHLMC).

**Citigroup 90 day T-bill Index** - Treasury bill rates of return, as reported by Citigroup (Salomon Smith Barney), for bills with a maximum time remaining to maturity of 90 days.

**Dow Jones U.S. Total Stock Market Index** - A capitalization-weighted stock index representing all U.S. common stocks traded regularly on the organized exchanges. The Index is the broadest measure of the aggregate U.S. stock market.

**FTSE Europe** - A tradable index, designed to represent the performance of the 100 most highly capitalized blue chip companies in Europe.

**Merrill Lynch Convertible Bond (All Quality) Index** - The Merrill Lynch All Convertibles All Qualities Index is a widely used index that measures convertible securities' performance. It measures the performance of U.S. dollar-denominated convertible securities not currently in bankruptcy with a total market value greater than \$50 million at issuance.

**MSCI All Country World ex-U.S. Index** - A capitalization-weighted index consisting of 22 developed and 23 emerging countries, but excluding the U.S. Covers approximately 85% of global equity opportunity set outside of the U.S.

**MSCI All Country World Index** - A capitalization-weighted index of stocks representing 46 stock markets in Europe, Australia, the Far East, the Middle East, Latin America and North America.

**MSCI All Country World IMI Index** - A capitalization-weighted index representing large and small cap stock from 46 stock markets in Europe, Australia, the Far East, the Middle East, Latin America and North America.

**MSCI Europe, Australasia, Far East (EAFE) Non-U.S. Stock Index** - A capitalization-weighted index of stocks representing 21 developed and emerging country markets in Europe, Australia, Asia and the Far East.

**MSCI World Index** - A capitalization-weighted index of stocks representing 22 developed stock markets in Europe, Asia and Canada.

**NFI-ODCE Index**- NCREIF Fund Index Open-end Diversified Core Equity Index is an index of investment returns reporting on both a historical and current basis the results of 33 open-end commingled funds pursuing a core investment strategy; underlying funds are leveraged with gross and net returns available

**DJ/CS Event-Driven Index** - Event driven funds typically invest in various asset classes and seek to profit from potential mispricing of securities related to a specific corporate or market event. Such events can include: mergers, bankruptcies, financial or operational stress, restructurings, asset sales, recapitalizations, spin-offs, litigation, regulatory and legislative changes as well as other types of corporate events. Event driven funds can invest in equities, fixed income instruments (investment grade, high yield, bank debt, convertible debt and distressed), options and various other derivatives. Many event driven fund managers use a combination of strategies and adjust exposures based on the opportunity sets in each subsector.

## Benchmark Descriptions

**LIBOR Index** - London Interbank Offered Rate. A filtered average of the world's most creditworthy banks' interbank deposit rates with maturities between overnight and one full year.

**Russell 3000 Index** - An index that measures the performance of the 3,000 stocks that make up the Russell 1000 and Russell 2000 Indices.

**Russell 1000 Index** - An index that measures the performance of the largest 1,000 stocks contained in the Russell 3000 Index.

**Russell 1000 Value Index** - An index that measures the performance of those Russell 1000 companies with lower price-to-book ratios and lower I/B/E/S growth forecasts.

**Russell 2000 Index** - An index that measures the performance of the smallest 2,000 companies contained in the Russell 3000 Index.

**Russell 2000 Growth Index** - An index that measures the performance of those Russell 2000 companies with greater price-to-book ratios and greater I/B/E/S growth forecasts.

**Russell 2000 Value Index** - An index that measures the performance of those Russell 2000 companies with lower price-to-book ratios and lower I/B/E/S growth forecasts.

**Russell Mid Cap Value Index** - An index that measures the performance of those Russell 1000 companies with lower price-to-book ratios and lower forecasted growth values.

**S&P 500 Stock Index** - A capitalization-weighted stock index consisting of the 500 largest publicly traded U.S. stocks.

**South Timberland Index** - The largest regional subindex of the NCREIF Timberland Index, consisting of timberland properties held in the U.S. South. This includes close to 300 properties with more than 10 million cumulative acres of timberland in the following states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. Calculations are based on quarterly returns at the individual property level. Performance is reported on an all-cash, unlevered basis, gross of investment management fees.

**HFR Macro Index** - Macro: Investment Managers which trade a broad range of strategies in which the investment process is predicated on movements in underlying economic variables and the impact these have on equity, fixed income, hard currency and commodity markets. Managers employ a variety of techniques, both discretionary and systematic analysis, combinations of top down and bottom up theses, quantitative and fundamental approaches and long and short term holding periods. Primary investment thesis is predicated on predicted or future movements in the underlying instruments.

**HFR Distressed/Restructuring Index** - Distressed Restructuring Strategies employ an investment process focused on corporate fixed income instruments, primarily on corporate credit instruments of companies trading at significant discounts to their value at issuance or obliged (par value) at maturity as a result of either formal bankruptcy proceeding or financial market perception of near term proceedings. Distressed Strategies employ primarily debt (greater than 60%) but also may maintain related equity exposure. Hedge Fund Research, Inc. (HFR) utilizes a UCITSIII compliant methodology to construct the HFR Hedge Fund Indices. The methodology is based on defined and predetermined rules and objective criteria to select and rebalance components to maximize representation of the Hedge Fund Universe.

## Arkansas Teacher Retirement System

## Appendix

## Historical U.S. Equity and Global Equity composite returns

<b>As of June 30, 2015</b>	<b>1 Year</b>	<b>3 Years</b>	<b>5 Years</b>	<b>10 Years</b>	<b>Since Inception</b>	<b>Inception Date</b>
U.S. Equity	6.7	18.1	16.4	9.4	10.5	04/01/1986
Dow Jones U.S. Total Stock Market Index	7.2	17.6	17.5	8.3	-	
Global Equity	1.8	14.6	12.1	-	2.5	11/01/2007
MSCI AC World Index (Net)	0.7	13.0	11.9	6.4	2.1	

In June 2015, the ATRS Board approved the combination of the U.S. and Global equity asset classes to a single Total Equity asset class. Total Equity performance reporting began in July 2015. In the table above, we show the historical returns for the U.S. Equity and Global Equity asset classes since inception through June 2015. Performance for the Total Equity asset class prior to July 2015 represents a weighted average of the U.S. Equity and Global Equity historical performance.

## Benchmark Descriptions

**Bloomberg Barclays Corporate High Yield Bond Index** - An index that covers the USD-dominated, non-investment grade, fixed rate, taxable corporate bond market. Debt issues from emerging market countries are excluded. Securities are classified as high-yield if the middle rating is Ba1/BB+ or below.

**Bloomberg Barclays Emerging Markets Index** - An unmanaged index that tracks total returns for external-currency-denominated debt instruments of the emerging markets.

**Bloomberg Barclays Global Aggregate** - Provides a broad-based measure of the global investment-grade fixed income markets. The three major components of this index are the U.S. Aggregate, the Pan-European Aggregate, and the Asian-Pacific Aggregate Indices. The index also includes Eurodollar and Euro-Yen corporate bonds, Canadian government, agency and corporate securities, and USD investment grade 144A securities.

**Bloomberg Barclays Global Treasury Ex-US** - The Barclays Global Treasury ex US Index is a subset of the flagship Global Treasury Index that does not have any exposure to US debt. This multi-currency benchmark includes investment grade, fixed-rate bonds issued by governments in their native currencies.

**Bloomberg Barclays Inflation Index** - Measures the performance of the U.S. Treasury Inflation Protected Securities ("TIPS") market.

**Bloomberg Barclays Universal Index** - A market value-weighted index which is the union of the U.S. Aggregate Index, U.S. High Yield Corporate Index, Eurodollar Index, U.S. Emerging Markets Index and the CMBS High Yield Index. The Index is appropriate for core plus fixed income mandates.

**Bloomberg Barclays U.S. Aggregate Bond Index** - A market value-weighted index consisting of government bonds, SEC-registered corporate bonds and mortgage-related and asset-backed securities with at least one year to maturity and an outstanding par value of \$250 million or greater. This index is a broad measure of the performance of the investment grade U.S. fixed income market.

**Bloomberg Barclays U.S. Government/Credit Index** - A subcomponent of the Barclays Capital Aggregate Index, this benchmark includes treasury securities, government related issues, and high quality corporate bonds with an outstanding par value of \$250 million or greater and at least one year of maturity remaining.

**Bloomberg Barclays U.S. Government Index** - A market value weighted index of U.S. government and government agency securities (other than mortgage securities) with maturities of one year or more.

**Bloomberg Barclays U.S. High Yield Index** - An index composed of non-investment grade corporate debt denominated in U.S. dollars. The issues have to have an outstanding par value of \$150 million or greater and at least one year of maturity remaining.

**Bloomberg Barclays U.S. Intermediate Aggregate Bond Index** - A market value-weighted index consisting of U.S. Treasury securities, corporate bonds and mortgage-related and asset-backed securities with one to ten years to maturity and an outstanding par value of \$250 million or greater.

**Bloomberg Barclays U.S. Intermediate Government Bond Index** - An unmanaged index considered representative of intermediate-term fixed-income obligations issued by the U.S. treasury, government agencies and quasi-federal corporations.

**Bloomberg Barclays U.S. Intermediate Government/Credit Index** - A market-value weighted index consisting of U.S. government bonds and SEC-registered corporate bonds with one to ten years to maturity and an outstanding par value of \$150 million or greater.

**Bloomberg Barclays U.S. Intermediate Treasury** - An unmanaged index considered representative of intermediate-term fixed-income obligations issued by the U.S. treasury.

**Bloomberg Barclays U.S. Long Credit Bond Index** - An unmanaged index considered representative of long-term fixed-income obligations issued by U.S. corporate, specified foreign debentures, and secured notes that meet the specified maturity, liquidity, and quality requirements. To qualify, bonds must be SEC-registered.

## Benchmark Descriptions

**Bloomberg Barclays U.S. Long Gov't/Credit Index** - The Barclays Capital U.S. Government/ Credit Bond Index measures performance of U.S. dollar denominated U.S. treasuries, government-related, and investment grade U.S. corporate securities that have a remaining maturity of greater than or equal to 1 year. In addition, the securities have \$250 million or more of outstanding face value, and must be fixed rate and non-convertible.

**Bloomberg Barclays U.S. Long Government Bond Index** - An unmanaged index considered representative of long-term fixed- income obligations issued by the U.S. treasury, government agencies and quasi-federal corporations.

**Bloomberg Barclays U.S. TIPS** - A market value-weighted index consisting of U.S. Treasury Inflation Protected Securities with one or more years remaining until maturity with total outstanding issue size of \$500m or more.

**Bloomberg Barclays U.S. Treasury 20-30 Year STRIPS Index** - A subcomponent of the Barclays Aggregate Index, this benchmark includes long-term treasury STRIPS.

**Bloomberg Commodity Index** - Consists of 22 exchange-traded futures on physical commodities, which are weighted to account for economic significance and market liquidity. Performance is calculated on an excess return basis and reflects commodity future price movements.

**BofA Merrill Lynch 3 Month Treasury Bill** - An index that measures the average return of the last three-month U.S. Treasury Bill issues.

**BofA Merrill Lynch High Yield Master** - A market capitalization-weighted index that tracks the performance of U.S. dollar- denominated, below investment grade corporate debt publicly issued in the U.S. domestic market.

**Citigroup 90-Day T-Bill Index** - An index that measures the average return of the last three-month U.S. Treasury Bill issues.

**Credit Suisse Leveraged Loan Index** - Designed to mirror the investable universe of the U.S. dollar denominated leveraged loan market.

**CRSP US Large Cap Index** - an index comprised of nearly 640 US large cap companies and includes securities traded on NYSE, NYSEMarket, NASDAQ, or ARCA, representing nearly 85% of the U.S. investable equity market. The index is reconstituted quarterly after the market close on the third Fridays of March, June, September, and December.

**CRSP US Total Market Index** - an index comprised of nearly 4,000 constituents across mega, large, small, and micro capitalizations and includes securities traded on NYSE, NYSE Market, NASDAQ, or ARCA, representing nearly 100% of the U.S. investable equity market. The index is reconstituted quarterly after the market close on the third Fridays of March, June, September, and December.

**DJ U.S. Completion Total Stock Market Index** - A capitalization-weighted index that consists of the stocks in the Dow Jones U.S. Total Stock Market Index less the stocks in the S&P 500 Stock Index.

**DJ U.S. Total Stock Market Index** - A capitalization-weighted stock index representing all domestic common stocks traded regularly on the organized exchanges. The index is the broadest measure of the aggregate domestic stock market and includes approximately 5,000 stocks.

**FTSE 4Good U.S. Select Index** - a socially responsible investment (SRI) index of US stocks that excludes companies with certain business activities such as weapons, tobacco, gambling, alcohol, nuclear power, and adult entertainment.

**FTSE All-World ex-U.S. Index** - A capitalization-weighted stock index representing 46 developed market countries and emerging market countries excluding the U.S.

## Benchmark Descriptions

**FTSE EPRA NAREIT Global ex-U.S. Index** - Designed to represent general trends in eligible real estate equities worldwide. Relevant real estate activities are defined as the ownership, disposal and development of income-producing real estate.

**FTSE Global All Cap ex US Index** - a market-capitalization weighted index representing the performance of roughly 5350 large, mid and small cap companies in 46 Developed and Emerging markets worldwide, excluding the USA.

**FTSE Global Core Infrastructure Index** - Represents the performance of infrastructure and infrastructure-related securities companies in a set of industries that FTSE defines as being involved in infrastructure. The series is based on the FTSE Global Equity Index Series and both developed and emerging markets are included.

**FTSE NAREIT U.S. Equity REITS** - Free float adjusted, market capitalization weighted index of US based equity real estate investment trusts (REITs).

**Goldman Sachs Commodity Index** - A composite index of commodity sector returns which represents a broadly diversified, unleveraged, long-only position in commodity futures.

**HFRI Fund-of-Fund Index** - This index is equity-weighted including 800 constituents. It includes both domestic and offshore accounts and is valued in U.S. dollars. Only fund-of-fund products are included in the index that have at least \$50 million under managements and have been actively trading for at least one year. All funds report net monthly returns.

**HFRI Fund Weighted Composite Index** - The HFRI Fund Weighted Composite Index is a global, equal-weighted index of over 2,000 single-manager funds that report to HFR Database. Constituent funds report monthly net of all fees performance in US Dollar and have a minimum of \$50 Million under management or a twelve (12) month track record of active performance. The HFRI Fund Weighted Composite Index does not include Funds of Hedge Funds.

**Hueler Stable Value Index** - The Hueler Analytics Stable Value Pooled Fund Comparative Universe represents investment strategies of \$96 billion in stable value assets, across 24 pooled funds, invested in contracts universe across a universe of 16 general account issuers and 14 synthetic wrap providers. The allocation of pooled fund assets is dominated by synthetic contracts issued by insurance companies and banks.

**iMoneyNet All Taxable Money Funds Index** - An index made up of the entire universe of money market mutual funds. The index currently represents over 1,300 funds, or approximately 99 percent of all money fund assets.

**iMoneyNet Money Fund Average** - An index made up of the entire universe of money market mutual funds. The index currently represents over 1,300 funds, or approximately 99 percent of all money fund assets.

**J.P. Morgan EMBI Global Diversified** - Comprised of dollar-denominated Brady bonds, traded loans and Eurobonds issued by emerging market sovereign and quasi-sovereign entities. The Diversified version limits the weights of the index countries by only including a specified portion of those countries' eligible current face amounts of debt outstanding, providing for a more even distribution of weights within the countries in the index.

**MSCI All Country World ex-U.S. Index** - A capitalization-weighted index of stocks representing 44 stock markets in Europe, Australia, the Far East, the Middle East, Latin America and North America. Index consists of 23 developed and 21 emerging countries, but excludes the U.S.

**MSCI All Country World ex-U.S. Index IMI** - A capitalization-weighted index of large, mid and small cap stocks representing 22 developed (excluding the United States) and 24 emerging market countries. The index is the broadest measure of the aggregate non-US stock market, covering approximately 99% of the global equity investment opportunity set outside of the United States.

## Benchmark Descriptions

**MSCI All Country World ex-U.S. Small Cap Index** - Covers all investable small cap securities with a market capitalization below that of the companies in the MSCI Standard Indices (excluding U.S.), and target approximately 14% of each market's free-float adjusted market capitalization.

**MSCI All Country World Index** - A capitalization-weighted index of stocks representing 46 stock markets in Europe, Australia, the Far East, the Middle East, Latin America and North America.

**MSCI All Country World Index IMI** - A capitalization-weighted index of large, mid and small cap stocks representing 23 developed and 24 emerging market countries. The index is the broadest measure of the aggregate global stock market, covering approximately 99% of the global equity investment opportunity set.

**MSCI EAFE Growth Index** - A capitalization-weighted index of 21 stock markets in Europe, Australia, Asia and the Far East designed to capture the growth-oriented companies.

**MSCI EAFE Index** - A capitalization-weighted index of stocks representing 22 developed countries in Europe, Australia, Asia, and the Far East.

**MSCI EAFE Small Cap Index** - A capitalization-weighted index of small cap stocks representing 23 developed country markets in Europe, Australia, Asia, and the Far East.

**MSCI EAFE Value Index** - A capitalization-weighted index of 21 stock markets in Europe, Australia, Asia and the Far East designed to capture the value-oriented companies.

**MSCI Emerging Markets Index** - A capitalization-weighted index of stocks representing 22 emerging country markets.

**MSCI Emerging Markets Value Index** - A capitalization-weighted index considered representative of value stocks across 46 stock markets in Europe, Australia, the Far East, the Middle East, Latin America and North America.

**MSCI U.S. Broad Market Index** - A capitalization-weighted stock index that aggregates the MSCI U.S. Large Cap 300, Mid Cap 450, Small Cap 1,750 and Micro Cap Indices. This index represents approximately 99.5% of the capitalization of the U.S. Equity market and includes approximately 3,562 companies.

**MSCI U.S. REIT Index** - A broad index that fairly represents the equity REIT opportunity set with proper investability screens to ensure that the index is investable and replicable. The index represents approximately 85% of the U.S. REIT universe.

**MSCI World Index** - A free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed markets, representing 24 developed market country indices.

**NCREIF Property Index** - A capitalization-weighted index of privately owned investment grade income-producing properties representing approximately \$269 billion in assets.

**NFI ODCE Index** - A capitalization weighted index comprised of open-end, Core funds investing in commercial real estate properties. The funds that constitute the index are subject to certain geographic and property type diversification requirements as well as leverage restrictions. The index reflects the impact of leverage on investment results. The returns shown in this report are net of management fees of the respective funds included in the index.

**Rolling 3-year Constant Maturity Treasury Index** - An index published by the Federal Reserve Board based on the monthly average yield of a range of Treasury securities, all adjusted to the equivalent of a three-year maturity.

**Russell 1000 Growth Index** - An index that measures the performance of those Russell 1000 companies with higher price-to- book ratios and higher I/B/E/S growth forecasts.

**Russell 1000 Index** - A capitalization-weighted index of the 1,000 largest publicly traded U.S. stocks by capitalization.

## Benchmark Descriptions

**Russell 1000 Value Index** - An index that measures the performance of those stocks included in the Russell 1000 Index with lower price-to-book ratios and lower I/B/E/S earnings growth forecasts.

**Russell 2000 Growth Index** - A capitalization-weighted index of those stocks in the Russell 2000 Index with higher price-to-book ratios and higher I/B/E/S earnings growth forecasts.

**Russell 2000 Index** - A capitalization-weighted index of the smallest 2,000 stocks in the Russell 3000 Index. The index excludes the largest- and smallest-capitalization issues in the domestic stock market.

**Russell 2000 Value Index** - An index that measures the performance of those stocks included in the Russell 2000 Index with lower price-to-book ratios and lower I/B/E/S earnings growth forecasts.

**Russell 2500 Growth Index** - A capitalization-weighted index representing those companies within the Russell 2500 Index with higher price-to-book ratios and higher I/B/E/S earnings growth forecasts.

**Russell 2500 Index** - The Index is constructed by first identifying the 3,000 largest-capitalization U.S. stocks and ranking them by market capitalizations, choosing the bottom 2,500 names on the list.

**Russell 2500 Value Index** - An index that measures the performance of those stocks included in the Russell 2500 Index with lower price-to-book ratios and lower I/B/E/S earnings growth forecasts.

**Russell 3000 Growth Index** - A capitalization-weighted index consisting of those Russell 3000 Index stocks that have higher price-to-book ratios and higher I/B/E/S earnings growth forecasts.

**Russell 3000 Index** - A capitalization-weighted index consisting of the 3,000 largest publicly traded U.S. stocks by capitalization. This index is a broad measure of the performance of the aggregate domestic equity market.

**Russell 3000 Value Index** - A capitalization-weighted index consisting of those Russell 3000 Index stocks that have lower price-to-book ratios and lower I/B/E/S earnings growth forecasts.

**Russell Mid Cap Growth Index** - A capitalization-weighted index representing those stocks in the Russell MidCap Index with higher price-to-book ratios and higher I/B/E/S earnings growth forecasts.

**Russell Mid Cap Index** - A capitalization-weighted index of the 800 smallest stocks in the Russell 1000 Index. This index is a broad measure of mid-capitalization stocks.

**Russell Mid Cap Value Index** - A capitalization-weighted index consisting of those Russell MidCap Index stocks that have lower price-to-book ratios and lower I/B/E/S earnings growth forecasts.

**S&P 500 Index** - A capitalization-weighted index representing stocks chosen by Standard & Poor's, Inc. for their size, liquidity, stability and industry group representation. The companies in the S&P 500 Index are generally among the largest in their industries.

## Benchmark Descriptions

**S&P Completion Index** -The S&P Completion Index is a sub-index of the S&P Total Market Index, including all stocks eligible for the S&P TMI and excluding all current constituents of the S&P 500. The index covers approximately 4,000 constituents, offering investors broad exposure to mid, small, and micro cap companies.

**S&P Leverage Loan Index** - A daily total return index that uses LSTA/LPC Mark-to-Market Pricing to calculate market value change.

**S&P MidCap 400 Index** - A market-capitalization-weighted index of stocks in all major industries in the mid-range of the U.S. stock market.

**Wilshire REIT** - A measure of the types of U.S. real estate securities that represent the ownership and operation of commercial or residential real estate. To be included in the index, a company must have a market capitalization of \$200 million and have at least 75% of the total revenue derived from the ownership and operation of the real estate assets.

- Indices cannot be invested in directly. Unmanaged index returns assume reinvestment of any and all distributions and do not reflect our fees or expenses.
- Past performance is no guarantee of future results.
- Please feel free to contact us at [retirement@aonhewitt.com](mailto:retirement@aonhewitt.com) for more index information.

## Thought Leadership Highlights

### White Papers

All Investors: How and Why Might Negative Interest Rates and Bond Yields 'Go Global?'	<a href="#">Link</a>
All Investors: How Picking Investment Managers is Like Picking Charities	<a href="#">Link</a>
All Investors: Global Perspectives on Responsible Investing	<a href="#">Link</a>
All Investors: Bank Capital Relief	<a href="#">Link</a>
All Investors: Why Japanification is Becoming Harder to Avoid	<a href="#">Link</a>
All Investors: Global Invested Capital Markets	
All Investors: 2020 and Beyond: Where Will We Find Those Market Returns from?	
All Investors: The Year that was: The Midas Touch in Action	<a href="#">Link</a>
Retirement Plans: 2020 Compliance Calendar	<a href="#">Link</a>
Retirement Plans: Legal and Compliance Quarterly Update	<a href="#">Link</a>
Retirement Plans: The Real Deal - Impact of Investment on Retirement Income Adequacy	<a href="#">Link</a>
Retirement Plans: Six Key Themes of the SECURE Act and Other Retirement Plan Provisions	<a href="#">Link</a>
All Investors ex-DC: When Opportunity Knocks Again: Ideas for Incorporating Opportunistic Flexibility Into Asset Allocation	<a href="#">Link</a>
All Investors ex-DC: Real Estate Investing in the Current Rate Environment	<a href="#">Link</a>
All Investors ex-DC: Artificial Intelligence and Machine Learning: How the Hedge Fund Industry is Implementing These Technological Advances	<a href="#">Link</a>
Private DB: Global Pension Risk Survey 2019	<a href="#">Link</a>
Private DB: Case Study: Navigating the Pension Plan from Static Allocation to Full Termination	<a href="#">Link</a>
Non-Profit: Understanding Your Non-Profit's Needs and Assessing OCIO Governance	<a href="#">Link</a>
DC: Target Date Fund Litigation	<a href="#">Link</a>

### Current Topics of Interest and Events

Webinar: 2020 Investment Market Outlook	<a href="#">Replay</a>
Webinar: SECURE Act	<a href="#">Replay</a>

### Thought Leadership Hub

<https://retirement-investment-insights.aon.com/>

## Notes

- The rates of return contained in this report are shown on an after-fees basis unless otherwise noted. They are geometric and time-weighted. Returns for periods longer than one year are annualized.
- Universe percentiles are based upon an ordering system in which 1 is the best ranking and 100 is the worst ranking.
- Due to rounding throughout the report, percentage totals displayed may not sum to 100%. Additionally, individual fund totals in dollar terms may not sum to the plan total.

## Disclaimer

### **Past performance is not necessarily indicative of future results.**

Unless otherwise noted, performance returns presented reflect the respective fund's performance as indicated. Returns may be presented on a before-fees basis (gross) or after-fees basis (net). After-fee performance is net of each respective sub-advisors' investment management fees and include the reinvestment of dividends and interest as indicated on the notes page within this report or on the asset allocation and performance summary pages. Actual returns may be reduced by AHIC's investment advisory fees or other trust payable expenses you may incur as a client. AHIC's advisory fees are described in Form ADV Part 2A. Portfolio performance, characteristics and volatility also may differ from the benchmark(s) shown.

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Chicago, IL 60601  
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## Memo

To Arkansas Teacher Retirement System (ATRS) Board of Trustees

From PJ Kelly, CFA, CAIA

Cc Clint Rhoden, Rod Graves, Jerry Myer

Date January 9, 2020

Re York Credit Opportunities Fund Liquidation

## Background

York Capital Management (York) has managed an opportunistic credit fund, York Credit Opportunities Fund (YCO), for ATRS since 2011 with \$64.6 million in assets as of 9/30/19. York has made the decision to liquidate YCO after receiving significant redemption requests, which, given the portfolio's high concentration in illiquid post reorganization equity positions, would have put remaining investors at an unfair disadvantage. The manager suspended year-end redemptions and will begin an orderly unwind of the portfolio.

YCO has significant holdings in the equity of companies that York has taken through a bankruptcy process and the manager will continue to work towards creating liquidity events through sales to strategic or financial buyers. We note that there is a big element of uncertainty associated with late cycle sales processes and there is no clear timeline to exit at the moment for a number of core YCO holdings. The manager anticipates making initial cash distributions at the end of January and at the end of March 2020 for an aggregate of 15-30% of the 12/31/2019 net asset value of the fund. We will provide further updates on cash distributions as more information becomes available.

Effective 1 January 2020, York will reduce the YCO management fee from 1.5% to 0.75% and will eliminate it in full on 1 January 2021. The manager made the decision to reduce the fee on Aon's recommendation.

## Recommendation

Investors in the YCO are offered two options: (i) redeem in full or (ii) roll over their redemption proceeds into another fund managed by York, while preserving their high water mark. We recommend proceeding with the redemption from YCO and using the proceeds for ATRS liquidity purposes.



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## Arkansas Teachers Retirement System Third Quarter 2019 Real Assets Performance Review

PROPRIETARY & CONFIDENTIAL

February 2020

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# Agenda

<b>Section 1</b>	<b>Executive Summary</b>
Section 2	Market Overview
Section 3	Real Assets Portfolio Update
Section 4	Glossary

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## Real Assets Markets Performance and Overview

### MARKET RETURN SUMMARY

As of 9/30/2019	Quarter	1 year	3 years	5 years	10 years
<b>NFI-ODCE (Net)</b>	1.1%	4.6%	6.3%	8.4%	9.8%
<b>NPI</b>	1.4%	6.2%	6.8%	8.6%	9.8%
<b>NCREIF Timberland Index</b>	0.2%	2.1%	3.1%	4.4%	4.0%
<b>NCREIF Farmland Index</b>	1.0%	5.3%	6.1%	7.9%	11.1%

*Note: Please see Glossary for Index Definitions*

- In the third quarter of 2019, the NFI-ODCE (net) returned 1.1%, up 31 basis points quarter-over-quarter. NFI-ODCE returns are struggling, due to the maturity of the real estate cycle. Quarterly returns have begun to shift away from the long-term average with the lack of appreciation being a larger driver of the total return
- The NCREIF Timberland Index (“NTI”) returned 0.2% for the quarter. The NTI’s trailing one-year return was 2.1% and driven primarily by an income return of 2.81% while appreciation returned -0.70%. Regionally, the Lake States were the NTI’s top performer while the Northwest region lagged for the quarter
- The NCREIF Farmland Index returned 1.0%, up 24 basis points from the prior quarter. Permanent and row crops notched similar performance at approximately 1.06% and 0.91% respectively. For the trailing one-year, permanent crops returned 6.73% compared to row crops’ 4.45%

## Portfolio Funding Status and Composition

As of September 30, 2019	ATRS' Portfolio \$ in Millions
Number of Investments	63
Total Commitments	\$3,480.5
Unfunded Commitments	\$509.5
Total Paid-In Capital	\$3,260.8
Total Distributions	\$2,647.5
Net Asset Value	\$2,204.3
Gross Asset Value	\$2,770.5
DPI*	0.8x
TVPI*	1.5x
Since Inception IRR*	7.3%
<i>*Active and Liquidated</i>	

PORTFOLIO COMPOSITION TO TARGETS (As of 9/30/2019)		
	Target	Actual Funded
<b>Target Real Asset Allocation</b>	15%	12.6%
<b><u>Portfolio Style Composition</u></b>		
<b>Real Estate</b>	10%	8.0%
<b>Core*</b>	50%-70%	73.2%
<b>Non-Core</b>	30%-50%	26.8%
<i>Value-Added**</i>	N/A	14.7%
<i>Opportunistic**</i>	N/A	12.1%
<b>Agriculture</b>	1%	1.1%
<b>Timber</b>	2%	1.6%
<b>Infrastructure</b>	2%	1.8%
<b>Leverage</b>	50%	21.3%

\* Includes Arkansas Investments

\*\* No stated targets

- As of the third quarter of 2019, the real assets portfolio stands at 12.6% of ATRS' total assets
- Recent infrastructure and real estate commitments will help the portfolio continue to move towards its target allocation irrespective of the liquidating investments
- In general, the portfolio is in compliance with its Statement of Investment Policy leverage, geographic region, and property type diversification; there is a slight overweight to core real estate, but a significant amount of noncore commitments have yet to be drawn

## ATRS' Real Assets Performance

### ATRS TOTAL REAL ASSETS RETURN SUMMARY

As of 9/30/2019	Quarter	1 Year Ending	3 Year Ending	5 Year Ending	10 Year Ending
<b>Total Real Assets Portfolio</b>	1.1%	5.3%	7.3%	8.1%	8.2%
<b>Real Assets Benchmark*</b>	1.1%	4.6%	5.7%	7.4%	8.0%

- The table shows the returns for ATRS' Total Real Assets Portfolio and the Real Assets Benchmark. ATRS performed in line with the real assets benchmark for the third quarter and has outperformed over longer term periods

## ATRS' Real Estate Performance

### ATRS TOTAL REAL ESTATE RETURN SUMMARY

As of 9/30/2019	Quarter	1 Year Ending	3 Year Ending	5 Year Ending	10 Year Ending
<b>Total Real Estate</b>	0.7%	3.8%	7.1%	8.8%	9.5%
<b>NFI-ODCE (Net)</b>	1.1%	4.6%	6.3%	8.4%	9.8%

- The table shows the time-weighted, net of fee returns for ATRS' Total Real Estate Portfolio and the NFI-ODCE benchmark. ATRS underperformed the benchmark for the quarter and 1 year periods by 40 basis points and 80 basis points respectively.
- There are a number of Non-Core Funds that have entered the J-curve and performance is expected to have a more meaningful impact as newer funds move out of the J-Curve and investments are realized
- For the quarter, PRISA was the primary driver of the real estate return with a 1.4% total return, while the Arkansas Investments has dragged with a -1.2% total return

## ATRS' Timberland and Agriculture Performance

As of 9/30/2019	Quarter	1 Year Ending	3 Year Ending	5 Year Ending	10 Year Ending
<b>Total Timberland</b>	2.6%	8.5%	5.0%	4.8%	3.6%
<b>Timberland Property Benchmark*</b>	0.9%	2.1%	2.2%	3.8%	2.6%
<b>Total Agriculture</b>	0.9%	3.5%	3.8%	4.7%	N/A
<b>Agriculture Benchmark*</b>	1.0%	4.5%	4.2%	4.7%	N/A
<b>CPI + 500 BPS</b>	1.5%	6.8%	7.2%	6.6%	6.8%

- The timber portfolio outperformed the benchmark over the quarter, returning 2.6%
- The agriculture portfolio underperformed the benchmark over the quarter, returning a 0.9%. The portfolio underperforms over the trailing one and three-year time periods
- Both the Timber Property and Agriculture benchmarks are reported gross of fees. If ATRS managers were to account for fees, the portfolio would look better in comparison

# ATRS' Infrastructure Performance

As of 9/30/2019

Asset Class	Total Commitment (\$)	Unfunded Commitment (\$)	Total Paid-In (\$)	Total Distributions (\$)	Net Asset Value (\$)	Total Value (\$)	DPI	TVPI	Net IRR
<b>Total Infrastructure</b>	345,413,930	54,270,268	301,396,942	71,876,759	310,419,091	382,295,850	0.24x	1.27x	12.78%

- ATRS' Infrastructure portfolio has been slowly moving out of the J-Curve and performance has been showing solid results to date
- First Reserve Energy Infrastructure Fund II is currently driving portfolio performance; the fund is achieving a 31.2% Net IRR

## ATRS' Real Assets Portfolio Highlights

- Commitment activity update
  - ATRS made commitments to the following
    - Axiom Infrastructure North America Fund IV: \$50 million
    - BTG Pactual Open End Core U.S. Timberland Fund: \$184 million
      - ♦ Separate Account timber assets were transferred to BTG for shares of the Open End Fund. No additional capital was allocated to the timberland sector
  - ATRS is currently in the queue for a partial redemption of UBS TPF

## Significant Events

- Rockwood: Dwight Arnesen, the East Coast acquisitions team leader, is planning to retire from his role in 2020, but will stay on as a consultant. Robert Gray, the West Coast acquisitions team leader, will take over and head all acquisitions activity.
- Subsequent to quarter end, Almanac entered into an agreement to sell the firm to Neuberger Berman. Townsend has reviewed the transaction, and is comfortable with the acquisition.
- Subsequent to quarter end, Goldman Sachs (through Petershill) acquired a minority stake in Kayne Anderson's real estate platform. This follows another similar transaction involving Goldman Sachs and Westbrook, which the Townsend Group reviewed and became comfortable with.

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# United States Real Estate Market Update (3Q19)

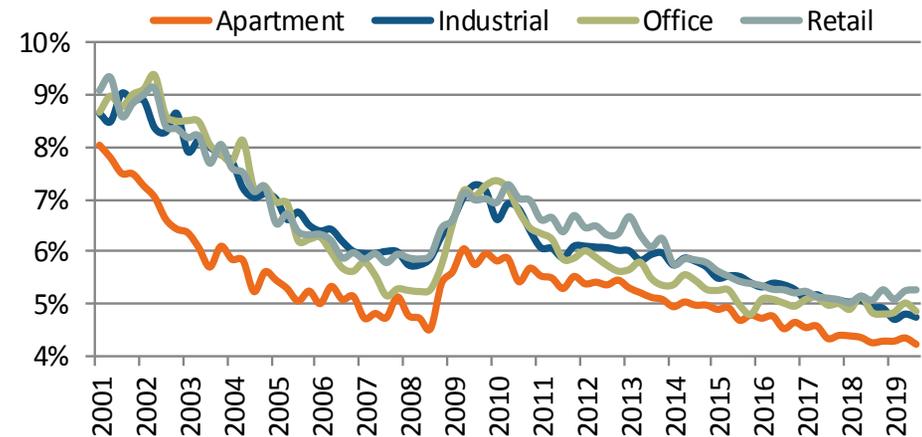
## General

- The S&P 500 produced a gross total return of 1.7% during the quarter. The MSCI US REIT index produced a return of 7.7%. Consumer Sentiment declined to 93.2, but rebounded subsequent to quarter-end.
- Macro indicators for U.S. real estate continue to be positive; GDP grew at an annualized rate of 2.1% in the third quarter and headline CPI rose by 1.7% YoY, below the Fed's 2% target. As of quarter-end, the economy has now experienced 108 consecutive months of job growth. The Federal Reserve has cut rates three times this year, including one cut following quarter end, and the current effective rate is 1.55%.

## Commercial Real Estate

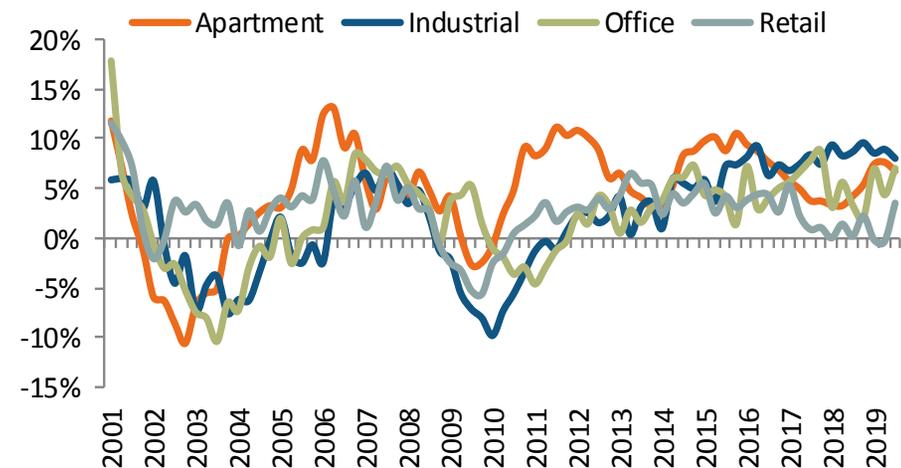
- Private real estate market carrying values remained flat over the quarter. Transaction cap rates (5.4%) expanded 4 bps during the quarter, while current valuation cap rates compressed across property sectors, apartments (-12 bps), industrial (-6 bps), office (-16 bps). Retail cap rates were flat during the quarter.
- NOI growth picked up across property sectors during the quarter, with the industrial sector continuing to outpace the other traditional property types. While the industrial sector has faced increasing supply, it continues to benefit from outsized demand tailwinds (e-commerce and economic growth). Retail NOI growth rebounded to a positive 3.5% year over year.
- In the third quarter of 2019, \$46 bn of aggregate capital was raised by real estate funds. Through the third quarter of 2019, private equity real estate funds raised \$131 bn which is an increase of 16% YoY. However, transaction volume declined during the 3<sup>rd</sup> quarter by -4% year over year to \$154 bn.
- 10-year treasury bond yields dropped 34 bps to 1.7% during the quarter, and, subsequent to quarter-end, have rebounded to 1.8%. The U.S. yield curve is no longer inverted.

Current Value Cap Rates by Property Type



Source: NCREIF

4 Qtr Rolling NOI Growth



Source: NCREIF

# United States Property Matrix (3Q19)



## INDUSTRIAL

- In 3Q19, industrial properties were the highest returning sector at 3.2% and outperformed the NPI by 175 bps.
- Transaction volumes reached \$41.3 billion in the third quarter of the year, a 66.0% year-over-year increase. Individual asset sales were up 20.6% year-over-year, while portfolio purchases turned in a year-over-year volume increase of 597.2%. Portfolio transaction volume was driven by multiple megadeals occurring in the sector, as well as a significant year-over-year decrease in entity-level transactions. This large portfolio transaction volume increase is expected to be an outlier and should regress to the mean positive growth rate.
- The industrial sector continued to experience steady NOI growth of 8.0% over the past year, decreasing from the prior periods TTM growth of 8.9% in 2Q19. Market rent growth is expected to decelerate compared to the recent phenomenal pace, but still remains strong.
- Vacancy increased by 24 bps to 3.4%, still remaining close to all-time historic lows. E-commerce continues to drive demand.
- Industrial cap rates compressed approximately 19 bps from a year ago, to 4.74%. Industrial fundamentals still top all property sectors.

## MULTIFAMILY

- The apartment sector delivered a 1.2% return during the quarter, underperforming the NPI by 23 bps.
- Transaction volume in the third quarter of 2019 reached \$46.8 billion, an increase of 5.6% year-over-year. This volume continues to make multifamily the most actively traded sector for the ninth straight quarter.
- Cap rates decreased to 4.2%, compressing 3 bps year-over-year. Robust job growth and improving wages have supported healthy operating fundamentals.
- Steady demand for the sector continues to keep occupancy above 94.2%, changes in vacancy remain flat from a year ago. The aging millennials have begun shifting their desires to suburban living but continued home price appreciation has deterred the full effect of this migratory trend.

## OFFICE

- The office sector returned 1.5% in 3Q19, 4 bps above the NPI return over the period.
- Transaction volumes decreased by 7.5% year-over-year in Q3. Annual sales volumes equaled \$32.3 billion for the quarter. Single asset transactions accounted for 83% of volume.
- Occupancy growth within the office sector has improved, increasing 1.1% year-over-year. Office continues to be the highest vacancy property type at close to 9.6%.
- NOI growth of 7.0% in the last year is a positive as the sector continues to benefit from positive job growth. Sun Belt and tech-oriented West Coast office fundamentals are healthiest.
- Office cap rates remained relatively flat from a year ago at approximately 4.8% in the third quarter. Office-using job growth is positive, though decelerating as expected.

## RETAIL

- As of 3Q19, the retail sector delivered a quarterly return of 0.2%, performing 119 bps below the NPI.
- Transaction volumes totaled \$15.0 billion in the third quarter, down 52.6% year-over-year.
- Cap rates have expanded approximately 20 bps within the sector over the last year. Strong fundamental headwinds continue to affect the retail landscape.
- NOI growth has turned a positive for the first time this year. NOI has increased 349 bps over the past year. Retail is expected to continue to suffer from the shift towards e-commerce.
- Retail vacancy rates increased 21 bps over the past year to 7.1%. Many big box stores have closed as the need for retail space shrinks, translating to a negative outlook for rent growth.

# Global Real Estate Market Update (3Q19)

- Global investment activity during the third quarter of 2019 was depressed relative to the same period in 2018. Year to date, the New York, San Francisco and Los Angeles metro markets have witnessed the greatest transaction volume.
- Broad geopolitical risk factors, such as Brexit and the Trade War, have negatively influenced sentiment. Fears of recession in the U.S. and an impending global slowdown also served to depress sentiment, in turn weighing on transaction volumes. Further monetary expansion has partially offset this trend, cushioning real estate yield spreads relative to sovereigns and supporting positive capital flows into the sector. Within the Eurozone, quantitative easing will provide stimulus to a flagging economy.

- Investment volumes in the Americas decreased during the third quarter year-over-year, including the U.S., Canada, and Mexico all showing declines, with Brazil increasing volume.
- Asia Pacific countries broadly declined, with Hong Kong volume decreasing significantly as a product of continued protests and political uncertainty within the metro. Australia was the sole country to post YoY transaction volume growth, although by a lackluster 1%.
- In EMEA, Brexit continued to press UK investment volumes lower, a 32% decline from third quarter 2018. Other EMEA markets saw similar declines – with France as a notable outlier – as trade tensions weigh on export reliant countries such as Germany.
- In the office sector, global leasing activity was healthy, leasing volumes decreased 3% YoY. The U.S office market was relatively strong, although leasing reached the lowest level since first quarter 2017. Europe experienced an uptick in demand, and office up-take increased 7% over the previous year. Central and Eastern Europe drove the trend, and experienced a 30% increase in activity.
- The retail sector continued to face headwinds globally as e-commerce disrupts traditional consumer spending habits. Within the U.S., net absorption dropped sharply, down 60% YoY. Surprisingly, mall vacancy held firm and rents rose moderately. Across Europe, rents moved downward, while APAC markets retail markets have remained largely neutral.
- The multifamily market in the U.S. has continued to see strong growth, with vacancy rates decreasing to a cycle low. Development continues, possibly presenting future supply headwinds. Rent control and other regulations hampered European markets, but investment volume remains positive. APAC markets were mixed, a result of macroeconomic uncertainty.
- Industrial properties continued their ascent, with robust uptake globally driven by logistics and omnichannel distribution demand. New supply has been increasing rapidly, and there are signs of slowing demand in Asia and Europe.

## Global Total Commercial Real Estate Volume - 2018 - 2019

\$ US Billions	Q3 2019	Q3 2018	% Change		YTD 2018	H1 2018	% Change YTD 19 - YTD 18
			Q3 19 – Q3 18				
Americas	136	146	-7%		355	366	-3%
EMEA	71	77	-9%		207	235	-12%
Asia Pacific	166	209	-21%		609	635	-4%
<b>Total</b>	<b>372</b>	<b>433</b>	<b>-14%</b>		<b>1172</b>	<b>1236</b>	<b>-5%</b>

Source: Real Capital Analytics, Inc., Q3' 19

	2019	2020	2021
<b>Global</b>	<b>3.1</b>	<b>3.1</b>	<b>3.2</b>
<b>Asia Pacific</b>	<b>4.4</b>	<b>4.3</b>	<b>4.4</b>
Australia	1.8	2.4	2.5
China	6.1	5.9	5.7
India	6.0	5.6	6.4
Japan	0.9	0.3	0.8
<b>North America</b>	<b>2.1</b>	<b>1.7</b>	<b>1.9</b>
US	2.3	1.8	1.9
<b>EMEA</b>	<b>2.1</b>	<b>2.4</b>	<b>2.6</b>
<b>European Union</b>	<b>1.4</b>	<b>1.3</b>	<b>1.5</b>
France	1.3	1.2	1.3
Germany	0.5	0.7	1.2
UK	1.2	1.1	1.5

Source: Bloomberg (December 2, 2019)

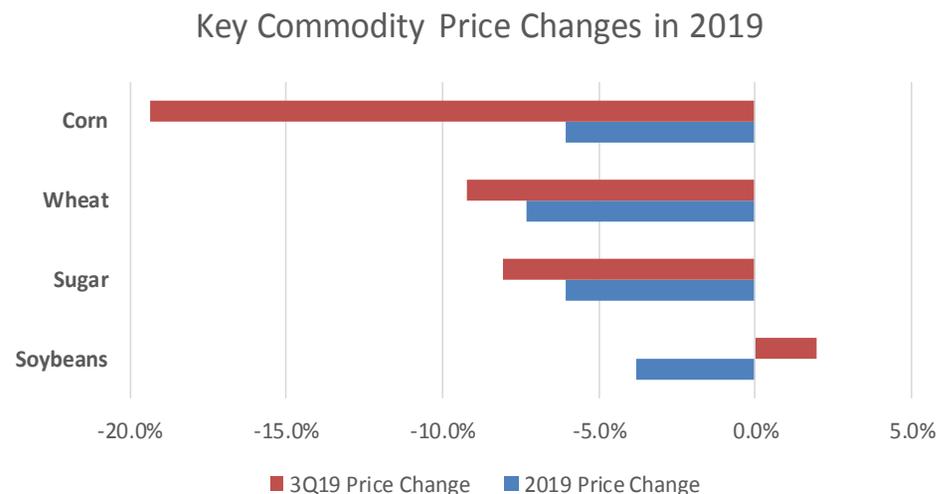
Note: 2021 projections are not yet available for certain regions

# Farmland - Third Quarter 2019 Market Update

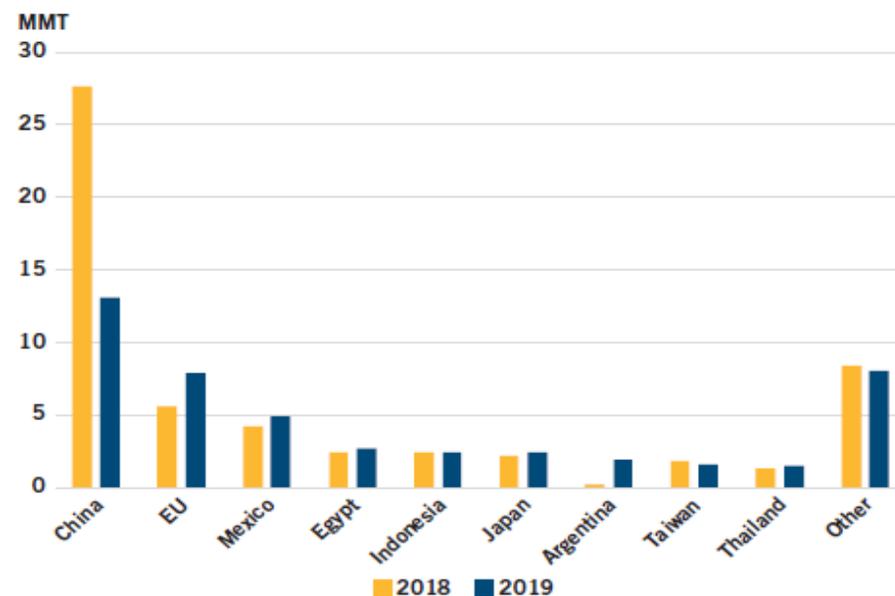
## FARMLAND MARKETS

- Agricultural markets remained in flux during the quarter as continued uncertainty over trade policy, mixed weather, and the ongoing impacts caused by the African Swine Fever (“ASF”) have led to increased volatility across the industry.
- Global commodity prices generally declined during the quarter as a multitude of factors continue to impact prices including multi-year-high stock levels, favorable weather conditions, ongoing trade tensions, low energy costs, and weakening demand overall.
- The World Bank’s Agricultural Price Index declined nearly 2% in the quarter and is about 3% lower than last year. **(FIGURE 1)**
- US-China trade negotiations remained unresolved as US producers continue to deal with unfavorable tariffs, while the ASF continued to impact global markets with a declining Chinese hog herd severely curtailing soybean imports. However, soybean prices rallied at the end of the quarter based on hopes of a resolution to the US-China trade dispute, as a “phase 1” agreement could be entered into by year-end.
- US soybean farmers held record soybean supplies as exports continued to lag, particularly to China, which have had limited relief despite much improved exports to other market like the EU. **(FIGURE 2)**

**FIGURE 1: Key Commodity Prices 3Q19**



**FIGURE 2: US Soybean Exports for Sep 1 – Aug 31 Marketing Year**

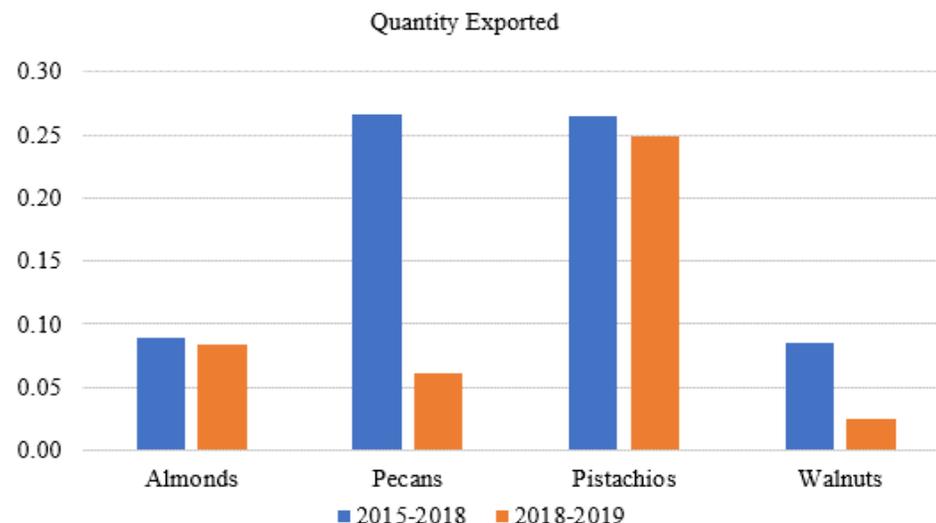


# Farmland - Third Quarter 2019 Market Update

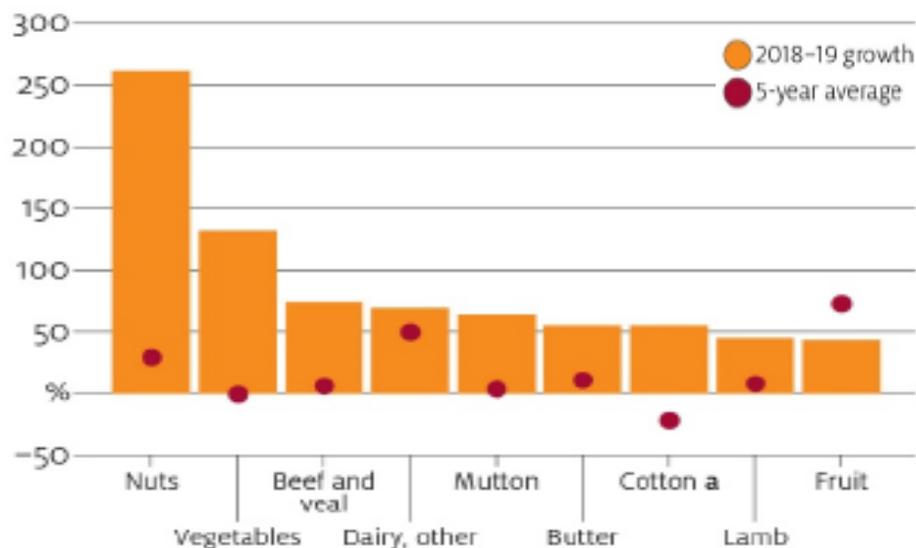
## FARMLAND MARKETS

- Pistachio prices have been supported by strong global demand and a small 18' Iranian crop, offsetting the impacts of US-China trade issues; exports were up 19% YTD. Almond prices were stable with strong global demand and low inventory levels. Total shipments for 2018-19 remained stable despite trade headwinds, while production is estimated to decline 3.5% helping maintain price support.
- All tree nuts, however, have been impacted by the US-China as indicated by lower US shipments to China in 2019-20', with Pecans and Walnuts taking a disproportionate share of the impact. (FIGURE 3)
- Australian commodity prices were mixed but primarily higher and driven by strong export prices and lower drought-driven stocks. The US-China trade dispute is providing opportunities for some producers to grow market share in China; in 18'/19' the value of Australia's agricultural exports to China increased by 11%, and the value of shelled and unshelled almond exports to China increased by 107%. (FIGURE 4)
- Brazilian oilseed exports are down 12% as China is buying less due to the adverse impact of the (ASF) on the Chinese hog herd and resulting lower demand for feed; however, farmland values remain strong as investors are reporting challenging market conditions for acquisitions and elevated price expectations as Brazil's economy continues to improve.

**FIGURE 3: US Tree Nut Exports to China as Share of Total Production**



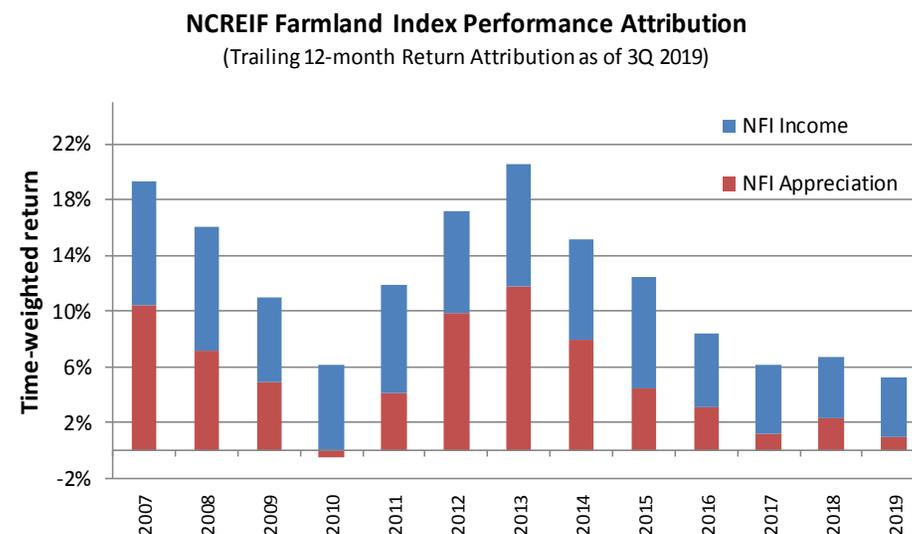
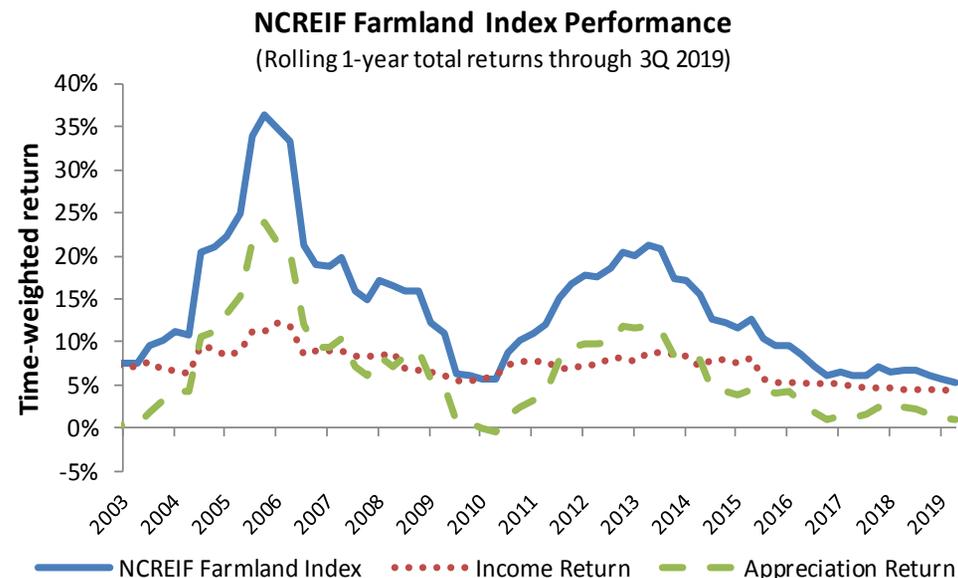
**FIGURE 4: Growth in Australian Exports to China, 2018-19'**



# Farmland - Third Quarter 2019 Market Update

## FARMLAND PERFORMANCE

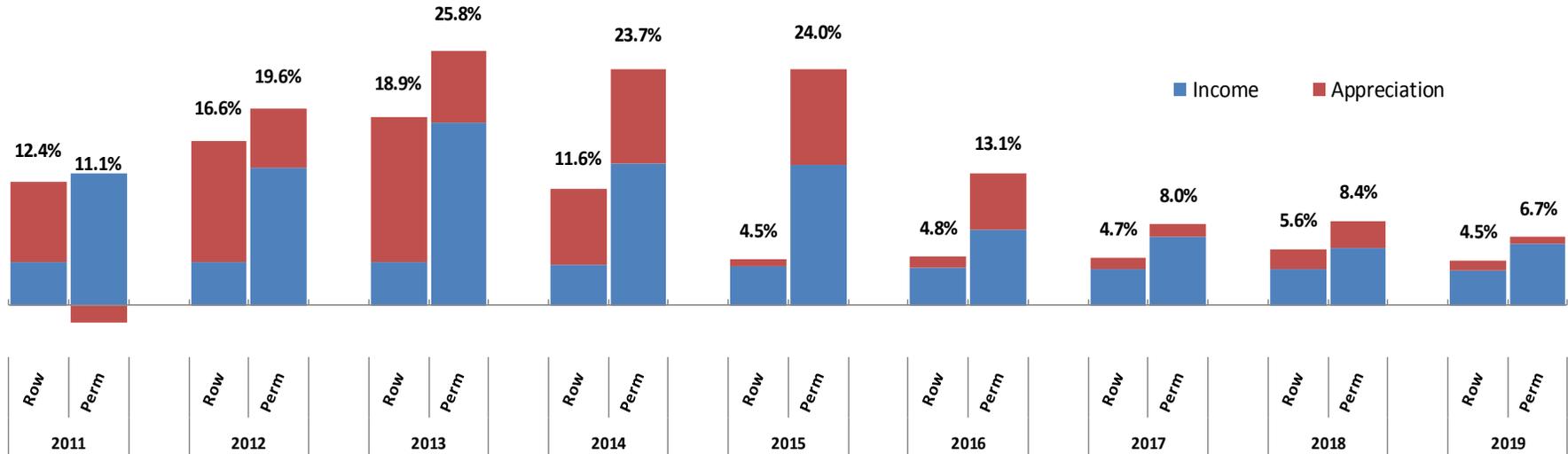
- The NCREIF Farmland Index (“NFI”) returned 0.97% for the quarter and entirely driven by its 0.98% income return as appreciation was effectively flat at -0.01%. The quarterly return improved 24 basis points from the prior quarter (0.73%) but was down 32 bps from 3Q18’s 1.29% return.
- Permanent crops outperformed slightly with a total return of 1.1% versus 0.9% for row crop. Permanent crops negative appreciation of -0.29% drove the NFI’s slight decline in values in 3Q19.
- The trailing twelve-month period (“TTM”) total return was 5.3% in 3Q19, down from 6.8% for the same TTM period ending 3Q18. The TTM total return was comprised of 4.4% income and 0.9% appreciation.
- Permanent crops outperformed over the TTM period with a 6.7% total return over row crops 4.5% total return.
- The total annual return delta for the two farm types have remained relatively consistent since inception, with annualized returns for permanent crops of 11.9% and 10.1% for row crops.
- On a regional basis, eight of the NFI’s 10 regions were positive performers with the Mountain (+1.6%) and Pacific West (+1.4%) leading, while the Pacific Northwest (-2.5%) was the lowest performing region.



# Farmland - Third Quarter 2019 Market Update

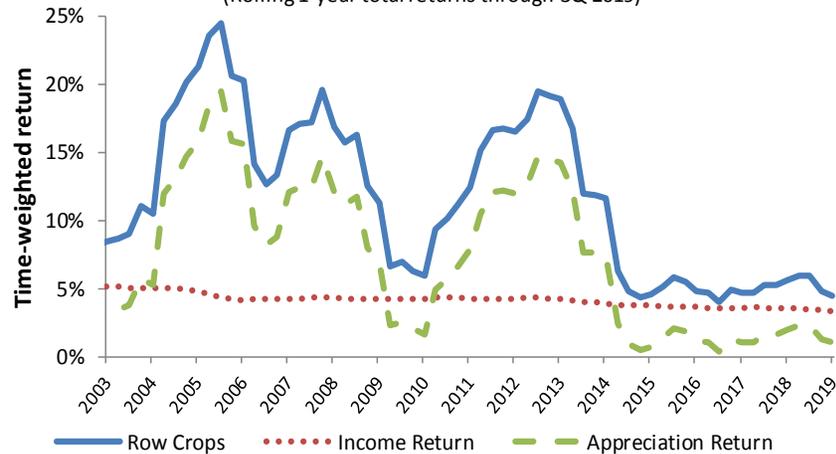
## FARMLAND PERFORMANCE

**NCREIF Farm Type Performance Attribution**  
(Trailing Twelve Month time-weighted returns as of 3Q 2019)



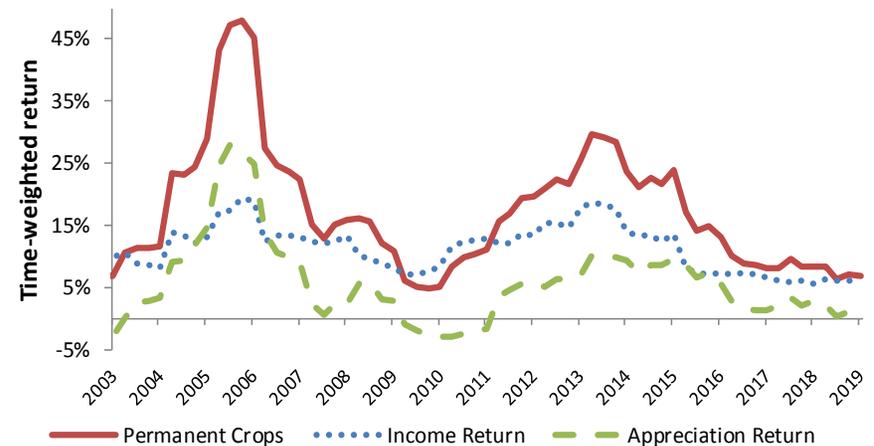
**NCREIF Row Crop Performance**

(Rolling 1-year total returns through 3Q 2019)



**NCREIF Permanent Crop Performance**

(Rolling 1-year total returns through 3Q 2019)



# Infrastructure

## General

- Nineteen funds reached a final close in Q3 2019, securing US\$8.4bn in aggregate capital. For the 12 months ending Q3 2019, this represents a 13% drop in the number of funds holding a final close with the aggregate capital raised decreasing by US\$27.0bn.
- Deal value for the quarter was down 49% in comparison to last quarter (est. aggregate value of US\$354.3bn) for a 2% decrease in the number of deals. Average deal size decreased by 48% quarter-on-quarter.

## Europe

- Notable secondary trades that closed in the quarter included the US\$2.1bn sale of a c.50.1% stake in Innogy Grid Holding, the US\$1.9bn sale of EQT's Swedish fibre optics and data centers business IP Only, and the US\$1.8bn sale of a 50.0% stake in Electricity North West Limited, a UK electricity distribution network. Renewable energy deal flow in Europe was dominated by two large offshore wind projects. The largest of the two was the financial close of Saint Nazaire (US\$2.7bn), a 480MW offshore wind farm in France, which will aim to start generating power in 2022.

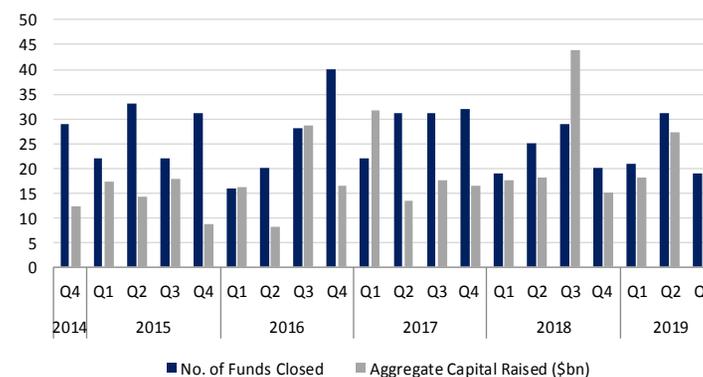
## North America

- Deal flow was dominated by a number of transactions, notably the US\$7.3bn development of a natural gas export terminal, Venture Global Calcasieu Pass in Louisiana. Other transactions included the sale of El Paso Electric, a regulated electric utility in Texas for US\$4.3bn and the sale of a 10.0% stake in the Highway 407 toll road concession for US\$2.4bn. In the renewables space, AltaGas sold a 290MW portfolio of contracted renewable energy assets for US\$0.7bn.

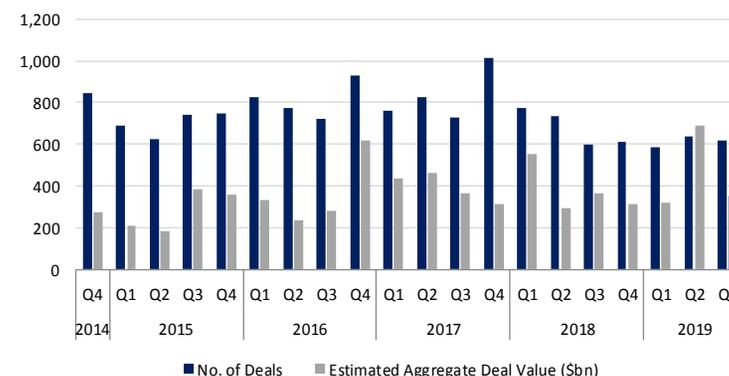
## Asia Pacific

- Deal flow was dominated a number of secondary transactions including the financial close for a 1,320MW (US\$2.6bn) coal-fired power plant in Vietnam. The sale of a 99.8% stake in Vodafone's New Zealand unit to Infratil and Brookfield for US\$2.2bn completed over the quarter, the business includes three mobile network operators with over 10,000km of cabling connections. Another notable transaction was the expansion of Bangalore International Airport to build a second terminal for US\$1.9bn, this is the first greenfield airport in India to be built through a PPA, the concession agreement with the Government of India is for 19 years. In the renewables space, the development of a 240MW wind farm in New South Wales in Australia closed. This project will comprise of 46 wind turbines and aims to commence operation in June 2021.

Unlisted Infrastructure Fundraising



Infrastructure Deals Completed



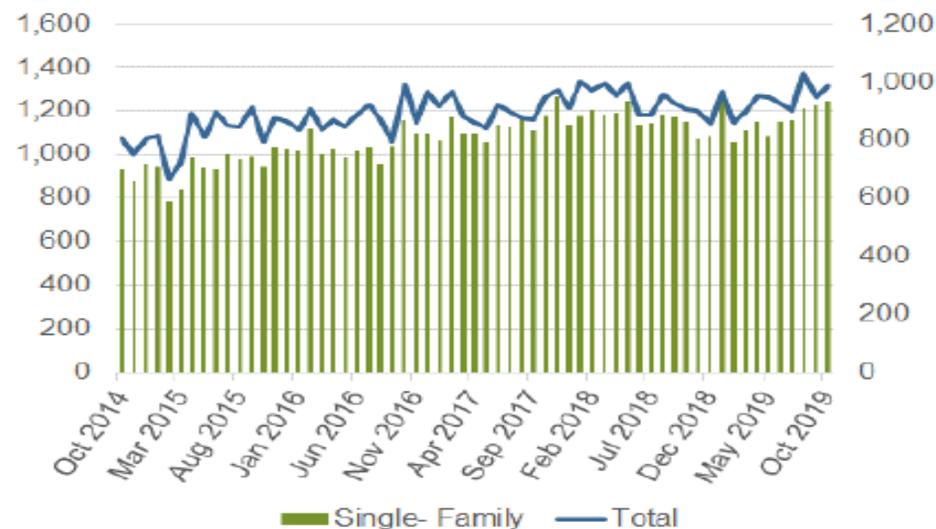
Source: Preqin

# Timberland – Third Quarter 2019 Market Update

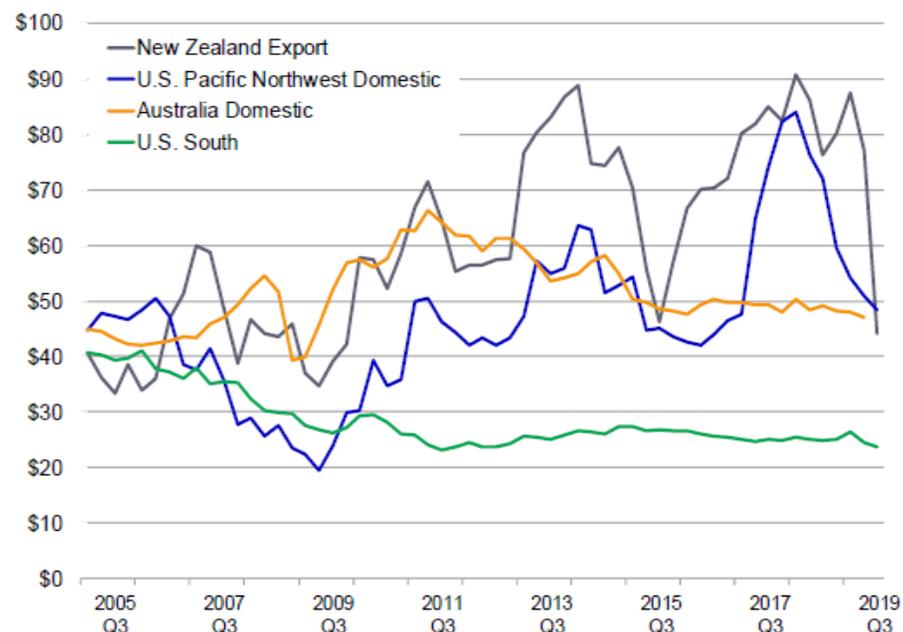
## TIMBERLAND MARKETS

- The US housing market appears to have re-gained momentum during 3Q19 despite a slow start to the year. US housing starts received a boost from declining mortgage rates as rates have decreased for 10 straight months through quarter end; housing starts increased 2% for the quarter and 4% for the year with 1.28M units. **(FIGURE 1)**
- Global timberland markets were mixed for the quarter, with lumber pricing generally improving, while most log and stumpage prices experiencing declines. **(FIGURE 2)**
- Northwest timber markets appeared to stabilize during the quarter helped by improving domestic demand. The ongoing trade dispute continued to pressure NW export markets as log exports to China are down 20% from last year, only slightly offset by a 10% increase in exports to Japan.
- Southern softwood markets saw further declines as the ongoing supply issues were exacerbated by increased harvesting activity as good weather prevailed. Northern hardwood markets were generally flat for the quarter and continue to face pressure from decreasing log exports to China in conjunction with reduced domestic demand.
- Australia’s housing market continued to slow, with housing starts 35% below 2017’s peak. Lumber and log prices have remained steady but should experience moderate declines as markets re-balance.

**FIGURE 1: US Housing Starts (SAAR<sup>1</sup>)**



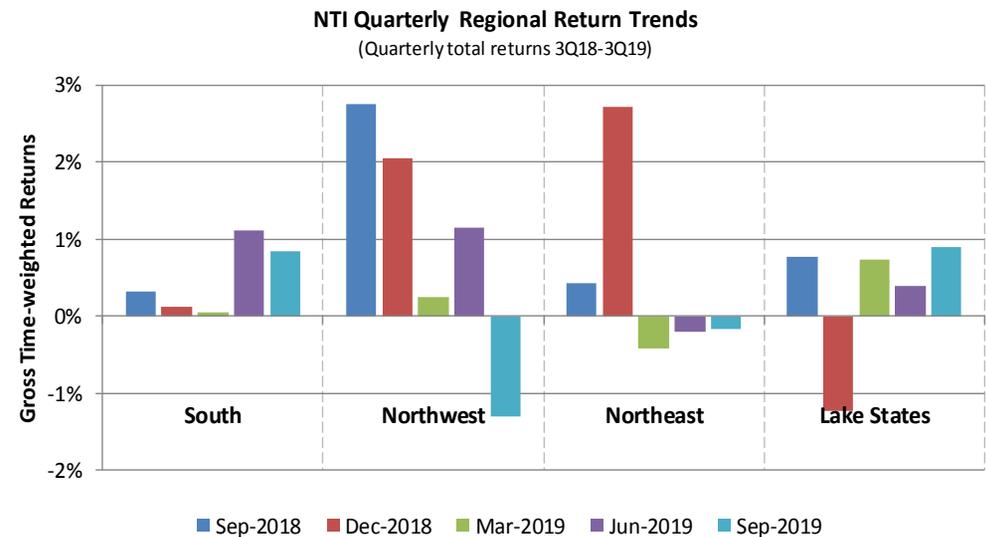
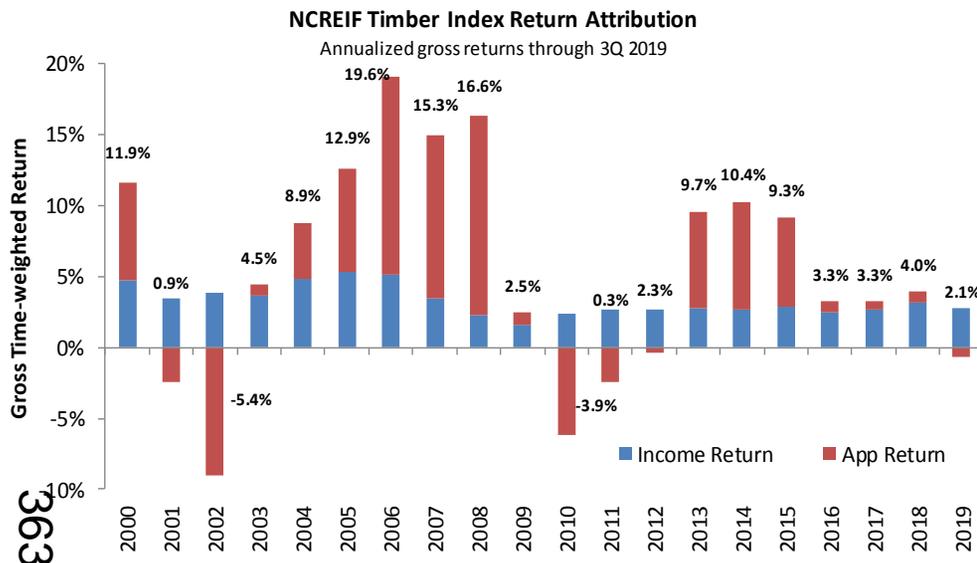
**FIGURE 2: Regional Softwood Sawtimber Stumpage Prices - USD per m<sup>3</sup>**



# Timberland – Third Quarter 2019 Market Update

## TIMBERLAND PERFORMANCE

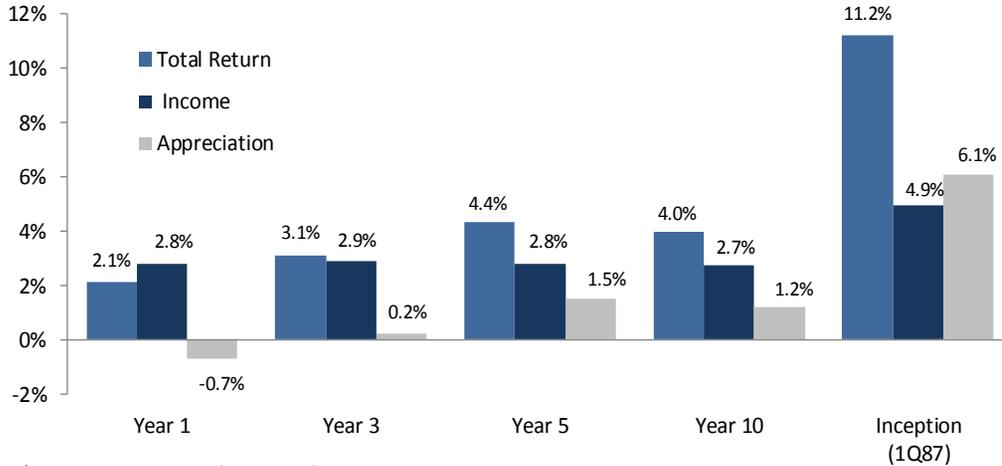
- The NCREIF Timberland Index (“NTI”) returned 0.2% for the quarter, down from last quarter’s 1.0% return and 3Q18’s 1.0% return; the return consisted of 0.7% income and -0.5% appreciation with all but the South (+0.1%) region depreciating in value.
- The Northwest region reported a significant drop in performance with a -1.3% total return and driven by depreciation of -1.8%, which was its first negative total return in over three years. The South, NTI’s largest regional component, and the Lake States were the NTI’s best performing regions during the quarter returning 0.8% and 0.9%, respectively. The Northeast remained under pressure with a -0.2% return for the quarter as the trade war’s impact on hardwood exports continued to impact values.
- The NTI returned 2.1% over the trailing twelve-month (“TTM”) period, which continued to be driven entirely by the income return (+2.8%) as appreciation continued to drag on performance with a -0.7% TTM return for the quarter.
- Timberland values increased slightly with an increase of 1.0% quarter-over-quarter (\$1,877 per acre) and 2.3% over the past 12-month period, driven primarily by a sharp increase in Northeastern timberland values (+22.8% increase) and countered by slight values declines across the remaining three regions.



# Timberland – Third Quarter 2019 Market Update

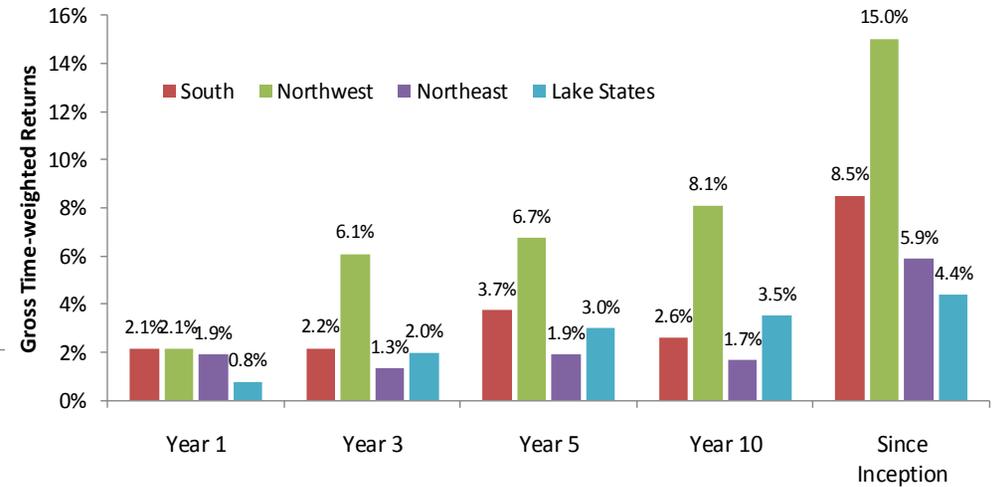
## TIMBERLAND PERFORMANCE

**NCREIF Timber Index Total Performance**  
Gross time-weighted returns as of 3Q 2019



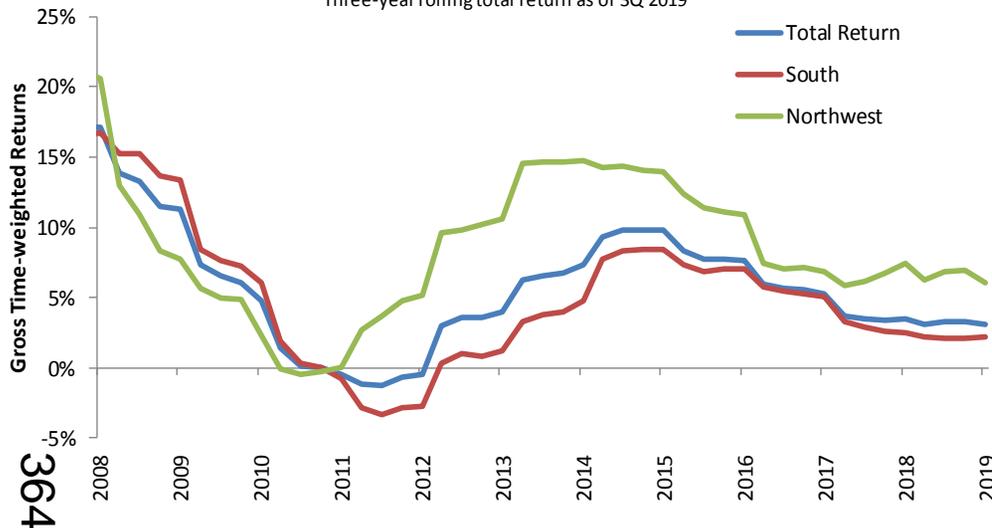
\*Inception Returns begin with 1Q87

**NCREIF Timber Index Regional Performance**  
Gross time-weighted total returns as of 3Q 2019



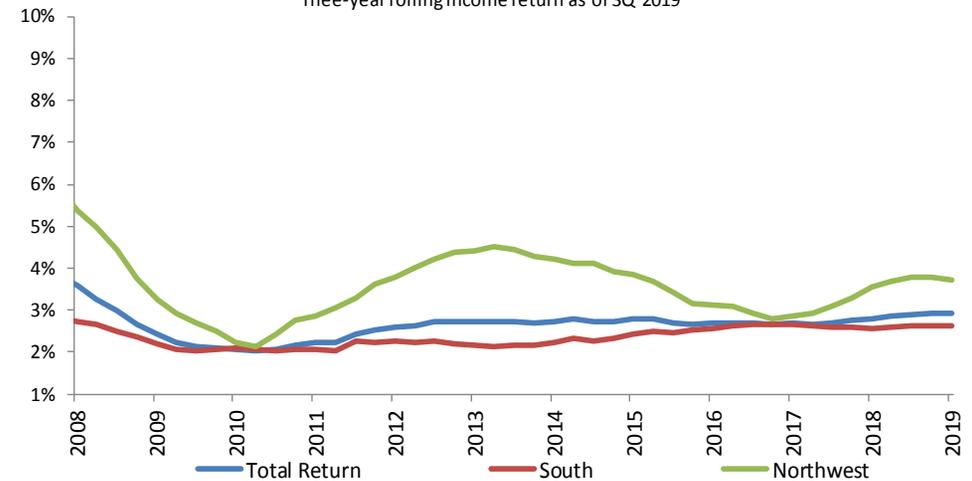
**Total Returns by Region**

Three-year rolling total return as of 3Q 2019



**EBITDA Returns by Region**

Three-year rolling income return as of 3Q 2019



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## Agenda

Section 1	Executive Summary
<b>Section 2</b>	Market Overview
<b>Section 3</b>	<b>Real Assets Portfolio Update</b>
Section 4	Glossary

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# ATRS' Portfolio Overview

As of 9/30/2019	Quarter	1 Year Ending	3 Year Ending	5 Year Ending	10 Year Ending
<b>Total Real Assets Portfolio</b>	1.1%	5.3%	7.3%	8.1%	8.2%
<b>Real Assets Benchmark*</b>	1.1%	4.6%	5.7%	7.4%	8.0%

As of September 30, 2019	ATRS' Portfolio \$ in Millions
Number of Investments	63
Total Commitments	\$3,480.5
Unfunded Commitments	\$509.5
Total Paid-In Capital	\$3,260.8
Total Distributions	\$2,647.5
Net Asset Value	\$2,204.3
Gross Asset Value	\$2,770.5
DPI*	0.8x
TVPI*	1.5x
Since Inception IRR*	7.3%
<i>*Active and Liquidated</i>	

As of September 30, 2019	Market Value (\$ millions)	Current Allocation (%)	Target (%)
ATRS Total Assets	\$17,519.7		
<b>Real Assets Portfolio:</b>	<b>2,204.3</b>	<b>12.6%</b>	<b>15%</b>
<b>Real Estate</b>	<b>1,404.8</b>	<b>8.0%</b>	<b>10%</b>
Core*	1028.0	73.2%	50-70%
Non-Core	376.8	26.8%	30-50%
Value-Added**	206.2	14.7%	N/A **
Opportunistic**	170.6	12.1%	N/A **
<b>Agriculture</b>	<b>200.3</b>	<b>1.1%</b>	<b>1%</b>
<b>Timber</b>	<b>288.8</b>	<b>1.6%</b>	<b>2%</b>
<b>Infrastructure</b>	<b>310.4</b>	<b>1.8%</b>	<b>2%</b>
Unfunded Commitments	509.5	2.9%	
<b>Market Value + Unfunded</b>	<b>2,713.8</b>	<b>15.5%</b>	

\* Includes Arkansas Investments

\*\* No stated targets

## ATRS' Real Estate Performance: Core Portfolio

As of 9/30/2019

Fund Name	Vintage Year	Total Commitment (\$)	Unfunded Commitment (\$)	Total Paid-In (\$)	Total Distributions (\$)	Net Asset Value (\$)	Total Value (\$)	DPI	TVPI	Net IRR
Arkansas Investments	2007	142,694,200	0	144,624,546	162,186,211	123,955,174	286,141,385	1.12x	1.98x	9.12%
JPMorgan Strategic Property Fund	2006	170,000,000	0	170,000,000	62,474,734	283,061,511	345,536,245	0.37x	2.03x	6.65%
MetLife Commercial Mortgage Income Fund, LP	2018	50,000,000	0	50,000,000	652,620	49,993,408	50,646,028	0.01x	1.01x	1.31%
Prudential Property Investment Separate Account	2005	170,000,000	0	212,936,320	127,768,859	275,710,576	403,479,435	0.60x	1.89x	6.54%
UBS Trumbull Property Fund	2005	170,000,000	0	199,152,820	110,689,185	241,994,306	352,683,491	0.56x	1.77x	5.76%
UBS Trumbull Property Income Fund	2016	50,000,000	0	50,000,000	3,131,504	53,295,948	56,427,452	0.06x	1.13x	6.12%
<b>Total Core</b>		<b>752,694,200</b>	<b>0</b>	<b>826,713,686</b>	<b>466,903,113</b>	<b>1,028,010,924</b>	<b>1,494,914,037</b>	<b>0.56x</b>	<b>1.81x</b>	<b>6.77%</b>

### Time Weighted Returns:

As of 9/30/2019 Partnership Name	Quarter	1 Year Ending	3 Year Ending	5 Year Ending	10 Year Ending
Arkansas Investments	-1.2%	2.5%	14.4%	12.9%	9.5%
JPMorgan Strategic Property Fund	0.2%	3.0%	5.6%	7.7%	9.7%
MetLife Commercial Mortgage Income Fund, LP	1.3%	N/A	N/A	N/A	N/A
Prudential Property Investment Separate Account	1.4%	6.0%	7.1%	9.0%	10.8%
UBS Trumbull Property Fund	0.7%	-1.2%	3.3%	5.9%	7.9%
UBS Trumbull Property Income Fund	1.4%	5.9%	N/A	N/A	N/A
<b>Total Core &amp; Open-End Portfolio</b>	<b>0.6%</b>	<b>2.9%</b>	<b>6.5%</b>	<b>8.2%</b>	<b>9.1%</b>

Note: Arkansas Investments are included in Core portfolio

# ATRS' Real Estate Performance: Value-Add Portfolio

As of 9/30/2019

Fund Name	Vintage Year	Total Commitment (\$)	Unfunded Commitment (\$)	Total Paid-In (\$)	Total Distributions (\$)	Net Asset Value (\$)	Total Value (\$)	DPI	TVPI	Net IRR
Almanac Realty Securities Fund V, L.P.	2008	50,000,000	0	54,264,528	79,984,434	801,247	80,785,681	1.47x	1.49x	11.76%
Almanac Realty Securities Fund VI, L.P.	2012	30,000,000	0	18,829,376	17,865,609	8,175,928	26,041,537	0.95x	1.38x	11.88%
Almanac Realty Securities Fund VII, L.P.	2015	30,000,000	9,241,896	24,423,471	18,264,694	13,665,776	31,930,470	0.75x	1.31x	13.61%
Almanac Realty Securities Fund VIII, L.P.	2018	30,000,000	28,347,419	1,652,581	0	1,321,444	1,321,444	0.00x	0.80x	-36.43%
Calmwater Fund III	2017	30,000,000	11,199,245	28,886,793	11,146,293	19,639,663	30,785,956	0.39x	1.07x	7.46%
CBRE Strategic Partners U.S. Value 8, L.P.	2016	25,000,000	3,361,092	21,638,908	2,786,433	22,754,709	25,541,142	0.13x	1.18x	10.91%
Fidelity Real Estate Growth Fund III	2008	30,000,000	0	26,910,386	35,676,792	0	35,676,792	1.33x	1.33x	7.36%
FPA Core Plus Fund IV, L.P.	2018	30,000,000	11,400,000	18,600,000	418,624	18,214,813	18,633,437	0.02x	1.00x	0.26%
Harbert European Real Estate Fund IV	2016	25,009,965	1,658,478	23,985,080	964,124	28,082,975	29,047,100	0.04x	1.21x	7.90%
JPMorgan Special Situations Property Fund	2006	50,000,000	0	50,000,000	64,229,336	0	64,229,336	1.28x	1.28x	2.96%
LaSalle Income & Growth Fund VI	2013	20,000,000	952,381	19,047,619	20,745,195	7,597,979	28,343,173	1.09x	1.49x	12.12%
LaSalle Income & Growth Fund VII	2017	20,000,000	5,533,212	17,770,879	7,528,508	13,842,231	21,370,739	0.42x	1.20x	12.54%
LaSalle Income & Growth Fund VIII	2018	50,000,000	50,000,000	0	0	0	0	N/A	N/A	N/A
Long Wharf Real Estate Partners V	2015	30,000,000	-0	31,494,655	11,433,580	26,439,859	37,873,439	0.36x	1.20x	10.60%
New Boston Real Estate Investment Fund VII	2008	10,000,000	0	9,668,685	7,948,106	147,445	8,095,551	0.82x	0.84x	-2.62%
Rockwood Capital Real Estate Partners Fund IX, L.P.	2012	30,000,000	4,081,464	27,422,960	28,148,713	10,937,025	39,085,738	1.03x	1.43x	13.27%
Rockwood Capital Real Estate Partners Fund XI	2019	40,000,000	40,000,000	0	0	0	0	N/A	N/A	N/A
Walton Street Real Estate Debt Fund II, LP	2019	40,000,000	38,106,220	1,893,780	1,385	1,979,383	1,980,768	0.00x	1.05x	4.46%
Westbrook Real Estate Fund IX, L.P.	2012	40,000,000	3,603,488	46,017,350	44,609,698	14,679,951	59,289,649	0.97x	1.29x	10.63%
Westbrook Real Estate Fund X, L.P.	2015	25,000,000	10,400,139	18,594,826	3,921,054	17,883,380	21,804,434	0.21x	1.17x	13.67%
<b>Total Value Added</b>		<b>635,009,965</b>	<b>217,885,035</b>	<b>441,101,877</b>	<b>355,672,579</b>	<b>206,163,808</b>	<b>561,836,387</b>	<b>0.81x</b>	<b>1.27x</b>	<b>7.24%</b>

# ATRS' Real Estate Performance: Opportunistic Portfolio

As of 9/30/2019

Fund Name	Vintage Year	Total Commitment (\$)	Unfunded Commitment (\$)	Total Paid-In (\$)	Total Distributions (\$)	Net Asset Value (\$)	Total Value (\$)	DPI	TVPI	Net IRR
Blackstone Real Estate Partners VII, L.P.	2011	50,000,000	6,997,801	62,951,212	76,604,451	27,555,372	104,159,823	1.22x	1.65x	16.61%
Blackstone Real Estate Partners Europe VI	2019	49,095,200	47,955,600	0	0	0	0	N/A	N/A	N/A
Carlyle Realty Partners VII, L.P.	2014	30,000,000	17,857,936	27,677,952	20,986,497	15,943,167	36,929,664	0.76x	1.33x	12.62%
Carlyle Realty Partners VIII, L.P.	2018	25,000,000	20,244,308	4,841,984	67,608	4,322,875	4,390,483	0.01x	0.91x	-15.27%
CB Richard Ellis Strategic Partners U.S. Opportunity Fund V, L.P.	2008	50,000,000	1,643,033	48,619,340	56,237,560	10,470,777	66,708,337	1.16x	1.37x	5.24%
Cerberus Institutional Real Estate Partners III, L.P.	2012	30,000,000	7,307,395	39,123,764	38,033,811	14,582,503	52,616,314	0.97x	1.34x	10.58%
DLJ Real Estate Capital Partners II, L.P.	1999	112,725,609	0	115,482,666	179,444,842	0	179,444,842	1.55x	1.55x	19.11%
Doughty Hanson & Co European Real Estate Limited Partnership Number One	1999	26,068,792	0	34,359,852	91,947,138	0	91,947,138	2.68x	2.68x	28.48%
Heitman European Property Partners IV	2009	50,000,000	2,203,609	34,448,111	24,292,222	2,515,854	26,808,076	0.71x	0.78x	-4.14%
Kayne Anderson Real Estate Partners V, L.P.	2018	25,000,000	11,808,028	13,399,771	0	13,159,364	13,159,364	0.00x	0.98x	-1.87%
Landmark Real Estate Partners VI, L.P.	2010	40,000,000	4,909,392	35,090,608	51,852,154	3,088,203	54,940,357	1.48x	1.57x	19.21%
Landmark Real Estate Partners VIII, L.P.	2017	25,000,000	19,670,895	8,481,894	3,229,893	6,746,485	9,976,378	0.38x	1.18x	20.57%
LaSalle Asia Opportunity Fund IV	2014	30,000,000	11,080,298	26,115,903	35,748,490	2,774,365	38,522,855	1.37x	1.48x	31.04%
LaSalle Asia Opportunity Fund V	2016	30,000,000	22,624,960	8,810,301	2,271,468	9,055,081	11,326,549	0.26x	1.29x	13.74%
Lone Star Real Estate Fund IV, L.P.	2015	24,260,817	5,204,622	20,812,524	19,128,792	9,766,779	28,895,571	0.92x	1.39x	16.85%
Metropolitan Real Estate Partners Co-Investments Fund, L.P.	2015	20,000,000	867,124	19,098,261	13,153,152	13,767,509	26,920,661	0.69x	1.41x	15.37%
O'Connor North American Property Partners II	2008	50,000,000	5,000,000	58,159,478	40,059,427	9,984,239	50,043,666	0.69x	0.86x	-2.81%
Olympus Real Estate Fund III, L.P.	2000	100,000,000	0	112,839,568	98,504,479	355,396	98,859,875	0.87x	0.88x	-3.67%
Torchlight Debt Opportunity Fund II	2007	55,000,000	0	55,000,000	47,668,921	0	47,668,921	0.87x	0.87x	-1.86%
Torchlight Debt Opportunity Fund III	2008	30,000,000	0	33,493,596	49,863,151	0	49,863,151	1.49x	1.49x	13.72%
Torchlight Debt Opportunity Fund IV	2013	30,000,000	0	32,937,974	38,865,361	7,113,731	45,979,092	1.18x	1.40x	10.30%
Torchlight Debt Opportunity Fund V	2015	25,000,000	5,000,000	20,001,134	11,546,218	13,567,645	25,113,863	0.58x	1.26x	11.56%
Torchlight Debt Opportunity Fund VI, LP	2017	25,000,000	19,453,340	7,684,224	2,137,564	5,846,481	7,984,045	0.28x	1.04x	6.15%
Westbrook Real Estate Fund II, L.P.	1997	75,000,000	0	80,737,536	120,795,230	0	120,795,230	1.50x	1.50x	13.42%
Westbrook Real Estate Fund III, L.P.	1998	100,000,000	0	112,862,649	147,939,777	0	147,939,777	1.31x	1.31x	8.79%
Westbrook Real Estate Fund IV, L.P.	2000	109,242,960	0	115,556,652	190,913,983	0	190,913,983	1.65x	1.65x	20.65%
Westbrook SHP, LLC (Sunstone Hotel Investors, LLC)	1999	40,000,000	0	40,000,000	44,660,669	0	44,660,669	1.12x	1.12x	2.47%
<b>Total Opportunistic</b>		<b>1,256,393,378</b>	<b>209,828,342</b>	<b>1,168,586,954</b>	<b>1,405,952,857</b>	<b>170,615,826</b>	<b>1,576,568,683</b>	<b>1.20x</b>	<b>1.35x</b>	<b>10.23%</b>

# ATRS' Timberland, Agriculture, and Infrastructure Performance

As of 9/30/2019

Fund Name	Vintage Year	Total Commitment (\$)	Unfunded Commitment (\$)	Total Paid-In (\$)	Total Distributions (\$)	Net Asset Value (\$)	Total Value (\$)	DPI	TVPI	Net IRR
BTG Timber Separate Account	1998	316,000,000	9,391,933	339,314,715	315,072,909	288,803,144	603,876,053	0.93x	1.78x	5.27%
<b>Total Timber</b>		<b>316,000,000</b>	<b>9,391,933</b>	<b>339,314,715</b>	<b>315,072,909</b>	<b>288,803,144</b>	<b>603,876,053</b>	<b>0.93x</b>	<b>1.78x</b>	<b>5.27%</b>
HFMS Farmland Separate Account	2011	125,000,000	18,172,892	133,658,887	26,831,779	145,603,471	172,435,250	0.20x	1.29x	5.51%
UBS Agrivest Core Farmland Fund	2013	50,000,000	0	50,000,000	5,185,809	54,681,531	59,867,340	0.10x	1.20x	4.68%
<b>Total Agriculture</b>		<b>175,000,000</b>	<b>18,172,892</b>	<b>183,658,887</b>	<b>32,017,588</b>	<b>200,285,002</b>	<b>232,302,590</b>	<b>0.17x</b>	<b>1.26x</b>	<b>5.32%</b>

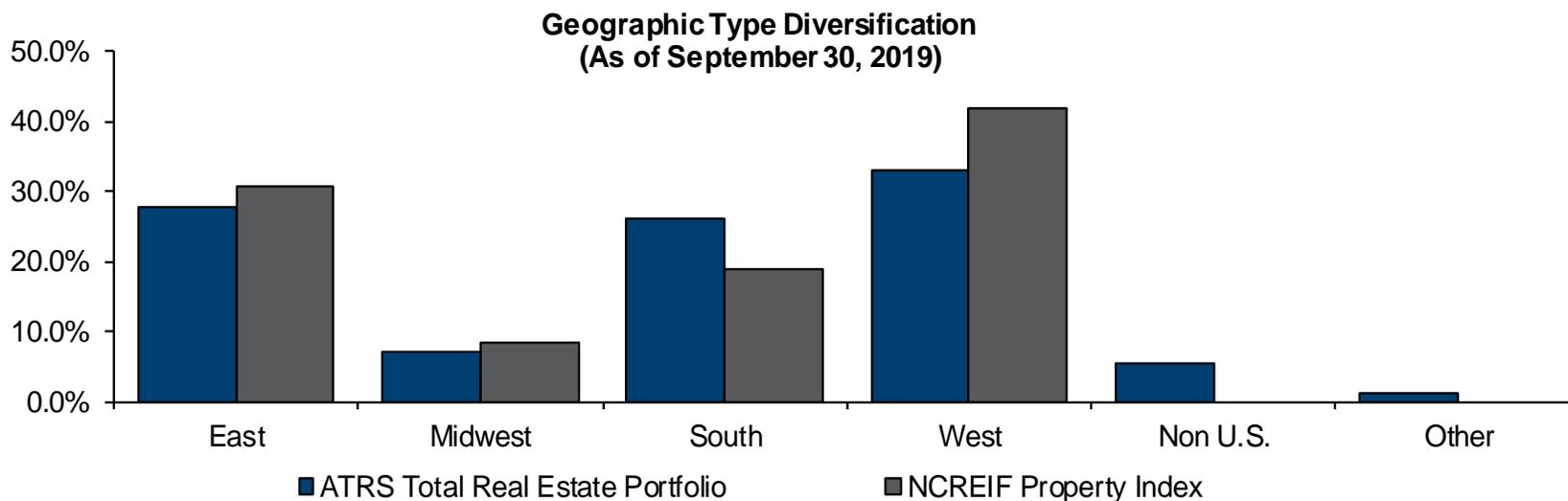
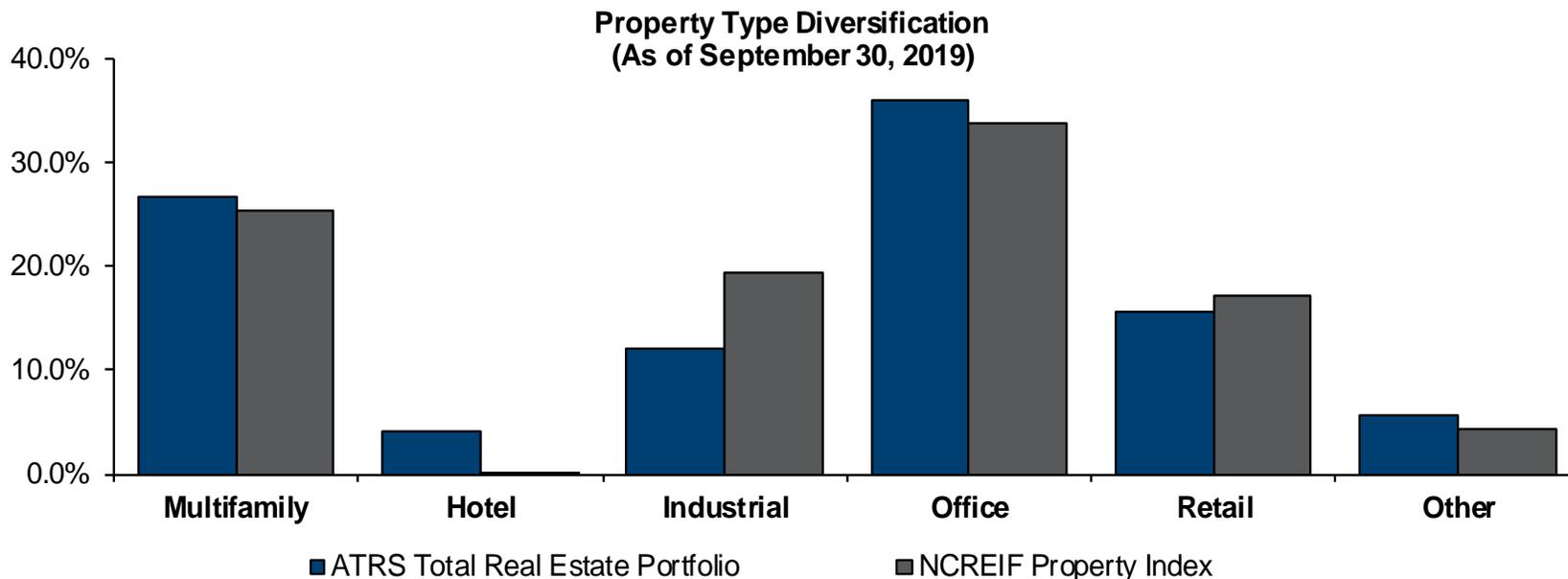
Fund Name	Vintage Year	Total Commitment (\$)	Unfunded Commitment (\$)	Total Paid-In (\$)	Total Distributions (\$)	Net Asset Value (\$)	Total Value (\$)	DPI	TVPI	Net IRR
Antin Infrastructure Partners II, L.P.	2014	47,647,600	5,187,924	35,754,093	8,442,272	45,489,255	53,931,526	0.24x	1.51x	10.41%
DIF Infrastructure Fund V	2018	47,766,330	20,295,217	25,871,241	1,265,555	24,390,602	25,656,157	0.05x	0.99x	-1.12%
First Reserve Energy Infrastructure Fund II, L.P.	2014	50,000,000	6,233,086	48,779,553	27,699,383	41,674,957	69,374,340	0.57x	1.42x	31.20%
Global Infrastructure Partners III, L.P.	2016	50,000,000	12,560,873	40,892,121	3,590,270	42,480,942	46,071,212	0.09x	1.13x	7.45%
IFM Global Infrastructure (US), L.P.	2017	50,000,000	0	50,000,000	299,038	55,688,751	55,987,788	0.01x	1.12x	12.06%
KKR Global Infrastructure Investors II, L.P.	2015	50,000,000	2,761,452	53,329,849	10,105,307	56,443,952	66,549,259	0.19x	1.25x	11.01%
Macquarie Infrastructure Partners III, L.P.	2013	50,000,000	7,231,715	46,770,085	20,474,934	44,250,633	64,725,567	0.44x	1.38x	13.15%
<b>Total Infrastructure</b>		<b>345,413,930</b>	<b>54,270,268</b>	<b>301,396,942</b>	<b>71,876,759</b>	<b>310,419,091</b>	<b>382,295,850</b>	<b>0.24x</b>	<b>1.27x</b>	<b>12.78%</b>

## Portfolio Performance Detail: By Vintage Year

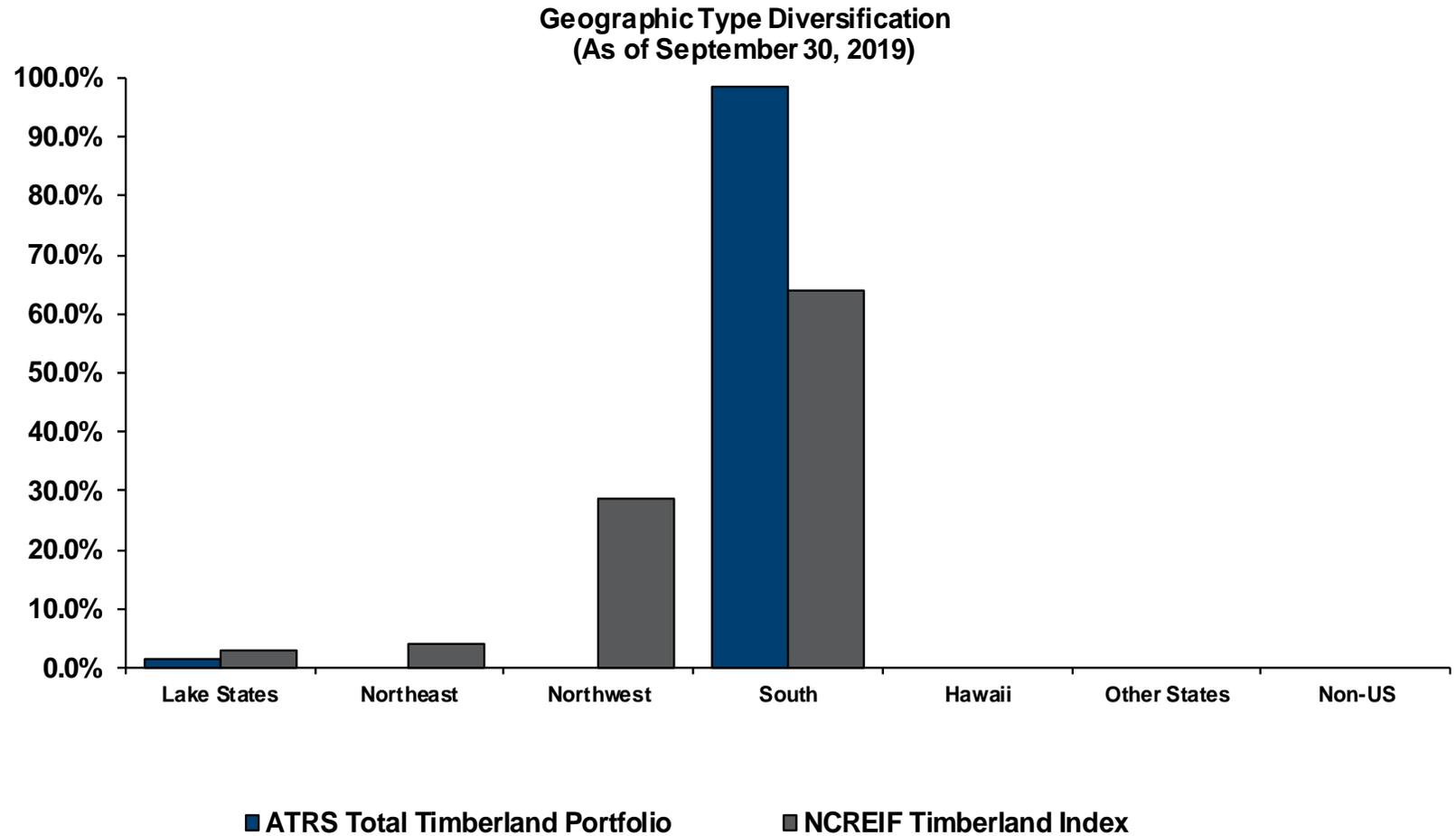
As of 9/30/2019

Vintage Year (ATRS)	Total Commitment	Unfunded Commitment	Total Paid-In	Total Distributions	Net Asset Value as of 9/30/2019	Total Value	DPI	TVPI	Net IRR
1997	75,000,000	0	80,737,536	120,795,230	0	120,795,230	1.50x	1.50x	13.42%
1998	416,000,000	9,391,933	452,177,364	463,012,686	288,803,144	751,815,830	1.02x	1.66x	5.65%
1999	178,794,401	0	189,842,518	316,052,650	0	316,052,650	1.66x	1.66x	15.90%
2000	209,242,960	0	228,396,220	289,418,462	355,396	289,773,858	1.27x	1.27x	8.51%
2005	340,000,000	0	412,089,139	238,458,043	517,704,883	756,162,926	0.58x	1.83x	6.17%
2006	220,000,000	0	220,000,000	126,704,070	283,061,511	409,765,581	0.58x	1.86x	6.01%
2007	197,694,200	0	199,624,547	209,855,132	123,955,174	333,810,306	1.05x	1.67x	6.77%
2008	220,000,000	6,643,033	231,116,013	269,769,470	21,403,708	291,173,177	1.17x	1.26x	5.16%
2009	50,000,000	2,203,609	34,448,111	24,292,222	2,515,854	26,808,076	0.71x	0.78x	-4.14%
2010	40,000,000	4,909,392	35,090,608	51,852,154	3,088,203	54,940,357	1.48x	1.57x	19.21%
2011	175,000,000	25,170,693	196,610,099	103,436,230	173,158,843	276,595,073	0.53x	1.41x	8.46%
2012	130,000,000	14,992,348	131,393,451	128,657,831	48,375,407	177,033,238	0.98x	1.35x	11.39%
2013	150,000,000	8,184,096	148,755,679	85,271,299	113,643,874	198,915,173	0.57x	1.34x	9.17%
2014	157,647,600	40,359,244	138,327,501	92,876,642	105,881,744	198,758,385	0.67x	1.44x	16.91%
2015	204,260,817	33,475,234	187,754,720	87,552,797	151,534,900	239,087,697	0.47x	1.27x	12.81%
2016	180,009,965	40,205,403	145,326,410	12,743,799	155,669,655	168,413,455	0.09x	1.16x	7.90%
2017	150,000,000	55,856,692	112,823,790	24,341,296	101,763,611	126,104,907	0.22x	1.12x	11.47%
2018	257,766,330	142,094,972	114,365,577	2,404,408	111,402,506	113,806,914	0.02x	1.00x	-0.92%
2019	129,095,200	126,061,820	1,893,780	1,385	1,979,383	1,980,768	0.00x	1.05x	4.46%
<b>Grand Total(s):</b>	<b>3,480,511,473</b>	<b>509,548,470</b>	<b>3,260,773,060</b>	<b>2,647,495,805</b>	<b>2,204,297,795</b>	<b>4,851,793,600</b>	<b>0.81x</b>	<b>1.49x</b>	<b>7.28%</b>

## Portfolio Diversification – Real Estate

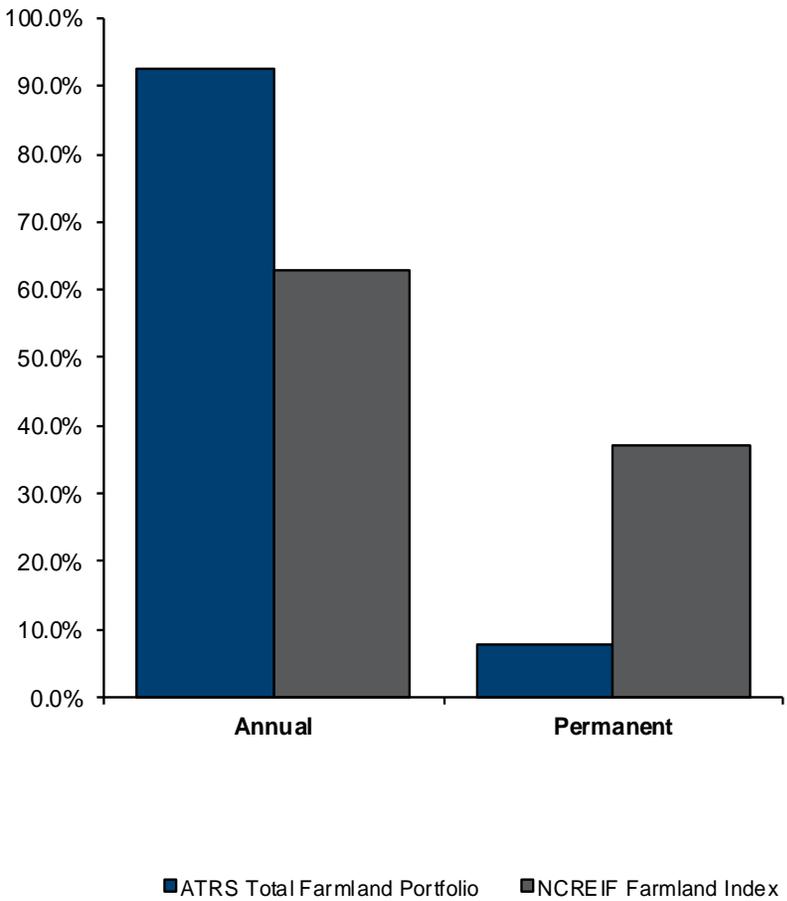


# Portfolio Diversification – Timberland

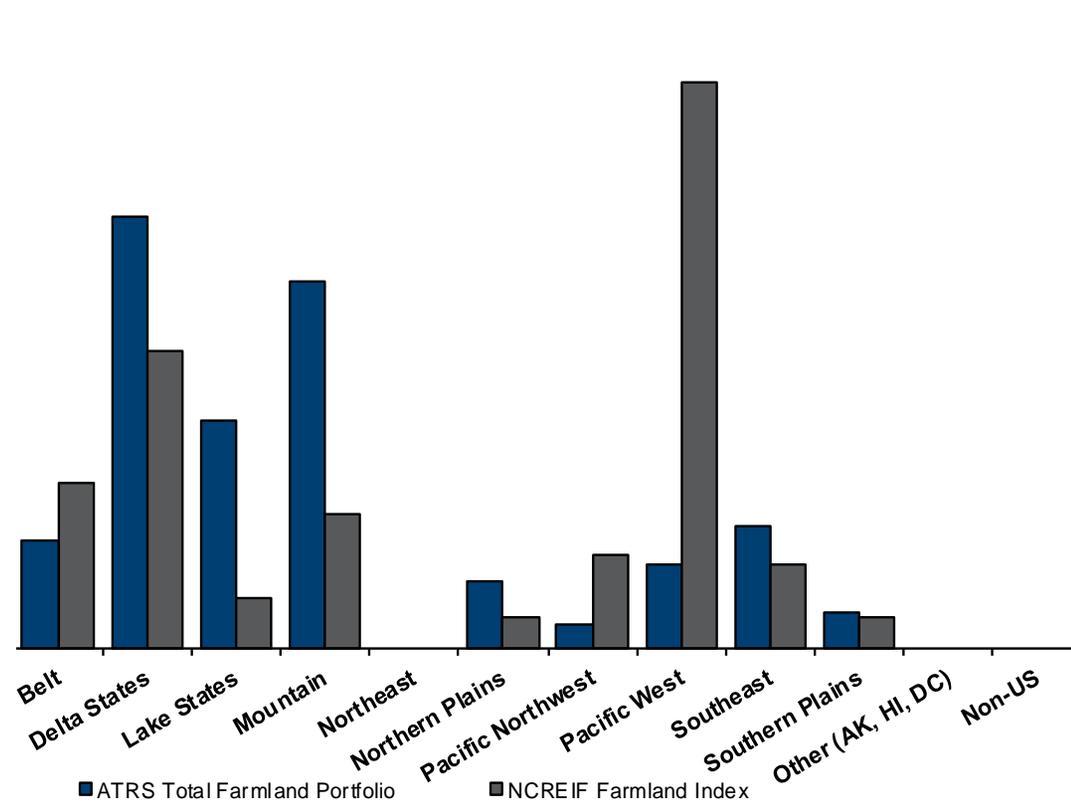


# Portfolio Diversification – Agriculture

**Crop Type Diversification as of 9/30/2019**

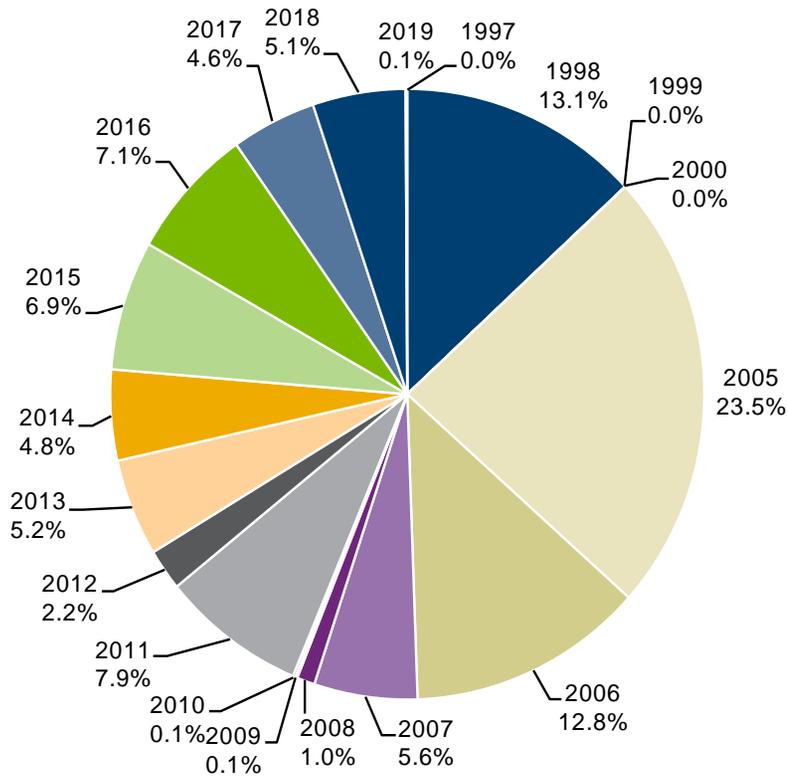


**Geographic Type Diversification (As of September 30, 2019)**

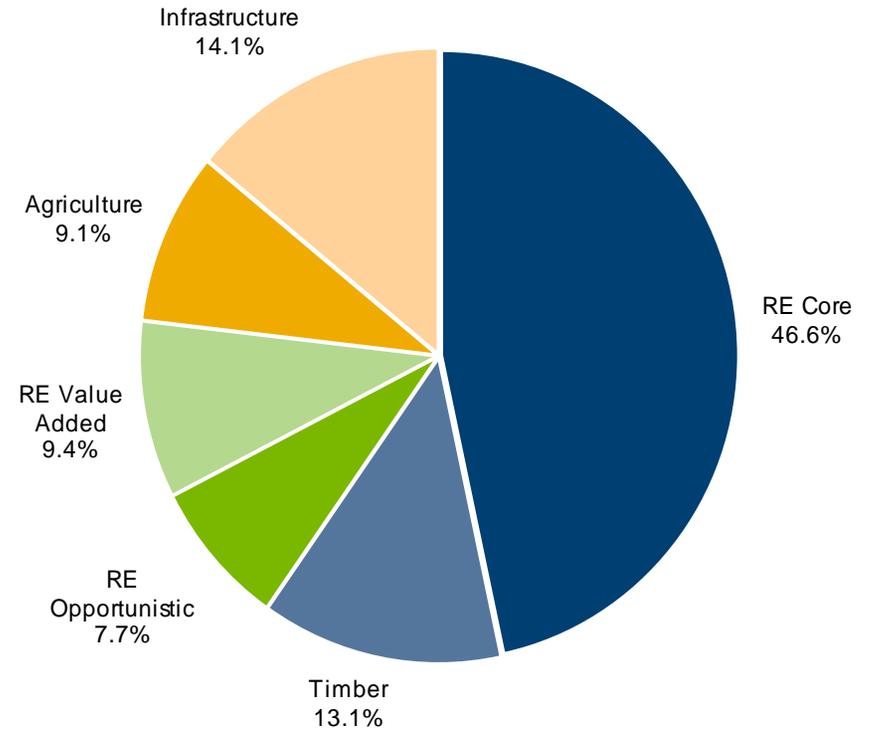


# Portfolio Diversification (cont'd)

**Vintage Year Diversification by Net Asset Value  
(As of 9/30/2019)**



**Style Diversification by Net Asset Value  
(As of 9/30/2019)**



Note: Arkansas Investments are included in Core portfolio

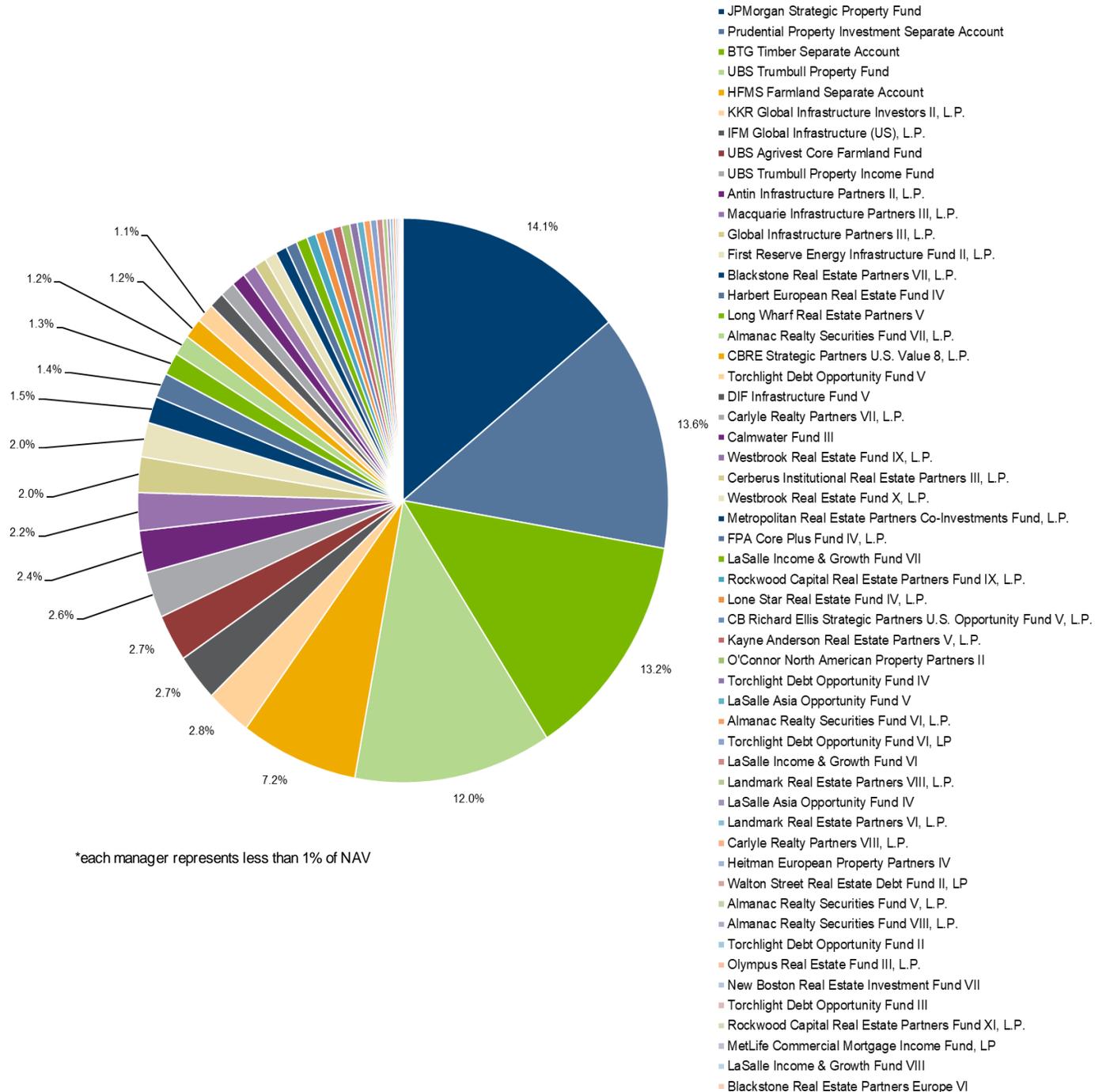
# Portfolio Funding Summary

Partnership Name	Funded Commitment as of 9/30/2019	Unfunded Commitment as of 9/30/2019	Total Commitment
Almanac Realty Securities Fund V, L.P.	50,000,000	0	50,000,000
Almanac Realty Securities Fund VI, L.P.	30,000,000	0	30,000,000
Almanac Realty Securities Fund VII, L.P.	20,758,104	9,241,896	30,000,000
Almanac Realty Securities Fund VIII, L.P.	1,652,581	28,347,419	30,000,000
Antin Infrastructure Partners II, L.P.	42,459,676	5,187,924	47,647,600
Blackstone Real Estate Partners Europe VI	0	47,955,600	49,095,200
Blackstone Real Estate Partners VII, L.P.	43,002,199	6,997,801	50,000,000
BTG Timber Separate Account	306,608,067	9,391,933	316,000,000
Calmwater Fund III	18,800,755	11,199,245	30,000,000
Carlyle Realty Partners VII, L.P.	12,142,064	17,857,936	30,000,000
Carlyle Realty Partners VIII, L.P.	4,755,692	20,244,308	25,000,000
CB Richard Ellis Strategic Partners U.S. Opportunity Fund V, L.P.	48,356,967	1,643,033	50,000,000
CBRE Strategic Partners U.S. Value 8, L.P.	21,638,908	3,361,092	25,000,000
Cerberus Institutional Real Estate Partners III, L.P.	22,692,605	7,307,395	30,000,000
DIF Infrastructure Fund V	27,471,113	20,295,217	47,766,330
First Reserve Energy Infrastructure Fund II, L.P.	43,766,914	6,233,086	50,000,000
FPA Core Plus Fund IV, L.P.	18,600,000	11,400,000	30,000,000
Global Infrastructure Partners III, L.P.	37,439,127	12,560,873	50,000,000
Harbert European Real Estate Fund IV	23,351,487	1,658,478	25,009,965
Heitman European Property Partners IV	47,796,391	2,203,609	50,000,000
HFMS Farmland Separate Account	106,827,108	18,172,892	125,000,000
IFM Global Infrastructure (US), L.P.	50,000,000	0	50,000,000
JPMorgan Strategic Property Fund	170,000,000	0	170,000,000
Kayne Anderson Real Estate Partners V, L.P.	13,191,972	11,808,028	25,000,000
KKR Global Infrastructure Investors II, L.P.	47,238,548	2,761,452	50,000,000
Landmark Real Estate Partners VI, L.P.	35,090,608	4,909,392	40,000,000
Landmark Real Estate Partners VIII, L.P.	5,329,105	19,670,895	25,000,000

## Portfolio Funding Summary (cont'd)

Partnership Name	Funded Commitment as of 9/30/2019	Unfunded Commitment as of 9/30/2019	Total Commitment
LaSalle Asia Opportunity Fund IV	18,919,702	11,080,298	30,000,000
LaSalle Asia Opportunity Fund V	7,375,040	22,624,960	30,000,000
LaSalle Income & Growth Fund VI	19,047,619	952,381	20,000,000
LaSalle Income & Growth Fund VII	14,466,788	5,533,212	20,000,000
LaSalle Income & Growth Fund VIII	0	50,000,000	50,000,000
Lone Star Real Estate Fund IV, L.P.	19,056,195	5,204,622	24,260,817
Long Wharf Real Estate Partners V	30,000,000	0	30,000,000
Macquarie Infrastructure Partners III, L.P.	42,768,285	7,231,715	50,000,000
MetLife Commercial Mortgage Income Fund, LP	50,000,000	0	50,000,000
Metropolitan Real Estate Partners Co-Investments Fund, L.P.	19,132,876	867,124	20,000,000
New Boston Real Estate Investment Fund VII	10,000,000	0	10,000,000
O'Connor North American Property Partners II	45,000,000	5,000,000	50,000,000
Olympus Real Estate Fund III, L.P.	100,000,000	0	100,000,000
Prudential Property Investment Separate Account	170,000,000	0	170,000,000
Rockwood Capital Real Estate Partners Fund IX, L.P.	25,918,536	4,081,464	30,000,000
Rockwood Capital Real Estate Partners Fund XI	0	40,000,000	40,000,000
Torchlight Debt Opportunity Fund II	55,000,000	0	55,000,000
Torchlight Debt Opportunity Fund III	30,000,000	0	30,000,000
Torchlight Debt Opportunity Fund IV	30,000,000	0	30,000,000
Torchlight Debt Opportunity Fund V	20,000,000	5,000,000	25,000,000
Torchlight Debt Opportunity Fund VI, LP	5,546,660	19,453,340	25,000,000
UBS Agrivest Core Farmland Fund	50,000,000	0	50,000,000
UBS Trumbull Property Fund	170,000,000	0	170,000,000
UBS Trumbull Property Income Fund	50,000,000	0	50,000,000
Walton Street Real Estate Debt Fund II, LP	1,893,780	38,106,220	40,000,000
Westbrook Real Estate Fund IX, L.P.	36,396,512	3,603,488	40,000,000
Westbrook Real Estate Fund X, L.P.	14,599,861	10,400,139	25,000,000
	<b>2,269,378,448</b>	<b>509,548,467</b>	<b>2,794,779,912</b>

# Manager Diversification



# Management Fees

ATRS Sub-Asset Class	ATRS Style	Partnership Name	Current Quarter Management Fees as of 9/30/2019	YTD Management Fees
Agriculture		HFMS Farmland Separate Account	(427,293.81)	(1,278,972.36)
Agriculture		UBS Agrivest Core Farmland Fund	(136,002.78)	(407,996.12)
<b>Subtotal:</b>			<b>(563,296.59)</b>	<b>(1,686,968.48)</b>
<b>Subtotal: Agriculture</b>			<b>(563,296.59)</b>	<b>(1,686,968.48)</b>
Infrastructure		Antin Infrastructure Partners II, L.P.	(76,927.02)	(233,727.01)
Infrastructure		DIF Infrastructure Fund V	11,330.78	22,657.93
Infrastructure		First Reserve Energy Infrastructure Fund II, L.P.	(159,666.00)	(498,755.00)
Infrastructure		Global Infrastructure Partners III, L.P.	(207,676.00)	(618,053.00)
Infrastructure		IFM Global Infrastructure (US), L.P.	(106,411.93)	(306,762.20)
Infrastructure		KKR Global Infrastructure Investors II, L.P.	(95,379.00)	(350,095.00)
Infrastructure		Macquarie Infrastructure Partners III, L.P.	(115,253.76)	(350,608.01)
<b>Subtotal:</b>			<b>(749,982.93)</b>	<b>(2,335,342.29)</b>
<b>Subtotal: Infrastructure</b>			<b>(749,982.93)</b>	<b>(2,335,342.29)</b>
Real Estate	Core	JPMorgan Strategic Property Fund	(616,441.81)	(1,849,889.64)
Real Estate	Core	MetLife Commercial Mortgage Income Fund, LP	(50,000.00)	(50,000.00)
Real Estate	Core	Prudential Property Investment Separate Account	(545,712.14)	(1,629,468.37)
Real Estate	Core	UBS Trumbull Property Fund	(424,860.74)	(1,335,561.42)
Real Estate	Core	UBS Trumbull Property Income Fund	(104,145.93)	(310,655.06)
<b>Subtotal: Core</b>			<b>(1,741,160.62)</b>	<b>(5,175,574.49)</b>

## Management Fees (cont'd)

ATRS Sub-Asset Class	ATRS Style	Partnership Name	Current Quarter Management Fees as of 9/30/2019	YTD Management Fees
Real Estate	Opportunistic	Blackstone Real Estate Partners Europe VI	0.00	0.00
Real Estate	Opportunistic	Blackstone Real Estate Partners VII, L.P.	(79,605.00)	(254,670.00)
Real Estate	Opportunistic	Carlyle Realty Partners VII, L.P.	(58,594.00)	(187,470.00)
Real Estate	Opportunistic	Carlyle Realty Partners VIII, L.P.	(88,219.00)	(261,781.00)
Real Estate	Opportunistic	CB Richard Ellis Strategic Partners U.S. Opportunity Fund V, L.P.	0.00	(31,250.00)
Real Estate	Opportunistic	Cerberus Institutional Real Estate Partners III, L.P.	(22,398.00)	(70,210.00)
Real Estate	Opportunistic	Heitman European Property Partners IV	(81,897.54)	(171,524.95)
Real Estate	Opportunistic	Kayne Anderson Real Estate Partners V, L.P.	(109,375.00)	(328,125.00)
Real Estate	Opportunistic	Landmark Real Estate Partners VI, L.P.	(9,316.00)	(41,139.00)
Real Estate	Opportunistic	Landmark Real Estate Partners VIII, L.P.	(62,500.00)	(187,091.00)
Real Estate	Opportunistic	LaSalle Asia Opportunity Fund IV	(6,866.00)	(35,543.00)
Real Estate	Opportunistic	LaSalle Asia Opportunity Fund V	(84,359.00)	(239,444.00)
Real Estate	Opportunistic	Lone Star Real Estate Fund IV, L.P.	(7,892.00)	(29,636.00)
Real Estate	Opportunistic	Metropolitan Real Estate Partners Co-Investments Fund, L.P.	(33,188.39)	(96,541.11)
Real Estate	Opportunistic	O'Connor North American Property Partners II	(17,667.00)	(52,999.00)
Real Estate	Opportunistic	Olympus Real Estate Fund III, L.P.	0.00	0.00
Real Estate	Opportunistic	Torchlight Debt Opportunity Fund II	0.00	0.00
Real Estate	Opportunistic	Torchlight Debt Opportunity Fund III	0.00	0.00
Real Estate	Opportunistic	Torchlight Debt Opportunity Fund IV	(20,534.00)	(76,145.00)
Real Estate	Opportunistic	Torchlight Debt Opportunity Fund V	(50,306.00)	(200,306.00)
Real Estate	Opportunistic	Torchlight Debt Opportunity Fund VI, LP	(79,688.00)	(239,064.00)
<b>Subtotal: Opportunistic</b>			<b>(812,404.93)</b>	<b>(2,502,939.06)</b>

## Management Fees (cont'd)

ATRS Sub-Asset Class	ATRS Style	Partnership Name	Current Quarter Management Fees as of 9/30/2019	YTD Management Fees
Real Estate	Value Added	Almanac Realty Securities Fund V, L.P.	(5,764.00)	(19,564.00)
Real Estate	Value Added	Almanac Realty Securities Fund VI, L.P.	(15,276.00)	(45,501.00)
Real Estate	Value Added	Almanac Realty Securities Fund VII, L.P.	(55,013.00)	(177,108.00)
Real Estate	Value Added	Almanac Realty Securities Fund VIII, L.P.	(94,521.00)	(280,480.00)
Real Estate	Value Added	Calmwater Fund III	(75,693.98)	(219,388.83)
Real Estate	Value Added	CBRE Strategic Partners U.S. Value 8, L.P.	(53,024.00)	(153,189.00)
Real Estate	Value Added	FPA Core Plus Fund IV, L.P.	(30,691.00)	(78,009.00)
Real Estate	Value Added	Harbert European Real Estate Fund IV	(80,485.80)	(245,620.79)
Real Estate	Value Added	LaSalle Income & Growth Fund VI	(17,718.37)	(52,577.33)
Real Estate	Value Added	LaSalle Income & Growth Fund VII	(42,741.29)	(172,244.76)
Real Estate	Value Added	LaSalle Income & Growth Fund VIII	0.00	0.00
Real Estate	Value Added	Long Wharf Real Estate Partners V	(84,032.00)	(307,182.91)
Real Estate	Value Added	New Boston Real Estate Investment Fund VII	0.00	(5,637.00)
Real Estate	Value Added	Rockwood Capital Real Estate Partners Fund IX, L.P.	(72,707.95)	(210,827.79)
Real Estate	Value Added	Rockwood Capital Real Estate Partners Fund XI	0.00	0.00
Real Estate	Value Added	Walton Street Real Estate Debt Fund II, LP	(10,134.00)	(27,462.00)
Real Estate	Value Added	Westbrook Real Estate Fund IX, L.P.	(47,652.00)	(149,682.00)
Real Estate	Value Added	Westbrook Real Estate Fund X, L.P.	(60,912.00)	(168,341.00)
<b>Subtotal: Value Added</b>			<b>(746,366.39)</b>	<b>(2,312,815.41)</b>
<b>Subtotal: Real Estate</b>			<b>(3,299,931.94)</b>	<b>(9,991,328.96)</b>
Timber		BTG Timber Separate Account	(598,683.44)	(1,712,414.71)
<b>Subtotal:</b>			<b>(598,683.44)</b>	<b>(1,712,414.71)</b>
<b>Subtotal: Timber</b>			<b>(598,683.44)</b>	<b>(1,712,414.71)</b>

# Compliance Matrix

RISK MANAGEMENT						
Property Type	NFI-ODCE	Target/Constraint	Minimum	Maximum	Actual	Compliant?
Office	33.8%	NFI-ODCE +/- 50%	16.9%	50.0%	36.0%	Yes
Retail	17.1%	NFI-ODCE +/- 50%	8.6%	25.7%	15.6%	Yes
Industrial	19.3%	NFI-ODCE +/- 50%	9.7%	29.0%	12.1%	Yes
Multifamily	25.3%	NFI-ODCE +/- 50%	12.7%	38.0%	26.7%	Yes
Lodging/Hotel	0.2%	NFI-ODCE +/- 50%	0.1%	0.3%	4.0%	No
Other <sup>1</sup>	4.3%	NFI-ODCE +/- 50%	2.2%	6.5%	5.6%	Yes
Geography - Real Estate	NFI-ODCE	Target/Constraint	Minimum	Maximum	Actual	Compliant?
West	41.7%	NFI-ODCE +/- 50%	20.9%	62.6%	32.9%	Yes
East	30.8%	NFI-ODCE +/- 50%	15.4%	46.2%	27.6%	Yes
Midwest	8.5%	NFI-ODCE +/- 50%	4.3%	12.8%	7.0%	Yes
South	19.0%	NFI-ODCE +/- 50%	9.5%	28.5%	26.2%	Yes
Other <sup>2,3</sup>	0.0%	n/a	n/a	n/a	1.0%	Yes
Non-U.S.	0.0%	n/a	0.0%	40.0%	5.3%	Yes
Geography - Timber	NCREIF Timberland	Target/Constraint	Minimum	Maximum	Actual	Compliant?
Lake States	2.9%	NCREIF Timberland +/- 50%	1.4%	4.3%	1.5%	Yes
Northeast	4.0%	NCREIF Timberland +/- 50%	2.0%	6.0%	0.0%	No
Northwest	28.6%	NCREIF Timberland +/- 50%	14.3%	42.8%	0.0%	No
South	64.1%	NCREIF Timberland +/- 50%	32.0%	96.1%	98.5%	No
Geography - Agriculture	NCREIF Farmland	Target/Constraint	Minimum	Maximum	Actual	Compliant?
Appalachian	0.6%		0.0%	50.0%	0.0%	Yes
Corn Belt	11.3%		0.0%	50.0%	7.4%	Yes
Delta States	20.3%		0.0%	50.0%	29.3%	Yes
Lake States	3.5%		0.0%	50.0%	15.5%	Yes
Mountain	9.2%		0.0%	50.0%	24.9%	Yes
Northeast	0.0%		0.0%	50.0%	0.0%	Yes
Northern Plains	2.1%		0.0%	50.0%	4.7%	Yes
Pacific Northwest	6.4%		0.0%	50.0%	1.7%	Yes
Pacific West	38.5%		0.0%	50.0%	5.7%	Yes
Southeast	5.8%		0.0%	50.0%	8.4%	Yes
Southern Plains	2.2%		0.0%	50.0%	2.5%	Yes
Other	0.0%		0.0%	50.0%	0.0%	Yes
Non-U.S.	0.0%		0.0%	50.0%	0.0%	Yes
Manager	Target/Constraint		Minimum	Maximum	Max	Compliant?
			0.0%	30.0%	13.9%	Yes
Style	Target/Constraint		Minimum	Maximum	Actual	Compliant?
Core			50.0%	70.0%	73.2%	No
Non-Core			30.0%	50.0%	26.8%	No

## Agenda

Section 1	Executive Summary
Section 2	Market Overview
Section 3	Real Assets Portfolio Update
<b>Section 4</b>	<b>Glossary</b>

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## Glossary of Terms

- Catch-up - The provision that dictates how cash flows from the fund will be allocated between the investors and the manager in order for the manager to receive their performance fee. This allocation of cash flows occurs once the investors have collected their capital and preferred return
- Core - The most conservative institutional real estate investing style
- Core-Plus - A style whereby investments have a slightly higher level of risk and expected return than Core, primarily through use of leverage
- Development - The construction of buildings from breaking the ground through building completion. This may also include entitlement of the land and the pursuit of permits prior to construction
- DPI – Distributions to Paid In; the ratio of distributions from investments to total invested capital
- First Closing - The point at which a manager receives and executes the subscription documents and can begin drawing capital from investors
- Final Closing - The final date at which new investors can subscribe to a fund
- Internal Rate of Return (IRR) - A method of measuring the performance of a portfolio from inception through a particular point in time. This method weights returns according to the dollars invested at each point in time. Hence, this is known as dollar-weighted return. This is a better measure when the manager controls when dollars must be invested and is the most commonly used method of real estate performance evaluation; Gross IRR is gross of fee and Net IRR is net of fee
- NFI-ODCE – NCREIF Fund Index Open-end Diversified Core Equity Index is an index of investment returns reporting on both a historical and current basis the results of 33 open-end commingled funds pursuing a core investment strategy; underlying funds are leveraged with gross and net returns available
- NPI – NCREIF Property Index is a quarterly time series composite total rate of return measure of investment performance of a very large pool of individual commercial real estate properties acquired in the private market for investment purposes only; it is reported unlevered and gross of fee

## Glossary of Terms (Cont'd)

- FTSE-NAREIT Equity REIT – An unmanaged capitalization-weighted index of all equity real estate investment trusts
- FTSE EPRA/NAREIT Global REIT – An unmanaged market-weighted total return index, which consists of many companies from Global markets whose floats are larger than \$100 million and derive more than half of their revenue from property-related activities
- Opportunistic - A style that is the riskiest form of real estate investing. The name derives from when such funds were formed after the early 1990s real estate market crash to take advantage of opportunities in unwanted properties. Such investments include ground-up development, highly-leveraged purchases, or transactions involving highly complicated legal or environmental situations
- Pre-Specified Deals – Investments that are purchased for a fund before its final close. The assets are typically warehoused on a line of credit
- Promote (Carried Interest) -The performance fee a manager receives once the investors have received their return of capital and the preferred return (return promised by the manager)
- RVPI – Residual Value to Paid In; the ratio of the residual value of an investment to total invested capital
- Time-Weighted Return - A method of measuring the performance of a portfolio over a particular period of time. Effectively, it is the return of one dollar invested in the portfolio at the beginning of the measurement period. This is a better return measure when the manager does not control when the dollars must be invested
- TVPI – Total value to paid-in ratio; the ratio of total value from an investment, including distributions, to total invested capital
- Value-Added - A style that represents moderate-risk real estate. A manager typically increases the future value of the investment by undertaking activities such as leasing, improving an existing building, or taking some risk through operating intensive assets, such as hotels or self-storage
- Vintage Year - The year in which a fund has its final closing. Typically coincides with the year a fund begins making investments

## Glossary of Terms (Cont'd)

- NCREIF Timberland Index- The National Council of Real Estate Investment Fiduciaries (NCREIF) Timberland Index is a quarterly time series composite return measure of investment performance of a large pool of individual timber properties acquired in the private market for investment purposes only.
- NCREIF Farmland Index- The National Council of Real Estate Investment Fiduciaries (NCREIF) Farmland Index is a quarterly time series composite return measure of investment performance of a large pool of individual agricultural properties acquired in the private market for investment purposes only.

## Disclosures

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# Arkansas Teacher Retirement System Private Equity Portfolio Review

September 30, 2019

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## Executive Summary

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### Portfolio Summary

Since establishing the private equity program in 1996, Arkansas Teacher Retirement System (“ATRS”) has committed approximately \$4.9 billion to 78 primary funds, 24 fund-of-funds, 1 co-investment fund, and 15 direct investments through September 30, 2019. Of the \$4.9 billion committed, 86% has been contributed, 103% of contributed capital has been returned, and a total value of 1.6 times contributed capital has been generated. ATRS’ portfolio has outperformed the Dow Jones U.S. Total Stock Market Index equivalent (“PME”) by 390 basis points since inception.

### Investment Activity

For the nine months ended September 30, 2019, ATRS made capital contributions of approximately \$293.8 million and received distributions of \$310.8 million, for net distributions of \$17.0 million.

### Commitment Activity

Since January 1, 2019, ATRS closed on commitments totaling \$285.0 million to the following ten funds:

- FP International 2019 (\$30.0 million)
- American Industrial VII (\$30.0 million)
- Arlington V (\$25.0 million)
- FP Venture 2019 (\$30.0 million)
- JF Lehman V (\$30.0 million)
- DW Healthcare V (\$30.0 million)
- FP CF Access (\$30.0 million)
- KPS Mid-Market I (\$20.0 million)
- KPS V (\$30.0 million)
- Clearlake VI (\$30.0 million)

Further, in 2019 ATRS closed on an additional \$58.0 million direct investment in Big River Steel and an additional \$14.0 million commitment to Highland LLC. The previously approved \$30 million commitment to ATRS/FP Private Equity was instead committed directly to FP CF Access Fund, following board approval

in June 2019. ATRS has also approved \$30.0 million commitments to each of FP Intl X and FP VC XIII as well as \$20.0 million to Thoma Bravo Explore I, which remain pending.

### Market Commentary

**U.S. Private Equity:** Investment activity increased gradually from 2014 to 2017, but has flattened out since Q1 2018 at a pace of ~1,300 deals per quarter. After a slight downtick early in the year, pricing has increased to post-crisis peak levels during Q3 2019. Fundraising has accelerated after a slow Q1. Capital commitments are on pace to exceed 2018 levels by nearly 50%.

**U.S. Venture Capital:** The fundraising market reached new highs with more than \$57 billion committed during 2018. Fundraising has trailed that pace during 2019, but VCs are still on pace to raise \$40 billion. Late Stage activity is on pace to exceed the trailing three-year average by 28%. Exit activity during Q3 returned to more typical levels after a number of high-profile IPOs combined to raise more than \$138 billion of proceeds in Q2 2019.

*Franklin Park*

January 16, 2020

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## Portfolio Overview

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## Portfolio Summary



Group	Num.	Committed Capital (\$)	Contributed Capital (\$)	Unfunded Commitment (\$)	Distributed Capital (\$)	Remaining Value (\$)	Remaining Value (%)	Exposure (\$)	DPI	TVPI	Net IRR
<b>By Vehicle</b>											
1996-2000: Legacy Portfolio	13	1,106,390,461	1,070,676,238	0	1,639,739,921	427,788	0.0%	427,788	1.5 x	1.5 x	9.2%
2005-2006: CSFB Portfolio	2	654,300,000	688,077,346	67,870,564	928,157,923	151,423,158	6.6%	219,293,722	1.3 x	1.6 x	8.8%
Post 2006 Fund Portfolio	88	2,778,323,718	2,063,787,965	972,996,048	1,601,710,936	1,643,987,908	71.9%	2,616,983,956	0.8 x	1.6 x	15.3%
Big River Steel	9	257,880,449	257,940,356	0	132,006,068	403,564,375	17.6%	403,564,375	0.5 x	2.1 x	25.8%
Blue Oak Arkansas	1	18,000,000	19,740,000	0	4,717,993	0	0.0%	0	0.2 x	0.2 x	-50.5%
Highland LLC	4	65,000,000	80,870,000	0	31,655,775	68,050,598	3.0%	68,050,598	0.4 x	1.2 x	14.9%
GTLA Holdings	1	20,000,000	20,000,000	0	0	20,000,000	0.9%	20,000,000	0.0 x	1.0 x	0.0%
<b>Total</b>	<b>118</b>	<b>4,899,894,628</b>	<b>4,201,091,906</b>	<b>1,040,866,612</b>	<b>4,337,988,616</b>	<b>2,287,453,827</b>	<b>100.0%</b>	<b>3,328,320,439</b>	<b>1.0 x</b>	<b>1.6 x</b>	<b>10.9%</b>
<b>By Fund Type</b>											
Co-Investment Fund	1	263,823,718	225,048,580	127,932,806	112,149,369	209,722,044	9.2%	337,654,850	0.5 x	1.4 x	14.8%
Fund-of-Funds	24	1,214,300,000	1,004,771,529	305,808,716	1,082,714,592	581,300,507	25.4%	887,109,223	1.1 x	1.7 x	10.5%
Operating Company	15	360,880,449	378,550,356	0	168,379,835	491,614,973	21.5%	491,614,973	0.4 x	1.7 x	21.9%
Primary Fund	78	3,060,890,461	2,592,721,440	607,125,090	2,974,744,820	1,004,816,303	43.9%	1,611,941,393	1.1 x	1.5 x	10.5%
<b>Total</b>	<b>118</b>	<b>4,899,894,628</b>	<b>4,201,091,906</b>	<b>1,040,866,612</b>	<b>4,337,988,616</b>	<b>2,287,453,827</b>	<b>100.0%</b>	<b>3,328,320,439</b>	<b>1.0 x</b>	<b>1.6 x</b>	<b>10.9%</b>

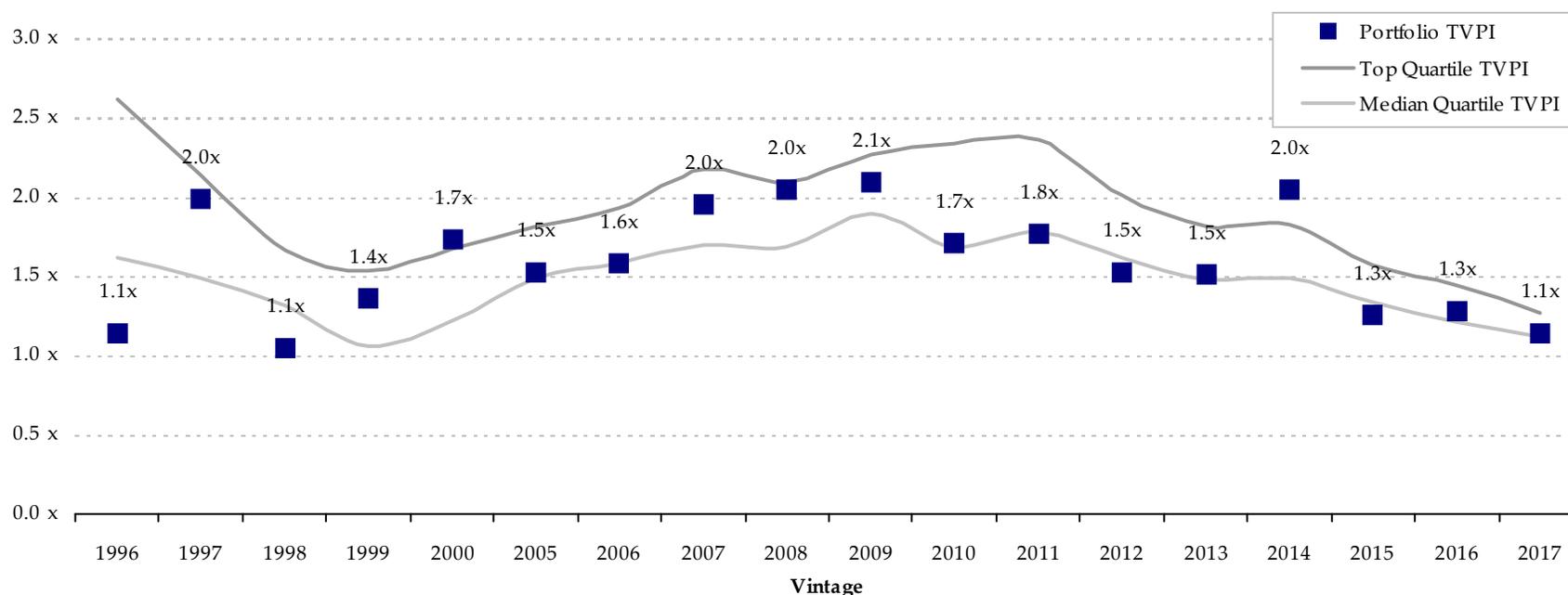
## Portfolio Summary



Group	Num.	Committed Capital (\$)	Contributed Capital (\$)	Unfunded Commitment (\$)	Distributed Capital (\$)	Remaining Value (\$)	Remaining Value (%)	Exposure (\$)	DPI	TVPI	Net IRR
<b>By Strategy</b>											
Buyout	56	2,242,390,461	1,815,119,132	530,351,640	2,231,250,542	726,116,919	31.7%	1,256,468,559	1.2 x	1.6 x	11.1%
Distressed Debt	3	100,000,000	93,881,464	22,429,968	78,435,414	48,039,109	2.1%	70,469,077	0.8 x	1.3 x	6.8%
Growth Equity	2	90,000,000	87,804,590	5,057,033	157,861,721	34,508,275	1.5%	39,565,308	1.8 x	2.2 x	18.2%
Hard Assets	14	392,500,000	366,827,504	63,282,496	203,049,333	216,170,282	9.5%	279,452,778	0.6 x	1.1 x	5.6%
Infrastructure	9	270,880,449	272,676,670	0	128,498,770	403,564,375	17.6%	403,564,375	0.5 x	2.0 x	22.9%
Mezzanine	6	250,000,000	176,140,154	17,396,065	202,798,667	28,822,950	1.3%	46,219,015	1.2 x	1.3 x	10.1%
Multi-Strategy	6	974,123,718	980,113,960	196,286,370	1,067,091,098	367,632,925	16.1%	563,919,295	1.1 x	1.5 x	7.7%
Special Assets	1	30,000,000	1,345,495	28,654,505	3,195	557,566	0.0%	29,212,071	0.0 x	0.4 x	NMF
Structured Capital	3	85,000,000	67,775,770	33,499,250	23,959,636	52,171,957	2.3%	85,671,207	0.4 x	1.1 x	6.6%
Turnaround	6	160,000,000	131,037,233	53,666,633	119,874,634	88,782,689	3.9%	142,449,322	0.9 x	1.6 x	16.4%
Venture Capital	12	305,000,000	208,369,933	90,242,652	125,165,606	321,086,780	14.0%	411,329,432	0.6 x	2.1 x	20.1%
<b>Total</b>	<b>118</b>	<b>4,899,894,628</b>	<b>4,201,091,906</b>	<b>1,040,866,612</b>	<b>4,337,988,616</b>	<b>2,287,453,827</b>	<b>100.0%</b>	<b>3,328,320,439</b>	<b>1.0 x</b>	<b>1.6 x</b>	<b>10.9%</b>
<b>By Sub-Asset Class</b>											
Corporate Finance	91	4,234,014,179	3,614,171,617	950,623,960	4,044,443,175	1,474,752,074	64.5%	2,425,376,034	1.1 x	1.5 x	10.3%
Direct Investments	15	360,880,449	378,550,356	0	168,379,835	491,614,973	21.5%	491,614,973	0.4 x	1.7 x	21.9%
Venture Capital	12	305,000,000	208,369,933	90,242,652	125,165,606	321,086,780	14.0%	411,329,432	0.6 x	2.1 x	20.1%
<b>Total</b>	<b>118</b>	<b>4,899,894,628</b>	<b>4,201,091,906</b>	<b>1,040,866,612</b>	<b>4,337,988,616</b>	<b>2,287,453,827</b>	<b>100.0%</b>	<b>3,328,320,439</b>	<b>1.0 x</b>	<b>1.6 x</b>	<b>10.9%</b>

- Remaining Value is defined as the investor's value as reported by the fund's manager.
- Exposure is defined as the sum of the investor's Remaining Value plus Unfunded Commitment.
- DPI is the ratio of Distributed Capital to Contributed Capital.
- TVPI is the ratio of Distributed Capital plus Remaining Value to Contributed Capital.
- Net IRR is defined as the annualized, compound rate of return using daily draws, distributions and Remaining Value as of the Report Date, net of fees and expenses, including late closing interest.
- Results include fully liquidated investments (if applicable).
- Commitments made in a foreign currency have been converted into U.S. dollars using an exchange rate as of the Report Date.

TVPI by Vintage

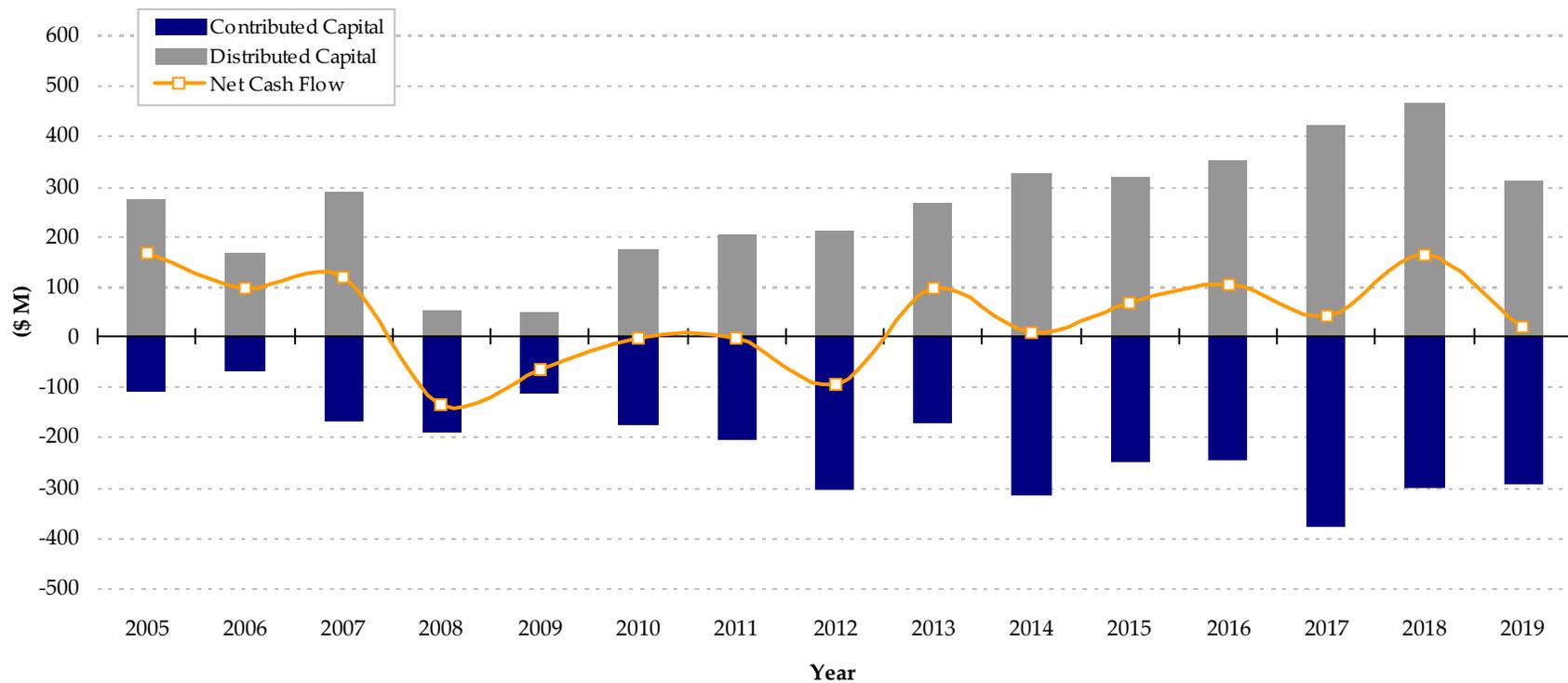


Net IRR vs. PME vs. Cambridge Associates: U.S. All Private Equity

Calculation Set	1-Year	3-Year	5-Year	10-Year	Inception
Aggregate Portfolio	10.4%	17.1%	14.6%	14.1%	10.9%
DJ US TSM TR Index* Public Market Equivalent (Aggregate Portfolio)	2.3%	13.0%	10.7%	13.6%	7.0%
Cambridge Associates: U.S. All Private Equity	14.1%	15.7%	12.7%	15.5%	N/A
Post 2006 Fund Portfolio	12.6%	15.8%	14.4%	15.9%	15.3%
DJ US TSM TR Index* Public Market Equivalent (Post 2006 Fund Portfolio)	2.2%	12.8%	10.7%	13.0%	12.3%

\* The Dow Jones U.S. Total Stock Market Total Return Index measures all U.S. equity securities that have readily available prices and is calculated with dividend reinvestment.

- 
- Benchmark TVPI represents vintage year first quartile per Cambridge Associates, as of June 30, 2019. The portfolio is compared to data compiled across multiple strategies including U.S. Buyout, Growth Equity, Venture Capital, Mezzanine, Distressed, Fund-of-funds, and Secondary funds.
  - Net IRR is defined as the annualized, compound rate of return using daily draws, distributions and Remaining Value as of the Report Date, net of fees and expenses, including late closing interest.
  - The public market equivalent (PME) represents the performance of a public market index expressed in terms of an IRR, using the same cash flows and timing as the investor's investment activity in private equity. The PME serves as a proxy for the return the investor could have achieved by investing in the public market. The PME return assumes cash flows are invested at the end of each day.
  - Cambridge Associates: U.S. All Private Equity reflects the pooled net IRR based on data compiled from Cambridge Associates as of June 30, 2019.
  - Benchmark data is not available (N/A).

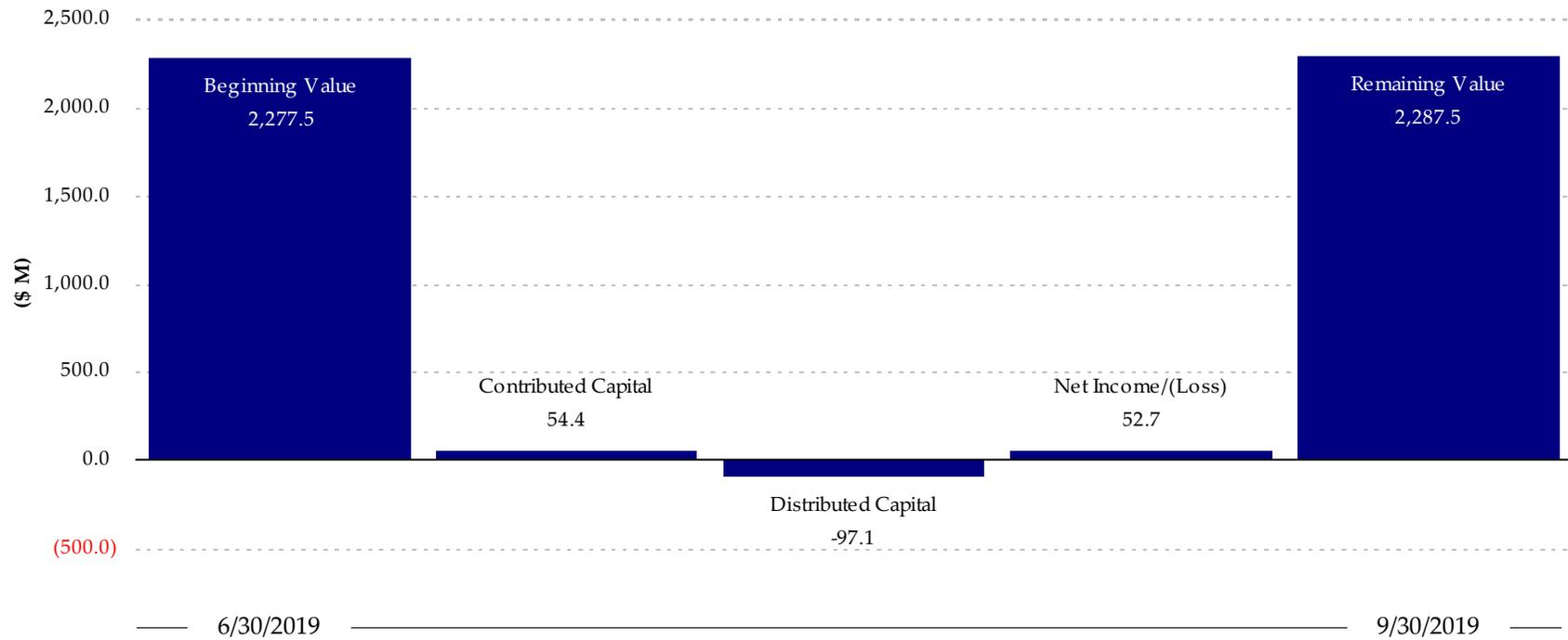


2019 (\$)		
Distributed	Contributed	Net Cash Flow
310,834,327	-293,805,703	17,028,624

▫ Cash flow data was compiled through the Report Date.

## Capital Account Change Since Prior Quarter

### Quarterly Portfolio Activity



Percent Change in Value	2.3%
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- Beginning Value represents the aggregate Remaining Value of the portfolio as of the prior quarter-end.
- Percent Change in Value is calculated by dividing Net Income / (Loss) by Beginning Value.

## Recent Commitments



### Commitments for Year Ended December 31, 2019

Fund	Strategy	Date	Commitment (\$)
FP Intl 2019	Buyout	Mar 2019	30,000,000
American Industrial VII	Buyout	Mar 2019	30,000,000
Arlington V	Buyout	May 2019	25,000,000
Big River - Equity Phase II	Infrastructure	May 2019	58,000,000
Highland Note 2020	Hard Assets	Jun 2019	14,000,000
FP Venture 2019	Venture Capital	Jun 2019	30,000,000
JF Lehman V	Buyout	Jun 2019	30,000,000
DW Healthcare V	Buyout	Jul 2019	30,000,000
FP CF Access	Buyout	Jul 2019	30,000,000
KPS Mid-Market I	Turnaround	Oct 2019	20,000,000
KPS V	Turnaround	Oct 2019	30,000,000
Clearlake VI	Buyout	Dec 2019	30,000,000
<b>Total</b>			<b>357,000,000</b>

### Year to Date Commitments as of January 16, 2020

Not Applicable

### Approved and Pending Commitments as of January 16, 2020

Fund	Strategy	Date	Target Commitment (\$)
FP Intl X	Buyout	N/A	30,000,000
FP VC XIII	Venture Capital	N/A	30,000,000
Thoma Bravo Explore I	Buyout	N/A	20,000,000

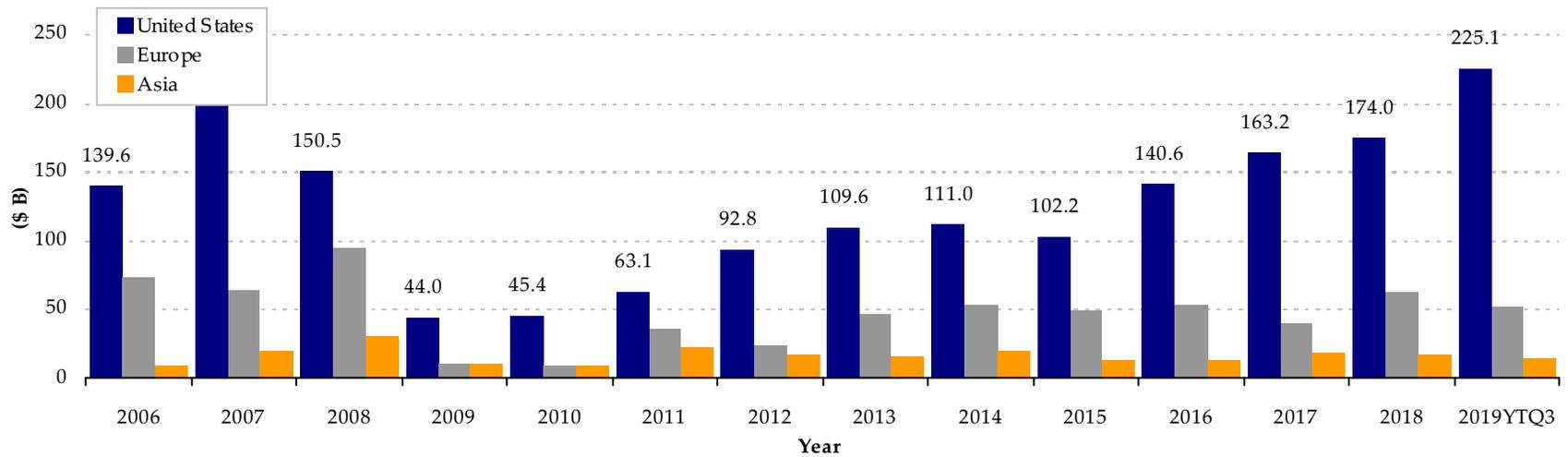
- Commitments made in a foreign currency have been converted into U.S. dollars using an exchange rate as of the Report Date, if applicable.
- ATRS committed an additional \$30.0 million to ATRS/FP Private Equity Fund as as part of the 2019 allocation, which was subsequently reversed.

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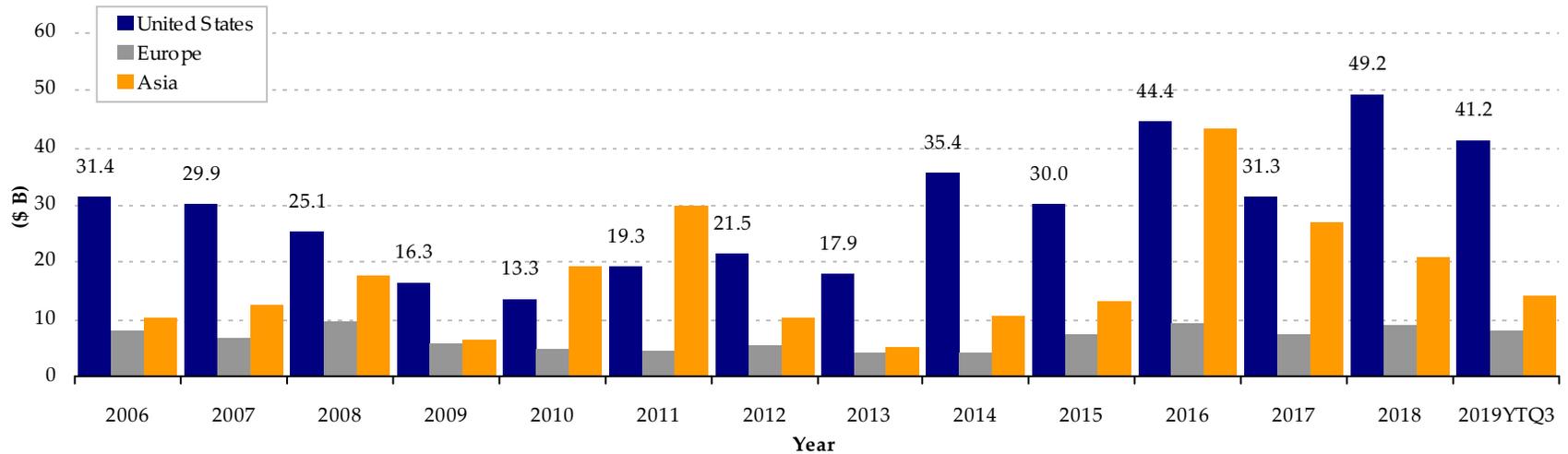
## Market Update

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Buyout Funds



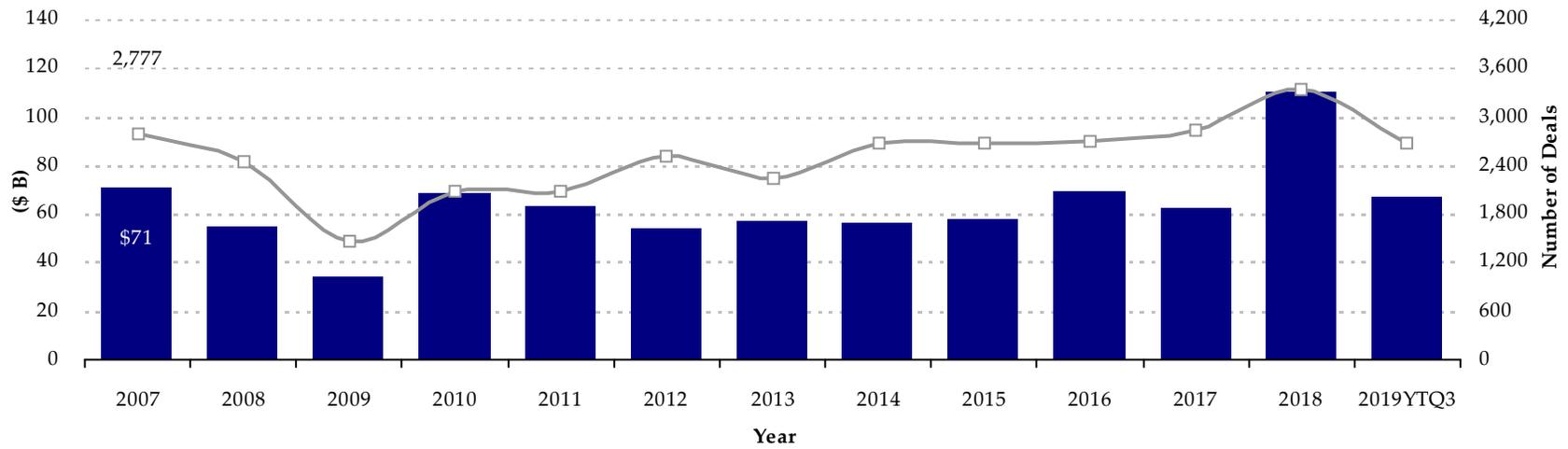
Venture Funds



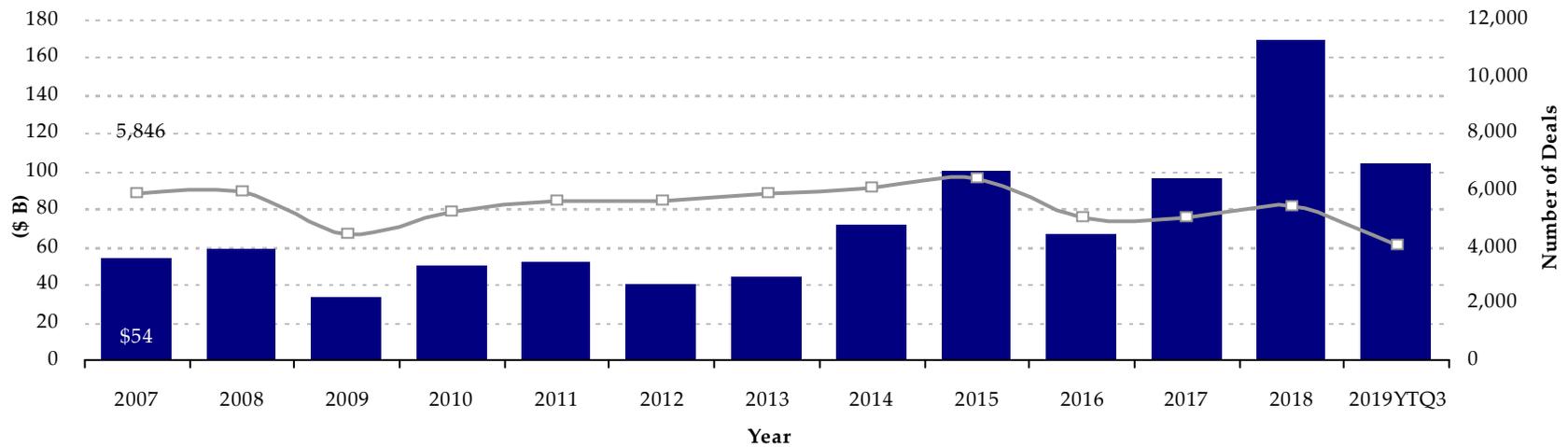
Source: Thomson One Private Equity.

Data compiled through 3Q 2019.

U.S. Buyout

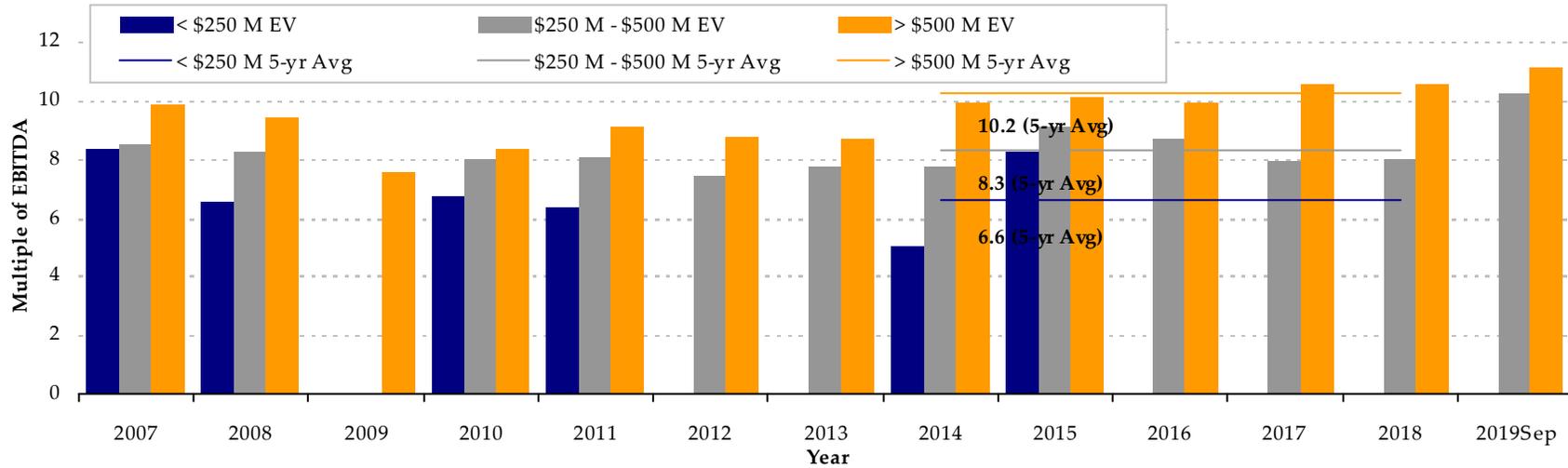


U.S. Venture

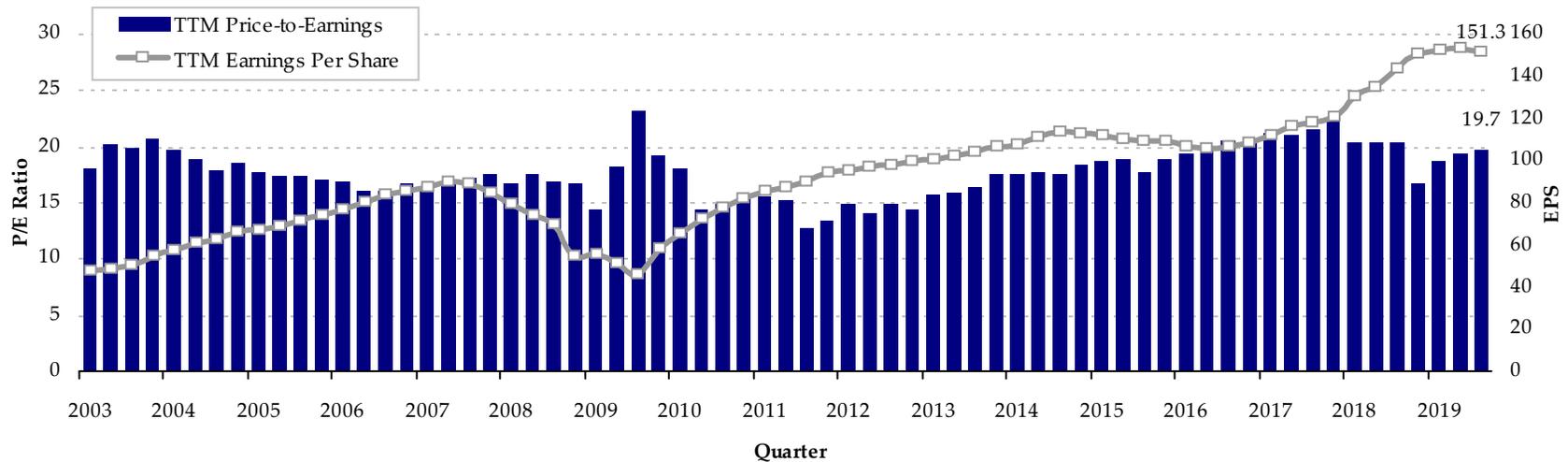


- Source: Thomson One Private Equity.
- Data compiled through 3Q 2019.

U.S. LBO Pricing Multiples

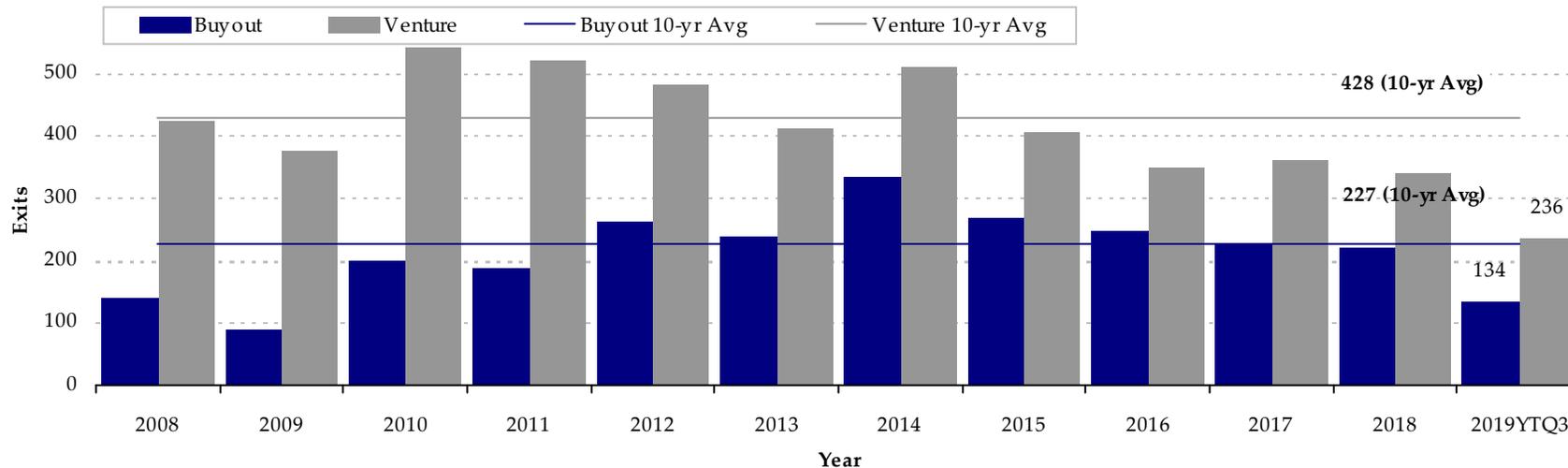


S&P 500 Valuation and Earnings

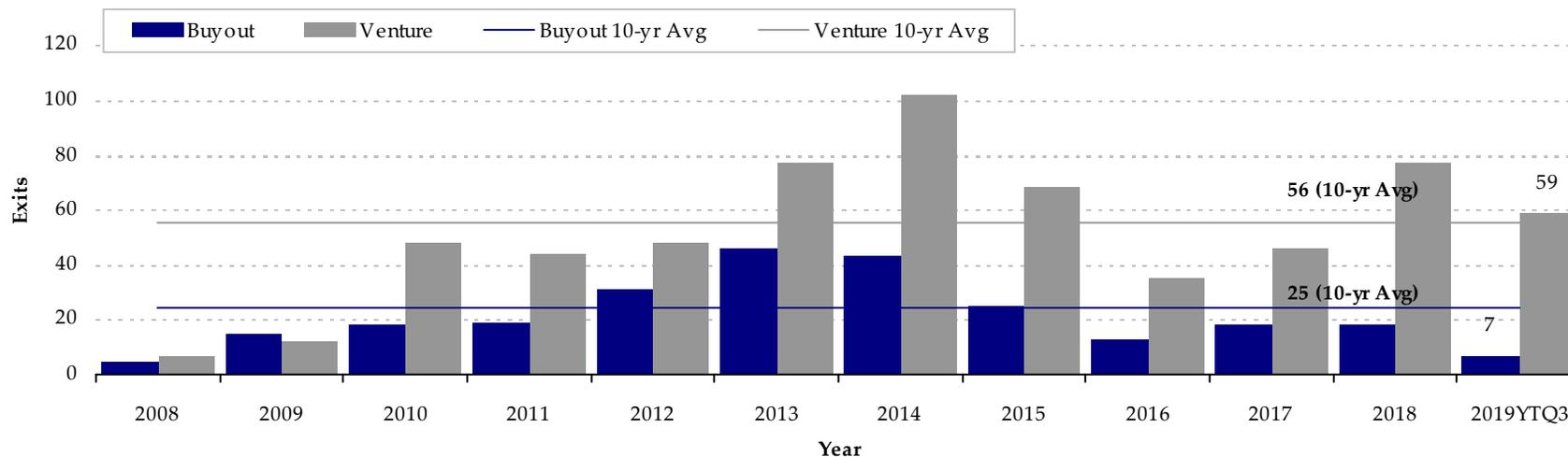


Source: Standard & Poor's Leveraged Commentary.

U.S. Mergers and Acquisitions



U.S. Initial Public Offerings



- Source: Thomson One Private Equity.
- Data compiled through 3Q 2019.

## Vintage Returns

Group	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
U.S. All PE Median	12.1%	15.9%	13.6%	15.2%	14.1%	13.4%	14.8%	14.4%	13.9%	11.8%
U.S. All PE Top Quartile	17.7%	22.9%	19.3%	21.0%	19.3%	19.1%	23.7%	22.6%	25.4%	28.9%
U.S. Buyout Median	14.0%	21.2%	17.5%	18.1%	16.5%	15.5%	16.3%	16.6%	11.5%	19.0%
U.S. Buyout Top Quartile	21.1%	26.3%	22.0%	22.7%	22.8%	18.8%	24.5%	23.7%	23.6%	33.7%
U.S. Energy Median	4.0%	8.5%	10.6%	4.0%	2.8%	7.8%	10.6%	11.2%	10.1%	5.4%
U.S. Energy Top Quartile	6.1%	17.8%	28.1%	8.7%	12.4%	20.9%	16.8%	14.3%	15.1%	16.9%
U.S. Real Estate Median	13.8%	16.9%	16.2%	16.6%	12.2%	13.6%	12.1%	10.9%	9.9%	4.5%
U.S. Real Estate Top Quartile	21.5%	19.6%	20.6%	20.9%	14.5%	17.3%	13.5%	14.4%	12.5%	10.4%
U.S. Venture Median	6.8%	13.0%	16.1%	16.6%	15.2%	14.7%	16.1%	16.0%	16.2%	11.6%
U.S. Venture Top Quartile	16.3%	21.5%	25.8%	23.3%	22.8%	21.5%	26.3%	24.7%	30.9%	21.1%

▫ Source: Cambridge Associates.

▫ Data compiled through June 30, 2019.

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# Performance Analysis

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# Investment Performance by Strategy



Investment	Vintage	Fund Size	Committed Capital (\$)	Contributed Capital (\$)	Unfunded Commitment (\$)	Distributed Capital (\$)	Remaining Value (\$)	TVPI	Net IRR
<b>Buyout</b>									
21st Century Group I *	2000	\$80,365,451	25,000,000	27,141,173	0	22,841,928	0	0.8 x	-3.8%
Advent GPE VI-A	2008	\$9,000,000,000	40,000,000	40,167,228	0	78,231,051	6,165,816	2.1 x	16.8%
Altaris Constellation	2017	\$165,000,000	20,000,000	16,225,389	4,766,723	991,694	21,671,944	1.4 x	19.1%
Altaris IV	2018	\$1,085,000,000	24,000,000	11,516,157	12,483,843	0	13,211,723	1.1 x	NMF
Altus Capital II	2010	\$200,000,000	20,000,000	18,479,906	4,381,151	19,175,211	9,224,275	1.5 x	12.3%
American Industrial VI	2016	\$1,845,000,000	20,000,000	20,962,158	1,813,213	2,775,370	22,185,245	1.2 x	10.6%
American Industrial VII	2019	\$3,075,000,000	30,000,000	0	30,000,000	0	-104,005	N/A	NMF
Arlington IV	2016	\$700,000,000	23,000,000	19,337,926	3,662,074	0	24,610,433	1.3 x	18.5%
Arlington V	2019	\$1,692,000,000	25,000,000	187,918	24,812,082	0	-96,081	-0.5 x	NMF
Boston Ventures VII	2006	\$434,507,010	50,000,000	43,016,769	8,258,947	44,748,285	16,742,016	1.4 x	6.0%
BV IX	2017	\$750,000,000	30,000,000	14,122,398	15,877,603	840,350	15,450,522	1.2 x	20.6%
BV VIII	2012	\$486,800,000	30,000,000	26,447,466	3,833,720	32,662,578	24,068,613	2.1 x	58.8%
Clearlake V	2018	\$3,623,125,000	30,000,000	19,357,089	12,474,081	3,741,861	24,978,100	1.5 x	NMF
Court Square III	2012	\$3,173,449,997	40,000,000	42,785,150	2,989,472	22,229,001	45,616,864	1.6 x	20.6%
Cypress MBP II *	1999	\$2,376,060,606	50,000,000	52,304,562	0	50,840,220	0	1.0 x	-0.5%
DLJ MBP III *	2000	\$5,304,941,647	200,000,000	215,345,711	0	458,746,671	0	2.1 x	19.4%
Doughty Hanson III *	1997	\$2,660,000,000	100,000,000	99,374,207	0	197,482,184	0	2.0 x	13.5%
DW Healthcare III	2012	\$268,147,500	40,000,000	35,694,363	4,305,637	40,738,290	22,974,163	1.8 x	18.4%
DW Healthcare IV	2016	\$294,274,000	30,000,000	25,957,390	5,571,576	11,273,132	28,458,563	1.5 x	36.8%
DW Healthcare V	2019	\$611,000,000	30,000,000	2,013,813	27,986,187	0	1,421,908	0.7 x	NMF
FP CF Access	2020	\$	30,000,000	0	30,000,000	0	0	N/A	NMF
FP Intrnl 2011	2011	\$45,000,000	25,000,000	22,668,480	2,604,774	14,445,771	17,842,981	1.4 x	8.5%
FP Intrnl 2012	2012	\$70,000,000	25,000,000	16,426,600	8,738,843	6,323,845	14,766,884	1.3 x	8.2%
FP Intrnl 2013	2013	\$97,000,000	20,000,000	13,093,700	7,025,225	1,533,231	15,786,994	1.3 x	9.0%
FP Intrnl 2014	2014	\$97,000,000	25,000,000	14,613,291	10,481,990	5,553,176	15,890,062	1.5 x	17.2%
FP Intrnl 2015	2015	\$113,000,000	25,000,000	13,716,880	11,359,669	439,802	15,045,594	1.1 x	6.8%
FP Intrnl 2016	2016	\$97,000,000	25,000,000	13,659,794	11,426,162	1,095,238	14,890,971	1.2 x	10.2%
FP Intrnl 2017	2017	\$98,000,000	25,000,000	9,183,673	15,901,194	0	10,195,187	1.1 x	10.6%
FP Intrnl 2018	2018	\$65,500,000	25,000,000	4,961,832	20,157,643	0	4,371,896	0.9 x	NMF
FP Intrnl 2019	2019	\$70,500,000	30,000,000	0	30,000,000	0	0	N/A	NMF
HMTF III *	1996	\$2,458,754,795	76,743,018	76,799,039	0	87,834,289	0	1.1 x	1.8%
HMTF IV *	1998	\$4,023,532,721	100,000,000	98,010,015	0	67,130,479	0	0.7 x	-6.1%
HMTF V *	2000	\$1,552,965,194	207,366,433	205,198,451	0	378,102,491	0	1.8 x	17.6%
JF Lehman III	2011	\$575,500,000	39,000,000	43,494,645	503,401	36,058,155	35,510,728	1.6 x	13.7%
JF Lehman IV	2016	\$833,000,000	30,000,000	24,636,761	5,363,240	11,401,706	30,308,639	1.7 x	31.7%
JF Lehman V	2020	\$1,000,000,000	30,000,000	0	30,000,000	0	0	N/A	NMF

## Investment Performance by Strategy



Investment	Vintage	Fund Size	Committed Capital (\$)	Contributed Capital (\$)	Unfunded Commitment (\$)	Distributed Capital (\$)	Remaining Value (\$)	TVPI	Net IRR
Mason Wells III	2010	\$525,000,000	30,000,000	28,553,580	1,446,420	68,546,055	6,178,012	2.6 x	19.1%
Oak Hill I *	1999	\$1,600,000,000	50,000,000	50,786,497	0	91,264,962	0	1.8 x	10.6%
One Rock II	2017	\$964,000,000	30,000,000	18,304,614	11,695,386	0	20,672,718	1.1 x	12.2%
Riverside IV	2009	\$406,091,370	40,000,000	31,433,665	10,099,013	72,706,965	2,478,575	2.4 x	21.4%
Riverside V	2013	\$561,224,490	35,000,000	32,625,595	4,168,822	18,659,770	26,721,636	1.4 x	9.6%
Riverside VI	2019	\$600,000,000	30,000,000	4,843,536	25,156,464	0	3,375,899	0.7 x	NMF
Second Cinven *	1998	£904,547,000	65,281,010	65,281,010	0	104,700,661	0	1.6 x	9.3%
Siris III	2015	\$1,810,000,000	25,000,000	27,225,659	7,155,449	16,198,542	16,935,756	1.2 x	12.4%
Siris IV	2019	\$3,452,454,000	30,000,000	9,148,255	20,851,745	0	9,323,051	1.0 x	NMF
SK Capital V	2018	\$2,013,000,000	30,000,000	3,672,134	26,327,866	10,490	3,266,299	0.9 x	NMF
Thoma Bravo Discover	2016	\$1,074,000,000	10,000,000	11,350,409	1,767,370	5,982,126	14,103,628	1.8 x	32.4%
Thoma Bravo Discover II	2018	\$2,402,685,000	17,000,000	5,747,674	11,252,326	0	5,426,039	0.9 x	NMF
Thoma Bravo XI	2014	\$3,662,000,000	20,000,000	20,634,595	2,286,609	18,895,188	31,769,891	2.5 x	27.1%
Thoma Bravo XII	2016	\$7,603,860,000	30,000,000	28,974,999	2,526,834	1,503,987	36,891,490	1.3 x	15.1%
Thoma Bravo XIII	2019	\$12,575,745,000	30,000,000	10,831,104	19,168,896	121	10,685,440	1.0 x	NMF
Vista Equity III	2007	\$1,287,129,725	50,000,000	54,230,289	4,000,393	127,483,122	4,794,486	2.4 x	28.7%
Vista Foundation II	2013	\$1,145,000,000	15,000,000	15,365,897	7,768,739	10,905,347	16,067,286	1.8 x	16.9%
Vista Foundation III	2016	\$2,950,561,226	30,000,000	21,406,639	8,631,076	4,739	24,739,573	1.2 x	9.4%
Wellspring V	2011	\$1,194,387,756	40,000,000	45,743,660	14,521,493	51,647,418	18,984,269	1.5 x	16.3%
Wicks IV	2011	\$414,000,000	40,000,000	42,059,387	4,748,289	45,505,040	22,512,837	1.6 x	17.2%
<b>Total Buyout</b>			<b>2,242,390,461</b>	<b>1,815,119,132</b>	<b>530,351,640</b>	<b>2,231,250,542</b>	<b>726,116,919</b>	<b>1.6 x</b>	<b>11.1%</b>
<b>Distressed Debt</b>									
Castlelake II	2011	\$996,762,000	35,000,000	32,656,036	2,625,461	27,537,421	17,033,620	1.4 x	6.6%
Castlelake III	2014	\$1,421,000,000	25,000,000	23,149,741	1,864,884	14,234,551	17,918,175	1.4 x	8.1%
Tennenbaum VI	2010	\$530,000,000	40,000,000	38,075,687	17,939,623	36,663,442	13,087,314	1.3 x	6.4%
<b>Total Distressed Debt</b>			<b>100,000,000</b>	<b>93,881,464</b>	<b>22,429,968</b>	<b>78,435,414</b>	<b>48,039,109</b>	<b>1.3 x</b>	<b>6.8%</b>
<b>Growth Equity</b>									
LLR III	2008	\$803,000,000	50,000,000	48,504,590	4,357,033	85,370,014	8,966,919	1.9 x	15.1%
TA XI	2010	\$4,000,100,000	40,000,000	39,300,000	700,000	72,491,707	25,541,356	2.5 x	23.1%
<b>Total Growth Equity</b>			<b>90,000,000</b>	<b>87,804,590</b>	<b>5,057,033</b>	<b>157,861,721</b>	<b>34,508,275</b>	<b>2.2 x</b>	<b>18.2%</b>

## Investment Performance by Strategy



Investment	Vintage	Fund Size	Committed Capital (\$)	Contributed Capital (\$)	Unfunded Commitment (\$)	Distributed Capital (\$)	Remaining Value (\$)	TVPI	Net IRR
<b>Hard Assets</b>									
EnCap IX	2013	\$5,154,639,175	25,000,000	28,060,297	1,693,307	21,199,616	13,887,419	1.3 x	9.5%
EnCap VIII	2010	\$3,608,247,422	47,500,000	52,253,424	2,087,574	31,031,849	12,860,726	0.8 x	-5.7%
EnCap X	2015	\$6,701,030,928	30,000,000	26,368,298	5,537,392	4,921,287	26,672,272	1.2 x	9.3%
EnCap XI	2017	\$6,961,190,722	35,000,000	7,144,778	27,855,222	0	5,826,558	0.8 x	-19.0%
GTLA Holdings	2018	\$20,000,000	20,000,000	20,000,000	0	0	20,000,000	1.0 x	NMF
Highland Contingent Note	2018	\$150,000,000	0	0	0	15,000,000	0	N/A	NMF
Highland Equity	2016	\$25,000,000	25,000,000	25,000,000	0	162,500	25,420,000	1.0 x	0.7%
Highland Note	2017	\$26,000,000	26,000,000	41,870,000	0	16,493,275	28,630,598	1.1 x	6.9%
Highland Note 2020	2019	\$14,000,000	14,000,000	14,000,000	0	0	14,000,000	1.0 x	NMF
Lime Rock Resources III	2014	\$762,000,000	25,000,000	25,482,772	413,848	4,521,414	21,981,628	1.0 x	0.9%
NGP IX	2007	\$4,000,000,000	50,000,000	54,166,654	250,302	76,124,968	1,237,017	1.4 x	10.8%
NGP X	2012	\$3,586,000,000	35,000,000	35,305,152	1,388,578	26,279,743	10,506,411	1.0 x	1.3%
NGP XI	2014	\$5,325,000,000	30,000,000	27,695,009	3,537,392	7,215,549	25,794,489	1.2 x	8.2%
NGP XII	2017	\$4,304,081,633	30,000,000	9,481,119	20,518,881	99,132	9,353,164	1.0 x	-0.2%
<b>Total Hard Assets</b>			<b>392,500,000</b>	<b>366,827,504</b>	<b>63,282,496</b>	<b>203,049,333</b>	<b>216,170,282</b>	<b>1.1 x</b>	<b>5.6%</b>
<b>Infrastructure</b>									
Big River - Equity	2014	\$93,090,000	93,090,000	93,090,000	0	19,160,000	327,000,000	3.7 x	28.8%
Big River - Equity Phase II	2019	\$58,000,000	58,000,000	58,000,000	0	0	58,295,562	1.0 x	NMF
Big River - Funding *	2017	\$3,750,000	3,750,000	3,750,000	0	3,812,795	0	1.0 x	4.3%
Big River - Holdings Note *	2017	\$12,000,000	12,000,000	12,000,000	0	13,343,726	0	1.1 x	11.0%
Big River - Holdings Note 2023	2018	\$12,000,000	12,000,000	12,000,000	0	0	12,871,433	1.1 x	NMF
Big River - Holdings Note 2023-2	2018	\$5,150,000	5,150,000	5,150,000	0	62,323	5,397,380	1.1 x	NMF
Big River - Preferred Equity *	2017	\$41,980,449	41,980,449	41,980,449	0	51,702,368	0	1.2 x	12.5%
Big River - Sr Secured Debt *	2015	\$26,910,000	26,910,000	26,966,221	0	35,699,565	0	1.3 x	14.7%
Blue Oak Arkansas *	2014	\$18,000,000	18,000,000	19,740,000	0	4,717,993	0	0.2 x	-50.5%
<b>Total Infrastructure</b>			<b>270,880,449</b>	<b>272,676,670</b>	<b>0</b>	<b>128,498,770</b>	<b>403,564,375</b>	<b>2.0 x</b>	<b>22.9%</b>

## Investment Performance by Strategy



Investment	Vintage	Fund Size	Committed Capital (\$)	Contributed Capital (\$)	Unfunded Commitment (\$)	Distributed Capital (\$)	Remaining Value (\$)	TVPI	Net IRR
<b>Mezzanine</b>									
Audax Mezzanine III	2011	\$1,002,250,000	25,000,000	23,905,973	6,825,000	27,223,431	4,120,034	1.3 x	9.7%
Big River - Mezzanine *	2014	\$5,000,000	5,000,000	5,003,686	0	8,225,290	0	1.6 x	17.3%
Blackstone Mezzanine I *	1999	\$1,141,000,000	100,000,000	73,353,517	0	96,729,026	0	1.3 x	10.2%
DLJ Investment II *	1999	\$1,600,000,000	80,000,000	43,611,022	0	60,455,204	0	1.4 x	10.3%
Greyrock IV	2017	\$275,000,000	30,000,000	20,337,103	10,048,941	386,044	20,960,722	1.0 x	3.8%
Insight Mezzanine I	2009	\$94,678,011	10,000,000	9,928,853	522,124	9,779,671	3,742,194	1.4 x	6.9%
<b>Total Mezzanine</b>			<b>250,000,000</b>	<b>176,140,154</b>	<b>17,396,065</b>	<b>202,798,667</b>	<b>28,822,950</b>	<b>1.3 x</b>	<b>10.1%</b>
<b>Multi-Strategy</b>									
ATRS-FP PE	2012	\$265,516,382	263,823,718	225,048,580	127,932,806	112,149,369	209,722,044	1.4 x	14.8%
CSFB-ATRS 2005-1 Series	2005	\$252,525,253	250,000,000	279,699,870	8,430,555	369,934,974	56,003,832	1.5 x	7.6%
CSFB-ATRS 2006-1 Series	2006	\$406,331,658	404,300,000	408,377,476	59,440,009	558,222,949	95,419,326	1.6 x	9.9%
DH Tech I	2000	\$236,700,000	50,000,000	61,471,034	0	20,514,606	427,788	0.3 x	-22.7%
Diamond State *	1999	\$46,000,000	2,000,000	2,000,000	0	3,097,200	0	1.5 x	5.5%
Diamond State II	2007	\$27,861,350	4,000,000	3,517,000	483,000	3,172,000	6,059,935	2.6 x	11.8%
<b>Total Multi-Strategy</b>			<b>974,123,718</b>	<b>980,113,960</b>	<b>196,286,370</b>	<b>1,067,091,098</b>	<b>367,632,925</b>	<b>1.5 x</b>	<b>7.7%</b>
<b>Special Assets</b>									
WNG II	2019	\$438,350,000	30,000,000	1,345,495	28,654,505	3,195	557,566	0.4 x	NMF
<b>Total Special Assets</b>			<b>30,000,000</b>	<b>1,345,495</b>	<b>28,654,505</b>	<b>3,195</b>	<b>557,566</b>	<b>0.4 x</b>	<b>NMF</b>
<b>Structured Capital</b>									
Bison V	2017	\$384,132,653	35,000,000	19,451,357	18,799,271	3,250,628	19,005,101	1.1 x	11.8%
Levine Leichtman V	2013	\$1,644,081,633	20,000,000	24,432,083	3,715,558	15,743,331	18,067,655	1.4 x	12.3%
PineBridge Structured III	2016	\$600,000,000	30,000,000	23,892,330	10,984,421	4,965,677	15,099,201	0.8 x	-12.3%
<b>Total Structured Capital</b>			<b>85,000,000</b>	<b>67,775,770</b>	<b>33,499,250</b>	<b>23,959,636</b>	<b>52,171,957</b>	<b>1.1 x</b>	<b>6.6%</b>

## Investment Performance by Strategy



Investment	Vintage	Fund Size	Committed Capital (\$)	Contributed Capital (\$)	Unfunded Commitment (\$)	Distributed Capital (\$)	Remaining Value (\$)	TVPI	Net IRR
<b>Turnaround</b>									
Atlas Capital II	2014	\$900,000,000	15,000,000	18,302,559	5,057,680	11,807,434	14,481,506	1.4 x	23.3%
Insight Equity II	2009	\$429,735,291	30,000,000	30,345,986	1,566,669	24,807,229	25,739,293	1.7 x	10.5%
KPS III Supplemental	2009	\$816,326,531	40,000,000	37,761,582	16,010,148	69,742,260	10,413,813	2.1 x	22.8%
KPS IV	2014	\$3,571,428,571	25,000,000	19,395,648	5,136,852	5,454,229	17,959,053	1.2 x	18.1%
Sycamore Partners II	2014	\$2,700,000,000	25,000,000	21,842,009	4,284,733	8,063,482	17,742,629	1.2 x	8.3%
Sycamore Partners III	2018	\$4,870,000,000	25,000,000	3,389,449	21,610,551	0	2,446,395	0.7 x	NMF
<b>Total Turnaround</b>			<b>160,000,000</b>	<b>131,037,233</b>	<b>53,666,633</b>	<b>119,874,634</b>	<b>88,782,689</b>	<b>1.6 x</b>	<b>16.4%</b>
<b>Venture Capital</b>									
FP Venture 2008	2008	\$102,000,000	30,000,000	29,733,510	415,186	37,324,188	26,210,244	2.1 x	15.2%
FP Venture 2009	2009	\$58,000,000	25,000,000	24,329,950	847,965	34,944,166	26,052,238	2.5 x	18.4%
FP Venture 2010	2010	\$80,000,000	25,000,000	15,890,625	1,722,064	9,386,033	25,065,305	2.2 x	15.3%
FP Venture 2011	2011	\$70,000,000	25,000,000	24,107,625	1,043,753	19,819,797	75,582,096	4.0 x	33.5%
FP Venture 2012	2012	\$80,000,000	25,000,000	21,718,750	3,388,416	11,990,353	36,411,102	2.2 x	20.2%
FP Venture 2013	2013	\$87,000,000	20,000,000	17,241,750	2,825,208	6,632,615	31,947,744	2.2 x	25.7%
FP Venture 2014	2014	\$93,000,000	25,000,000	23,118,520	1,951,135	3,860,450	35,741,714	1.7 x	17.7%
FP Venture 2015	2015	\$113,000,000	25,000,000	21,460,280	3,611,081	718,327	28,674,760	1.4 x	15.8%
FP Venture 2016	2016	\$82,000,000	25,000,000	14,634,146	10,438,124	396,634	18,462,180	1.3 x	17.8%
FP Venture 2017	2017	\$113,000,000	25,000,000	7,035,398	18,011,367	69,226	8,291,940	1.2 x	21.3%
FP Venture 2018	2018	\$80,500,000	25,000,000	5,745,342	19,313,059	217	5,419,218	0.9 x	NMF
FP Venture 2019	2019	\$80,500,000	30,000,000	3,354,037	26,675,294	23,600	3,228,239	1.0 x	NMF
<b>Total Venture Capital</b>			<b>305,000,000</b>	<b>208,369,933</b>	<b>90,242,652</b>	<b>125,165,606</b>	<b>321,086,780</b>	<b>2.1 x</b>	<b>20.1%</b>
<b>Total Portfolio</b>			<b>4,899,894,628</b>	<b>4,201,091,906</b>	<b>1,040,866,612</b>	<b>4,337,988,616</b>	<b>2,287,453,827</b>	<b>1.6 x</b>	<b>10.9%</b>

- Remaining Value is defined as the investor's value as reported by the fund's manager.
- TVPI is the ratio of Distributed Capital plus Remaining Value to Contributed Capital.
- Net IRR is defined as the annualized, compound rate of return using daily draws, distributions and Remaining Value as of the Report Date, net of fees and expenses, including late closing interest.
- An asterisk indicates an investment that is fully liquidated, if applicable.
- Commitments made in a foreign currency have been converted into U.S. dollars using an exchange rate as of the Report Date, if applicable.

## Investment Performance by Vintage Year



Investment	Strategy	Committed Capital (\$)	Contributed Capital (\$)	Unfunded Commitment (\$)	Distributed Capital (\$)	Remaining Value (\$)	TVPI	Net IRR
<b>1996</b>								
HMTF III *	Buyout	76,743,018	76,799,039	0	87,834,289	0	1.1 x	1.8%
<b>Total 1996</b>		<b>76,743,018</b>	<b>76,799,039</b>	<b>0</b>	<b>87,834,289</b>	<b>0</b>	<b>1.1 x</b>	<b>1.8%</b>
<b>1997</b>								
Doughty Hanson III *	Buyout	100,000,000	99,374,207	0	197,482,184	0	2.0 x	13.5%
<b>Total 1997</b>		<b>100,000,000</b>	<b>99,374,207</b>	<b>0</b>	<b>197,482,184</b>	<b>0</b>	<b>2.0 x</b>	<b>13.5%</b>
<b>1998</b>								
HMTF IV *	Buyout	100,000,000	98,010,015	0	67,130,479	0	0.7 x	-6.1%
Second Cinven *	Buyout	65,281,010	65,281,010	0	104,700,661	0	1.6 x	9.3%
<b>Total 1998</b>		<b>165,281,010</b>	<b>163,291,025</b>	<b>0</b>	<b>171,831,140</b>	<b>0</b>	<b>1.1 x</b>	<b>0.9%</b>
<b>1999</b>								
Blackstone Mezzanine I *	Mezzanine	100,000,000	73,353,517	0	96,729,026	0	1.3 x	10.2%
Cypress MBP II *	Buyout	50,000,000	52,304,562	0	50,840,220	0	1.0 x	-0.5%
Diamond State *	Multi-Strategy	2,000,000	2,000,000	0	3,097,200	0	1.5 x	5.5%
DLJ Investment II *	Mezzanine	80,000,000	43,611,022	0	60,455,204	0	1.4 x	10.3%
Oak Hill I *	Buyout	50,000,000	50,786,497	0	91,264,962	0	1.8 x	10.6%
<b>Total 1999</b>		<b>282,000,000</b>	<b>222,055,598</b>	<b>0</b>	<b>302,386,613</b>	<b>0</b>	<b>1.4 x</b>	<b>7.7%</b>
<b>2000</b>								
21st Century Group I *	Buyout	25,000,000	27,141,173	0	22,841,928	0	0.8 x	-3.8%
DH Tech I	Multi-Strategy	50,000,000	61,471,034	0	20,514,606	427,788	0.3 x	-22.7%
DLJ MBP III *	Buyout	200,000,000	215,345,711	0	458,746,671	0	2.1 x	19.4%
HMTF V *	Buyout	207,366,433	205,198,451	0	378,102,491	0	1.8 x	17.6%
<b>Total 2000</b>		<b>482,366,433</b>	<b>509,156,369</b>	<b>0</b>	<b>880,205,696</b>	<b>427,788</b>	<b>1.7 x</b>	<b>14.8%</b>
<b>2005</b>								
CSFB-ATRS 2005-1 Series	Multi-Strategy	250,000,000	279,699,870	8,430,555	369,934,974	56,003,832	1.5 x	7.6%
<b>Total 2005</b>		<b>250,000,000</b>	<b>279,699,870</b>	<b>8,430,555</b>	<b>369,934,974</b>	<b>56,003,832</b>	<b>1.5 x</b>	<b>7.6%</b>

## Investment Performance by Vintage Year



Investment	Strategy	Committed Capital (\$)	Contributed Capital (\$)	Unfunded Commitment (\$)	Distributed Capital (\$)	Remaining Value (\$)	TVPI	Net IRR
<b>2006</b>								
Boston Ventures VII	Buyout	50,000,000	43,016,769	8,258,947	44,748,285	16,742,016	1.4 x	6.0%
CSFB-ATRS 2006-1 Series	Multi-Strategy	404,300,000	408,377,476	59,440,009	558,222,949	95,419,326	1.6 x	9.9%
<b>Total 2006</b>		<b>454,300,000</b>	<b>451,394,245</b>	<b>67,698,956</b>	<b>602,971,234</b>	<b>112,161,342</b>	<b>1.6 x</b>	<b>9.5%</b>
<b>2007</b>								
Diamond State II	Multi-Strategy	4,000,000	3,517,000	483,000	3,172,000	6,059,935	2.6 x	11.8%
NGP IX	Hard Assets	50,000,000	54,166,654	250,302	76,124,968	1,237,017	1.4 x	10.8%
Vista Equity III	Buyout	50,000,000	54,230,289	4,000,393	127,483,122	4,794,486	2.4 x	28.7%
<b>Total 2007</b>		<b>104,000,000</b>	<b>111,913,943</b>	<b>4,733,695</b>	<b>206,780,090</b>	<b>12,091,438</b>	<b>2.0 x</b>	<b>20.6%</b>
<b>2008</b>								
Advent GPE VI-A	Buyout	40,000,000	40,167,228	0	78,231,051	6,165,816	2.1 x	16.8%
FP Venture 2008	Venture Capital	30,000,000	29,733,510	415,186	37,324,188	26,210,244	2.1 x	15.2%
LLR III	Growth Equity	50,000,000	48,504,590	4,357,033	85,370,014	8,966,919	1.9 x	15.1%
<b>Total 2008</b>		<b>120,000,000</b>	<b>118,405,328</b>	<b>4,772,219</b>	<b>200,925,253</b>	<b>41,342,979</b>	<b>2.0 x</b>	<b>15.7%</b>
<b>2009</b>								
FP Venture 2009	Venture Capital	25,000,000	24,329,950	847,965	34,944,166	26,052,238	2.5 x	18.4%
Insight Equity II	Turnaround	30,000,000	30,345,986	1,566,669	24,807,229	25,739,293	1.7 x	10.5%
Insight Mezzanine I	Mezzanine	10,000,000	9,928,853	522,124	9,779,671	3,742,194	1.4 x	6.9%
KPS III Supplemental	Turnaround	40,000,000	37,761,582	16,010,148	69,742,260	10,413,813	2.1 x	22.8%
Riverside IV	Buyout	40,000,000	31,433,665	10,099,013	72,706,965	2,478,575	2.4 x	21.4%
<b>Total 2009</b>		<b>145,000,000</b>	<b>133,800,036</b>	<b>29,045,919</b>	<b>211,980,291</b>	<b>68,426,113</b>	<b>2.1 x</b>	<b>17.8%</b>
<b>2010</b>								
Altus Capital II	Buyout	20,000,000	18,479,906	4,381,151	19,175,211	9,224,275	1.5 x	12.3%
EnCap VIII	Hard Assets	47,500,000	52,253,424	2,087,574	31,031,849	12,860,726	0.8 x	-5.7%
FP Venture 2010	Venture Capital	25,000,000	15,890,625	1,722,064	9,386,033	25,065,305	2.2 x	15.3%
Mason Wells III	Buyout	30,000,000	28,553,580	1,446,420	68,546,055	6,178,012	2.6 x	19.1%
TA XI	Growth Equity	40,000,000	39,300,000	700,000	72,491,707	25,541,356	2.5 x	23.1%
Tennenbaum VI	Distressed Debt	40,000,000	38,075,687	17,939,623	36,663,442	13,087,314	1.3 x	6.4%
<b>Total 2010</b>		<b>202,500,000</b>	<b>192,553,222</b>	<b>28,276,832</b>	<b>237,294,298</b>	<b>91,956,988</b>	<b>1.7 x</b>	<b>13.1%</b>

## Investment Performance by Vintage Year



Investment	Strategy	Committed Capital (\$)	Contributed Capital (\$)	Unfunded Commitment (\$)	Distributed Capital (\$)	Remaining Value (\$)	TVPI	Net IRR
<b>2011</b>								
Audax Mezzanine III	Mezzanine	25,000,000	23,905,973	6,825,000	27,223,431	4,120,034	1.3 x	9.7%
Castlelake II	Distressed Debt	35,000,000	32,656,036	2,625,461	27,537,421	17,033,620	1.4 x	6.6%
FP Intl 2011	Buyout	25,000,000	22,668,480	2,604,774	14,445,771	17,842,981	1.4 x	8.5%
FP Venture 2011	Venture Capital	25,000,000	24,107,625	1,043,753	19,819,797	75,582,096	4.0 x	33.5%
JF Lehman III	Buyout	39,000,000	43,494,645	503,401	36,058,155	35,510,728	1.6 x	13.7%
Wellspring V	Buyout	40,000,000	45,743,660	14,521,493	51,647,418	18,984,269	1.5 x	16.3%
Wicks IV	Buyout	40,000,000	42,059,387	4,748,289	45,505,040	22,512,837	1.6 x	17.2%
<b>Total 2011</b>		<b>229,000,000</b>	<b>234,635,806</b>	<b>32,872,171</b>	<b>222,237,033</b>	<b>191,586,565</b>	<b>1.8 x</b>	<b>15.8%</b>
<b>2012</b>								
ATRS-FP PE	Multi-Strategy	263,823,718	225,048,580	127,932,806	112,149,369	209,722,044	1.4 x	14.8%
BV VIII	Buyout	30,000,000	26,447,466	3,833,720	32,662,578	24,068,613	2.1 x	58.8%
Court Square III	Buyout	40,000,000	42,785,150	2,989,472	22,229,001	45,616,864	1.6 x	20.6%
DW Healthcare III	Buyout	40,000,000	35,694,363	4,305,637	40,738,290	22,974,163	1.8 x	18.4%
FP Intl 2012	Buyout	25,000,000	16,426,600	8,738,843	6,323,845	14,766,884	1.3 x	8.2%
FP Venture 2012	Venture Capital	25,000,000	21,718,750	3,388,416	11,990,353	36,411,102	2.2 x	20.2%
NGP X	Hard Assets	35,000,000	35,305,152	1,388,578	26,279,743	10,506,411	1.0 x	1.3%
<b>Total 2012</b>		<b>458,823,718</b>	<b>403,426,061</b>	<b>152,577,472</b>	<b>252,373,179</b>	<b>364,066,081</b>	<b>1.5 x</b>	<b>16.2%</b>
<b>2013</b>								
EnCap IX	Hard Assets	25,000,000	28,060,297	1,693,307	21,199,616	13,887,419	1.3 x	9.5%
FP Intl 2013	Buyout	20,000,000	13,093,700	7,025,225	1,533,231	15,786,994	1.3 x	9.0%
FP Venture 2013	Venture Capital	20,000,000	17,241,750	2,825,208	6,632,615	31,947,744	2.2 x	25.7%
Levine Leichtman V	Structured Capital	20,000,000	24,432,083	3,715,558	15,743,331	18,067,655	1.4 x	12.3%
Riverside V	Buyout	35,000,000	32,625,595	4,168,822	18,659,770	26,721,636	1.4 x	9.6%
Vista Foundation II	Buyout	15,000,000	15,365,897	7,768,739	10,905,347	16,067,286	1.8 x	16.9%
<b>Total 2013</b>		<b>135,000,000</b>	<b>130,819,323</b>	<b>27,196,859</b>	<b>74,673,909</b>	<b>122,478,734</b>	<b>1.5 x</b>	<b>13.7%</b>

## Investment Performance by Vintage Year



Investment	Strategy	Committed Capital (\$)	Contributed Capital (\$)	Unfunded Commitment (\$)	Distributed Capital (\$)	Remaining Value (\$)	TVPI	Net IRR
<b>2014</b>								
Atlas Capital II	Turnaround	15,000,000	18,302,559	5,057,680	11,807,434	14,481,506	1.4 x	23.3%
Big River - Equity	Infrastructure	93,090,000	93,090,000	0	19,160,000	327,000,000	3.7 x	28.8%
Big River - Mezzanine *	Mezzanine	5,000,000	5,003,686	0	8,225,290	0	1.6 x	17.3%
Blue Oak Arkansas *	Infrastructure	18,000,000	19,740,000	0	4,717,993	0	0.2 x	-50.5%
Castlelake III	Distressed Debt	25,000,000	23,149,741	1,864,884	14,234,551	17,918,175	1.4 x	8.1%
FP Intl 2014	Buyout	25,000,000	14,613,291	10,481,990	5,553,176	15,890,062	1.5 x	17.2%
FP Venture 2014	Venture Capital	25,000,000	23,118,520	1,951,135	3,860,450	35,741,714	1.7 x	17.7%
KPS IV	Turnaround	25,000,000	19,395,648	5,136,852	5,454,229	17,959,053	1.2 x	18.1%
Lime Rock Resources III	Hard Assets	25,000,000	25,482,772	413,848	4,521,414	21,981,628	1.0 x	0.9%
NGP XI	Hard Assets	30,000,000	27,695,009	3,537,392	7,215,549	25,794,489	1.2 x	8.2%
Sycamore Partners II	Turnaround	25,000,000	21,842,009	4,284,733	8,063,482	17,742,629	1.2 x	8.3%
Thoma Bravo XI	Buyout	20,000,000	20,634,595	2,286,609	18,895,188	31,769,891	2.5 x	27.1%
<b>Total 2014</b>		<b>331,090,000</b>	<b>312,067,830</b>	<b>35,015,123</b>	<b>111,708,756</b>	<b>526,279,147</b>	<b>2.0 x</b>	<b>20.2%</b>
<b>2015</b>								
Big River - Sr Secured Debt *	Infrastructure	26,910,000	26,966,221	0	35,699,565	0	1.3 x	14.7%
EnCap X	Hard Assets	30,000,000	26,368,298	5,537,392	4,921,287	26,672,272	1.2 x	9.3%
FP Intl 2015	Buyout	25,000,000	13,716,880	11,359,669	439,802	15,045,594	1.1 x	6.8%
FP Venture 2015	Venture Capital	25,000,000	21,460,280	3,611,081	718,327	28,674,760	1.4 x	15.8%
Siris III	Buyout	25,000,000	27,225,659	7,155,449	16,198,542	16,935,756	1.2 x	12.4%
<b>Total 2015</b>		<b>131,910,000</b>	<b>115,737,339</b>	<b>27,663,591</b>	<b>57,977,523</b>	<b>87,328,382</b>	<b>1.3 x</b>	<b>12.5%</b>
<b>2016</b>								
American Industrial VI	Buyout	20,000,000	20,962,158	1,813,213	2,775,370	22,185,245	1.2 x	10.6%
Arlington IV	Buyout	23,000,000	19,337,926	3,662,074	0	24,610,433	1.3 x	18.5%
DW Healthcare IV	Buyout	30,000,000	25,957,390	5,571,576	11,273,132	28,458,563	1.5 x	36.8%
FP Intl 2016	Buyout	25,000,000	13,659,794	11,426,162	1,095,238	14,890,971	1.2 x	10.2%
FP Venture 2016	Venture Capital	25,000,000	14,634,146	10,438,124	396,634	18,462,180	1.3 x	17.8%
Highland Equity	Hard Assets	25,000,000	25,000,000	0	162,500	25,420,000	1.0 x	0.7%
JF Lehman IV	Buyout	30,000,000	24,636,761	5,363,240	11,401,706	30,308,639	1.7 x	31.7%
PineBridge Structured III	Structured Capital	30,000,000	23,892,330	10,984,421	4,965,677	15,099,201	0.8 x	-12.3%
Thoma Bravo Discover	Buyout	10,000,000	11,350,409	1,767,370	5,982,126	14,103,628	1.8 x	32.4%
Thoma Bravo XII	Buyout	30,000,000	28,974,999	2,526,834	1,503,987	36,891,490	1.3 x	15.1%
Vista Foundation III	Buyout	30,000,000	21,406,639	8,631,076	4,739	24,739,573	1.2 x	9.4%
<b>Total 2016</b>		<b>278,000,000</b>	<b>229,812,552</b>	<b>62,184,090</b>	<b>39,561,109</b>	<b>255,169,923</b>	<b>1.3 x</b>	<b>14.7%</b>

## Investment Performance by Vintage Year



Investment	Strategy	Committed Capital (\$)	Contributed Capital (\$)	Unfunded Commitment (\$)	Distributed Capital (\$)	Remaining Value (\$)	TVPI	Net IRR
<b>2017</b>								
Altaris Constellation	Buyout	20,000,000	16,225,389	4,766,723	991,694	21,671,944	1.4 x	19.1%
Big River - Funding *	Infrastructure	3,750,000	3,750,000	0	3,812,795	0	1.0 x	4.3%
Big River - Holdings Note *	Infrastructure	12,000,000	12,000,000	0	13,343,726	0	1.1 x	11.0%
Big River - Preferred Equity *	Infrastructure	41,980,449	41,980,449	0	51,702,368	0	1.2 x	12.5%
Bison V	Structured Capital	35,000,000	19,451,357	18,799,271	3,250,628	19,005,101	1.1 x	11.8%
BV IX	Buyout	30,000,000	14,122,398	15,877,603	840,350	15,450,522	1.2 x	20.6%
EnCap XI	Hard Assets	35,000,000	7,144,778	27,855,222	0	5,826,558	0.8 x	-19.0%
FP Intl 2017	Buyout	25,000,000	9,183,673	15,901,194	0	10,195,187	1.1 x	10.6%
FP Venture 2017	Venture Capital	25,000,000	7,035,398	18,011,367	69,226	8,291,940	1.2 x	21.3%
Greyrock IV	Mezzanine	30,000,000	20,337,103	10,048,941	386,044	20,960,722	1.0 x	3.8%
Highland Note	Hard Assets	26,000,000	41,870,000	0	16,493,275	28,630,598	1.1 x	6.9%
NGP XII	Hard Assets	30,000,000	9,481,119	20,518,881	99,132	9,353,164	1.0 x	-0.2%
One Rock II	Buyout	30,000,000	18,304,614	11,695,386	0	20,672,718	1.1 x	12.2%
<b>Total 2017</b>		<b>343,730,449</b>	<b>220,886,279</b>	<b>143,474,588</b>	<b>90,989,239</b>	<b>160,058,454</b>	<b>1.1 x</b>	<b>10.5%</b>
<b>2018</b>								
Altaris IV	Buyout	24,000,000	11,516,157	12,483,843	0	13,211,723	1.1 x	NMF
Big River - Holdings Note 2023	Infrastructure	12,000,000	12,000,000	0	0	12,871,433	1.1 x	NMF
Big River - Holdings Note 2023-2	Infrastructure	5,150,000	5,150,000	0	62,323	5,397,380	1.1 x	NMF
Clearlake V	Buyout	30,000,000	19,357,089	12,474,081	3,741,861	24,978,100	1.5 x	NMF
FP Intl 2018	Buyout	25,000,000	4,961,832	20,157,643	0	4,371,896	0.9 x	NMF
FP Venture 2018	Venture Capital	25,000,000	5,745,342	19,313,059	217	5,419,218	0.9 x	NMF
GTLA Holdings	Hard Assets	20,000,000	20,000,000	0	0	20,000,000	1.0 x	NMF
Highland Contingent Note	Hard Assets	0	0	0	15,000,000	0	N/A	NMF
SK Capital V	Buyout	30,000,000	3,672,134	26,327,866	10,490	3,266,299	0.9 x	NMF
Sycamore Partners III	Turnaround	25,000,000	3,389,449	21,610,551	0	2,446,395	0.7 x	NMF
Thoma Bravo Discover II	Buyout	17,000,000	5,747,674	11,252,326	0	5,426,039	0.9 x	NMF
<b>Total 2018</b>		<b>213,150,000</b>	<b>91,539,677</b>	<b>123,619,369</b>	<b>18,814,891</b>	<b>97,388,483</b>	<b>1.3 x</b>	<b>NMF</b>

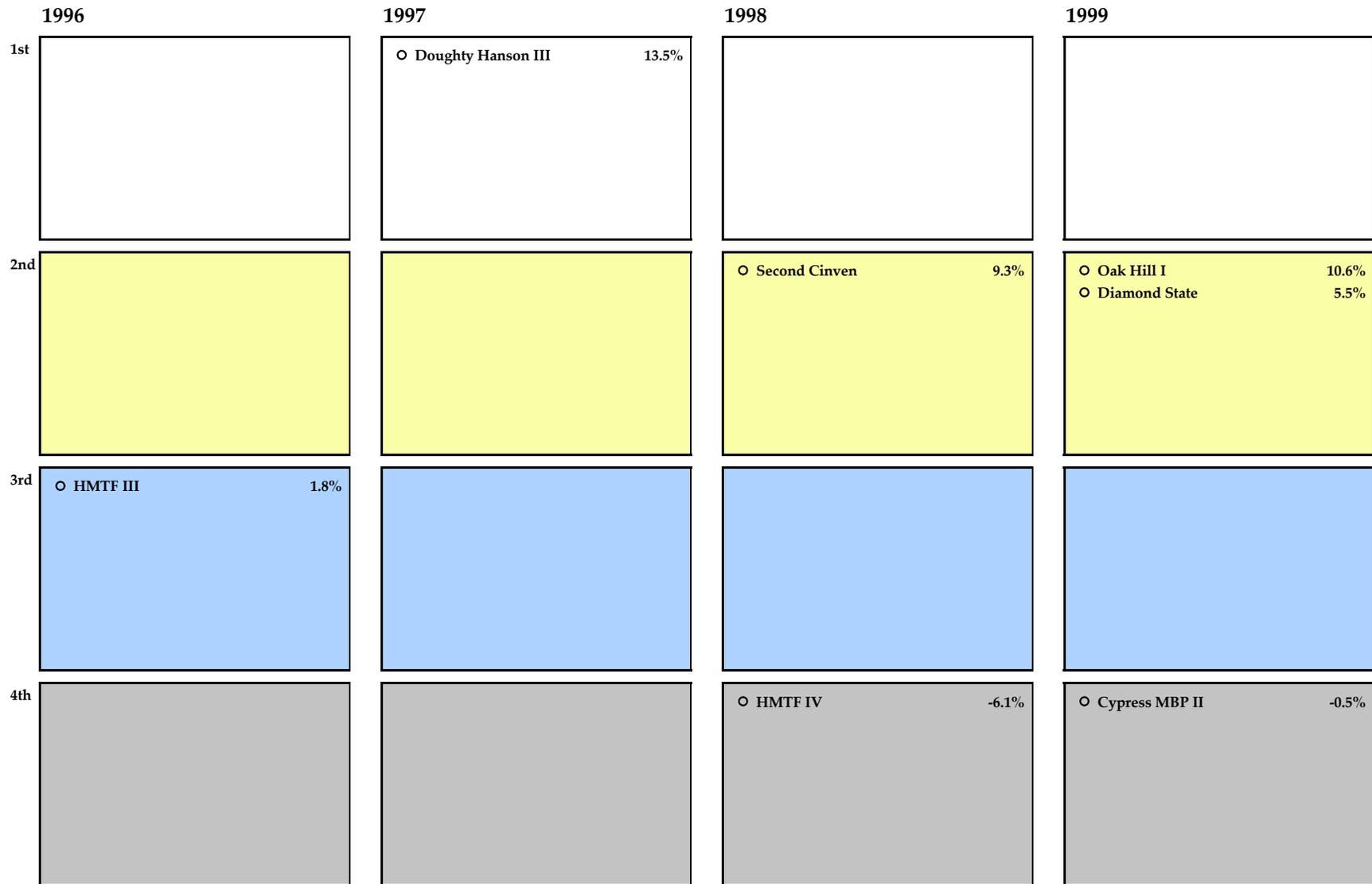
## Investment Performance by Vintage Year



Investment	Strategy	Committed Capital (\$)	Contributed Capital (\$)	Unfunded Commitment (\$)	Distributed Capital (\$)	Remaining Value (\$)	TVPI	Net IRR
<b>2019</b>								
American Industrial VII	Buyout	30,000,000	0	30,000,000	0	-104,005	N/A	NMF
Arlington V	Buyout	25,000,000	187,918	24,812,082	0	-96,081	-0.5 x	NMF
Big River - Equity Phase II	Infrastructure	58,000,000	58,000,000	0	0	58,295,562	1.0 x	NMF
DW Healthcare V	Buyout	30,000,000	2,013,813	27,986,187	0	1,421,908	0.7 x	NMF
FP Intl 2019	Buyout	30,000,000	0	30,000,000	0	0	N/A	NMF
FP Venture 2019	Venture Capital	30,000,000	3,354,037	26,675,294	23,600	3,228,239	1.0 x	NMF
Highland Note 2020	Hard Assets	14,000,000	14,000,000	0	0	14,000,000	1.0 x	NMF
Riverside VI	Buyout	30,000,000	4,843,536	25,156,464	0	3,375,899	0.7 x	NMF
Siris IV	Buyout	30,000,000	9,148,255	20,851,745	0	9,323,051	1.0 x	NMF
Thoma Bravo XIII	Buyout	30,000,000	10,831,104	19,168,896	121	10,685,440	1.0 x	NMF
WNG II	Special Assets	30,000,000	1,345,495	28,654,505	3,195	557,566	0.4 x	NMF
<b>Total 2019</b>		<b>337,000,000</b>	<b>103,724,158</b>	<b>233,305,173</b>	<b>26,916</b>	<b>100,687,578</b>	<b>1.0 x</b>	<b>NMF</b>
<b>2020</b>								
FP CF Access	Buyout	30,000,000	0	30,000,000	0	0	N/A	NMF
JF Lehman V	Buyout	30,000,000	0	30,000,000	0	0	N/A	NMF
<b>Total 2020</b>		<b>60,000,000</b>	<b>0</b>	<b>60,000,000</b>	<b>0</b>	<b>0</b>	<b>N/A</b>	<b>NMF</b>
<b>Total Portfolio</b>		<b>4,899,894,628</b>	<b>4,201,091,906</b>	<b>1,040,866,612</b>	<b>4,337,988,616</b>	<b>2,287,453,827</b>	<b>1.6 x</b>	<b>10.9%</b>

- Remaining Value is defined as the investor's value as reported by the fund's manager.
- TVPI is the ratio of Distributed Capital plus Remaining Value to Contributed Capital.
- Net IRR is defined as the annualized, compound rate of return using daily draws, distributions and Remaining Value as of the Report Date, net of fees and expenses, including late closing interest.
- An asterisk indicates an investment that is fully liquidated, if applicable.
- Commitments made in a foreign currency have been converted into U.S. dollars using an exchange rate as of the Report Date, if applicable.

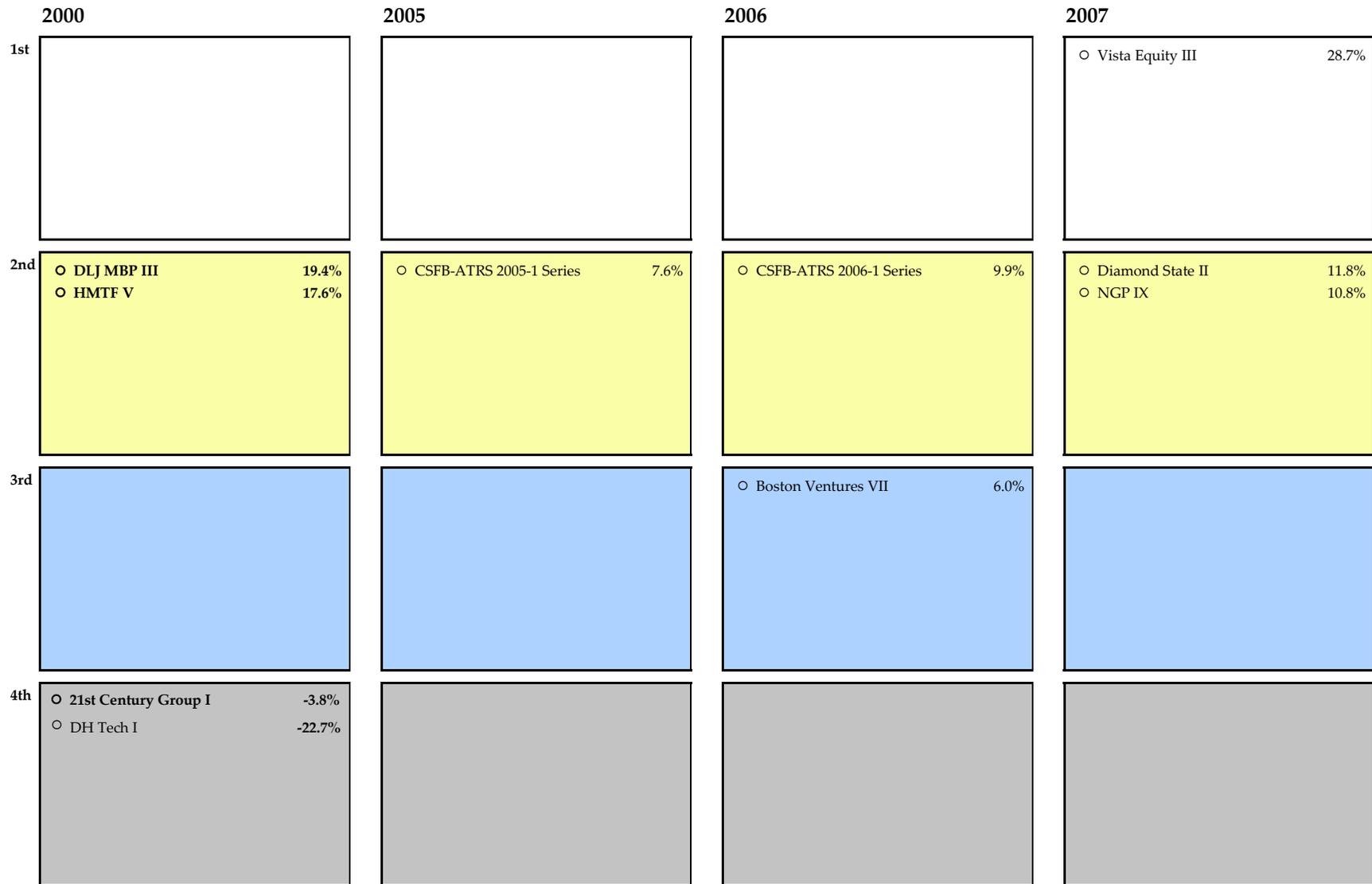
# Performance by Vintage Year and Quartile Group



● Venture ○ Non-venture

BOLD = Realized

# Performance by Vintage Year and Quartile Group



● Venture ○ Non-venture

**BOLD = Realized**

# Performance by Vintage Year and Quartile Group

	2008	2009	2010	2011
1st			○ TA XI 23.1%	● FP Venture 2011 33.5%
2nd	○ Advent GPE VI-A 16.8% ● FP Venture 2008 15.2% ○ LLR III 15.1%	○ KPS III Supplemental 22.8% ○ Riverside IV 21.4% ● FP Venture 2009 18.4%	○ Mason Wells III 19.1%	
3rd			● FP Venture 2010 15.3%	○ Wicks IV 17.2% ○ Wellspring V 16.3% ○ JF Lehman III 13.7%
4th		○ Insight Equity II 10.5%	○ Altus Capital II 12.3% ○ EnCap VIII -5.7%	○ FP Intl 2011 8.5%

● Venture ○ Non-venture

BOLD = Realized

# Performance by Vintage Year and Quartile Group

	2012	2013	2014	2015
1st	○ BV VIII 58.8%	● FP Venture 2013 25.7%	○ Thoma Bravo XI 27.1%	
2nd	○ Court Square III 20.6% ● FP Venture 2012 20.2% ○ DW Healthcare III 18.4%	○ Vista Foundation II 16.9% ○ EnCap IX 9.5%	○ Atlas Capital II 23.3% ○ KPS IV 18.1% ● FP Venture 2014 17.7% ○ FP Intl 2014 17.2%	
3rd	○ ATRS-FP PE 14.8% ○ NGP X 1.3%	○ Riverside V 9.6%	○ NGP XI 8.2%	● FP Venture 2015 15.8% ○ Siris III 12.4% ○ EnCap X 9.3%
4th	○ FP Intl 2012 8.2%	○ FP Intl 2013 9.0%	○ Sycamore Partners II 8.3% ○ Lime Rock Resources III 0.9%	○ FP Intl 2015 6.8%

● Venture ○ Non-venture

BOLD = Realized

# Performance by Vintage Year and Quartile Group

	2016	2017
1st	<ul style="list-style-type: none"> <li>○ DW Healthcare IV 36.8%</li> <li>○ Thoma Bravo Discover 32.4%</li> <li>○ JF Lehman IV 31.7%</li> </ul>	<ul style="list-style-type: none"> <li>● FP Venture 2017 21.3%</li> </ul>
2nd	<ul style="list-style-type: none"> <li>○ Arlington IV 18.5%</li> <li>● FP Venture 2016 17.8%</li> <li>○ Thoma Bravo XII 15.1%</li> </ul>	<ul style="list-style-type: none"> <li>○ BV IX 20.6%</li> <li>○ Altaris Constellation 19.1%</li> </ul>
3rd	<ul style="list-style-type: none"> <li>○ American Industrial VI 10.6%</li> <li>○ FP Intl 2016 10.2%</li> <li>○ Vista Foundation III 9.4%</li> </ul>	<ul style="list-style-type: none"> <li>○ One Rock II 12.2%</li> <li>○ FP Intl 2017 10.6%</li> </ul>
4th		<ul style="list-style-type: none"> <li>○ NGP XII -0.2%</li> <li>○ EnCap XI -19.0%</li> </ul>

● Venture ○ Non-venture

**BOLD = Realized**

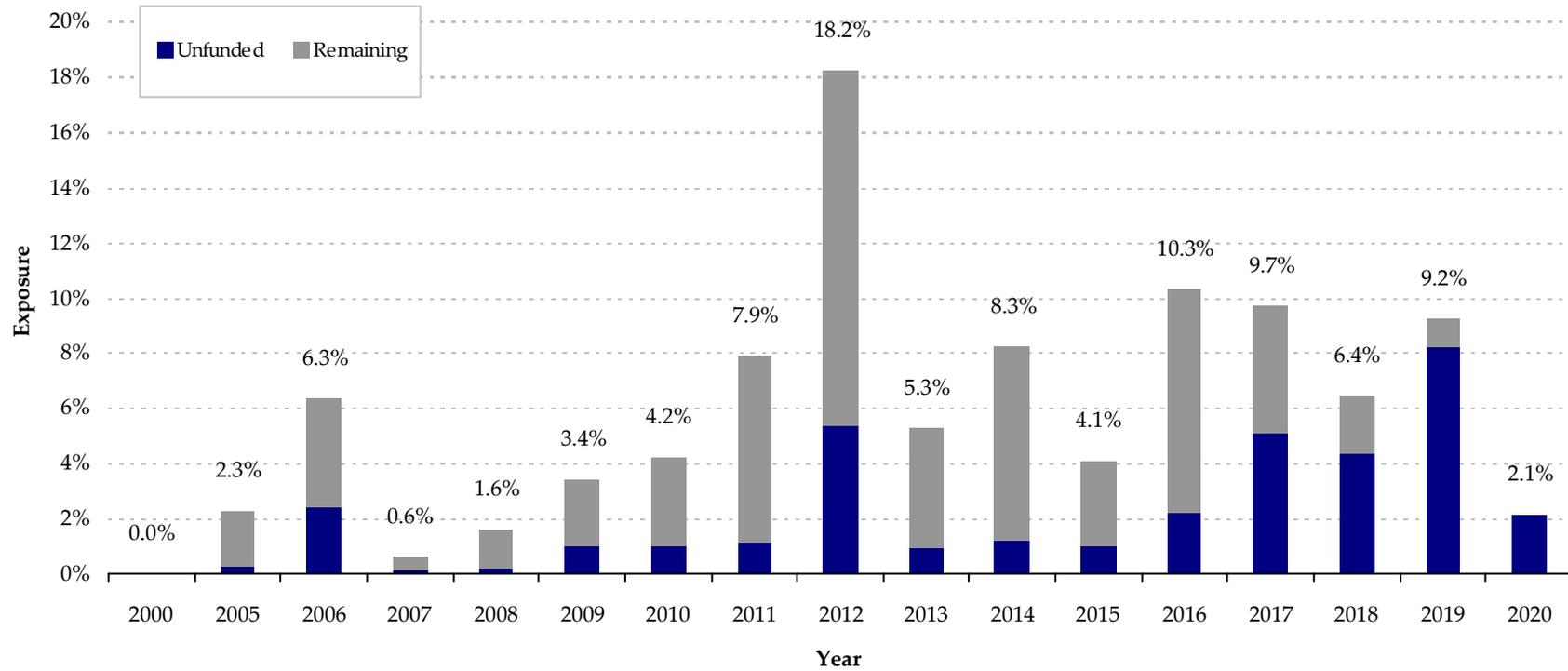
- 
- The analysis compares each fund's Net IRR versus its respective peer group by vintage year and strategy. Funds with a corporate finance strategy, excluding private debt, are compared to Cambridge Associates, U.S. Buyout. Funds with a venture capital strategy are compared to Cambridge Associates, U.S. Venture Capital. Multi-strategy funds are compared to data compiled by Cambridge Associates for funds across multiple strategies including U.S. Buyout, Growth Equity, Venture Capital, Mezzanine, Distressed, Fund-of-Funds, and Secondary Funds. Funds with a hard assets strategy are compared to Cambridge Associates, U.S. Private Equity Energy. Funds with a real estate strategy are compared to Cambridge Associates, U.S. Real Estate. Benchmark data is not available for funds with a private debt strategy.
  - The analysis excludes the two most recent vintage years, as fund performance is deemed not yet meaningful (NMF).
  - Net IRR is defined as the annualized, compound rate of return using daily draws, distributions and Remaining Value as of the Report Date, net of fees and expenses, including late closing interest.
  - Benchmark data was compiled from Cambridge Associates as of June 30, 2019. Hard Assets benchmark data for Vintage Years prior to 2005 is not available.

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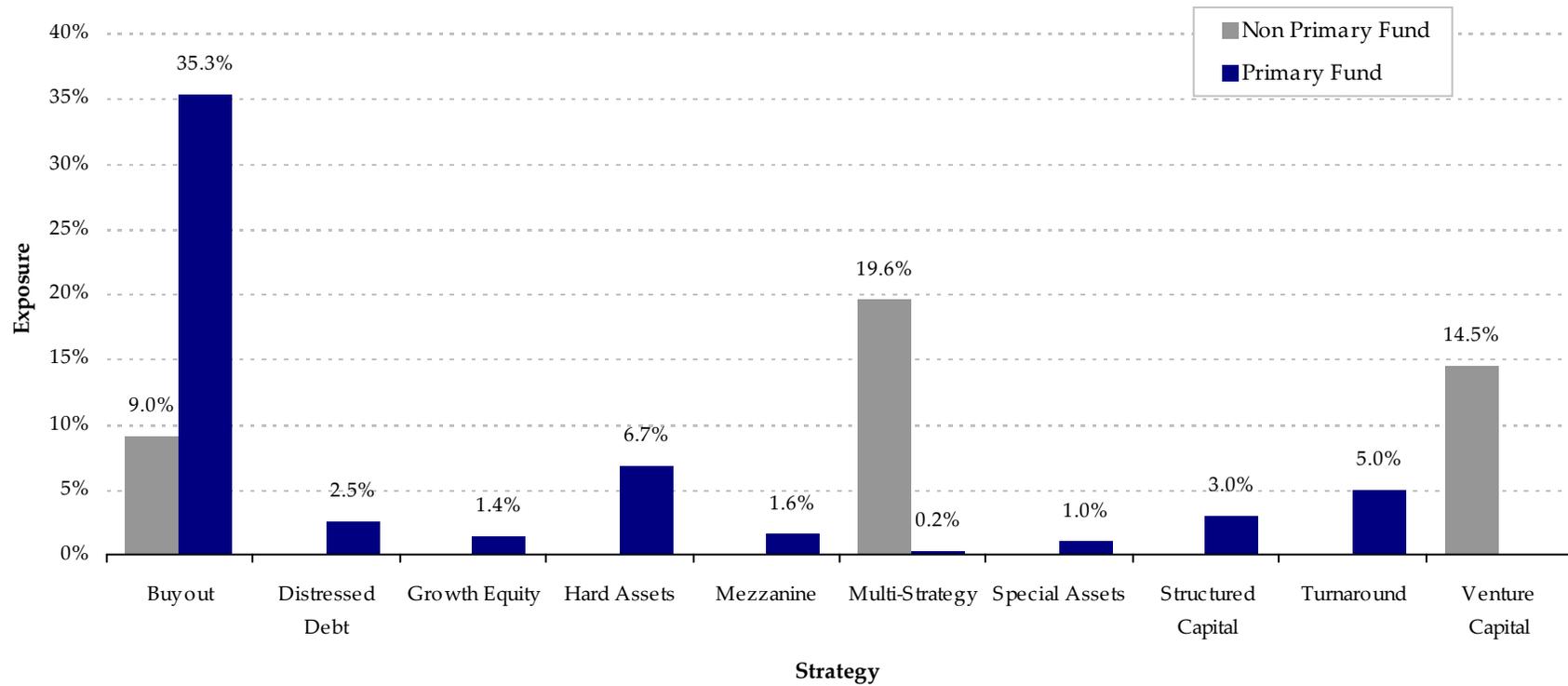
## Diversification Analysis

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## Exposure By Vintage Year

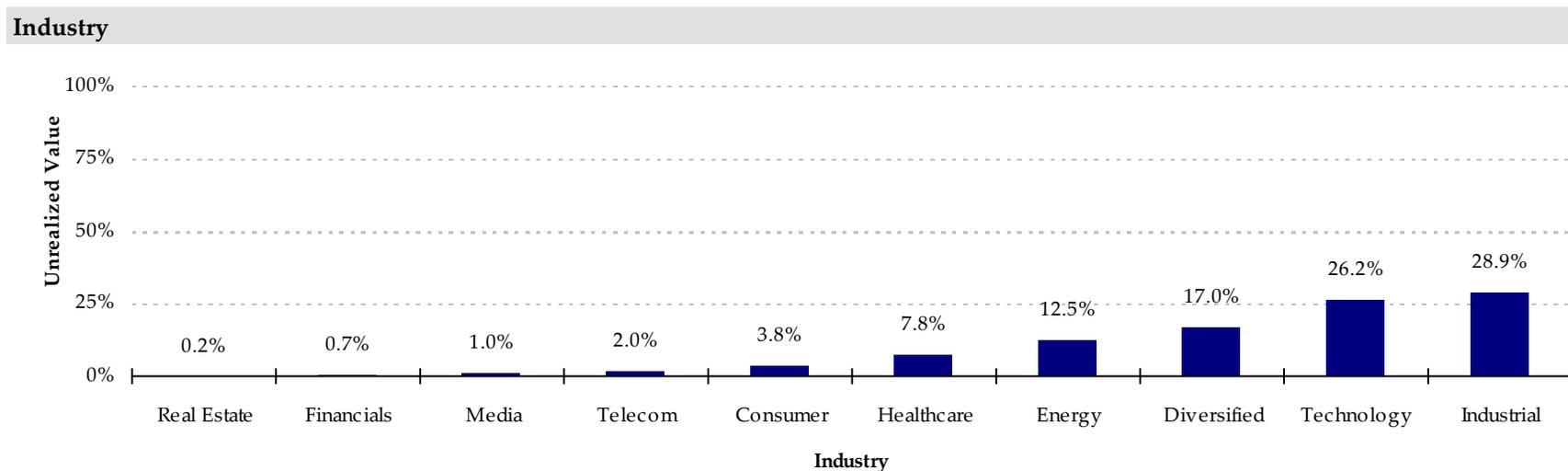
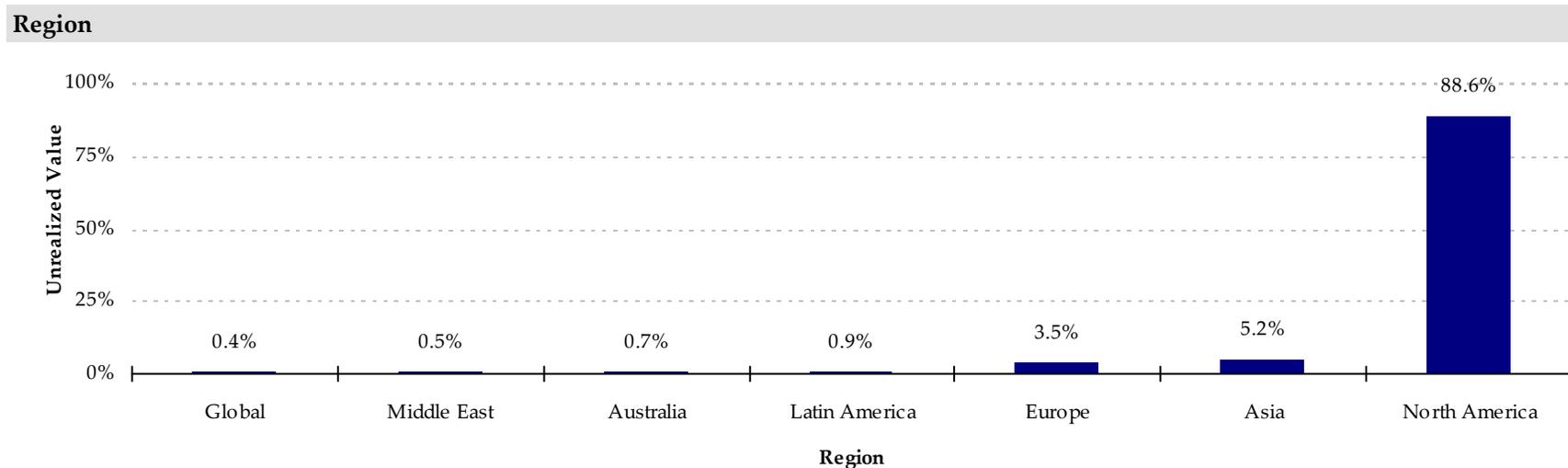


- Exposure is defined as the sum of the investor's Remaining Value plus Unfunded Commitment.
- Data includes commitments through the Report Date.

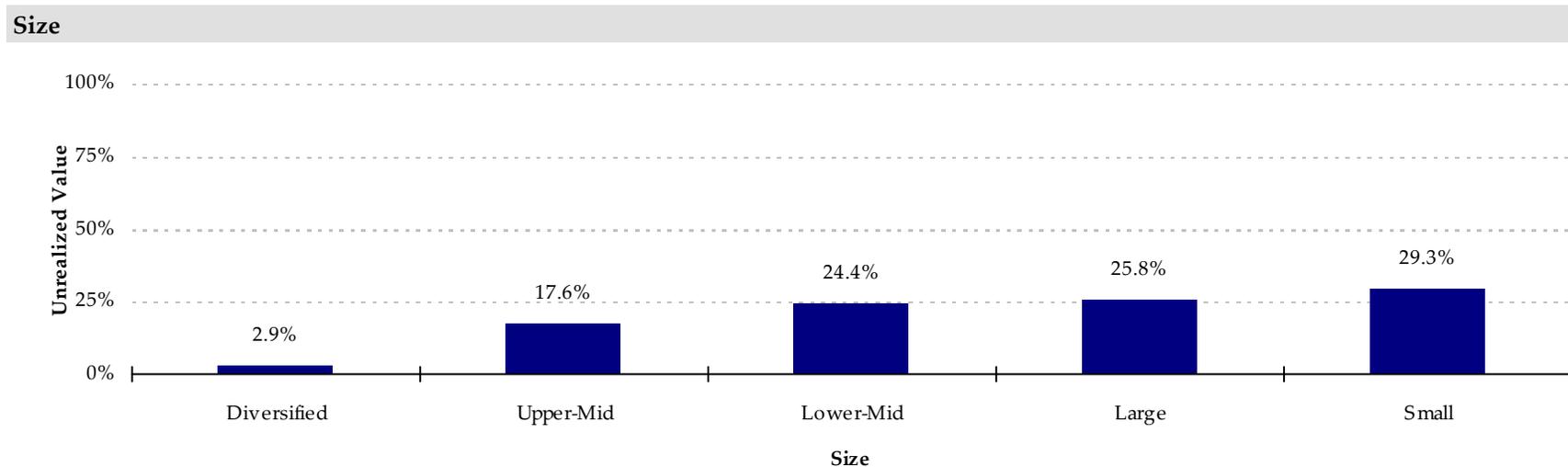
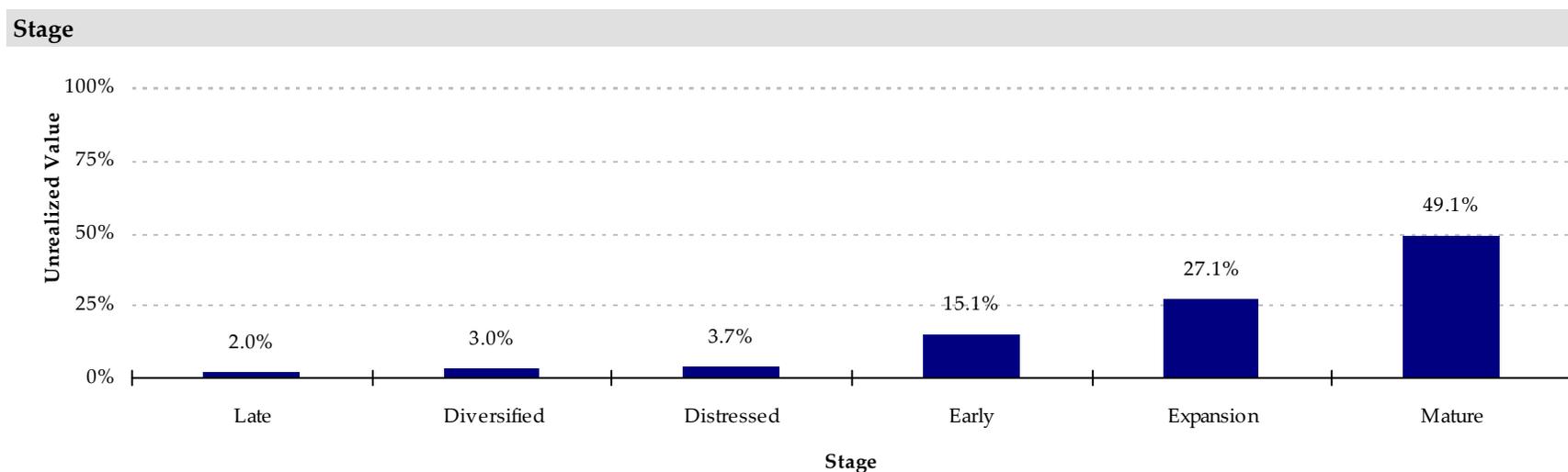


▫ Exposure is defined as the sum of the investor's Remaining Value plus Unfunded Commitment.

▫ Primary Fund represents interests in private equity funds acquired directly from the seller (i.e. fund manager). Non Primary Fund represents interests in private equity funds acquired through a commitment to a fund-of-funds or secondary fund-of-funds.

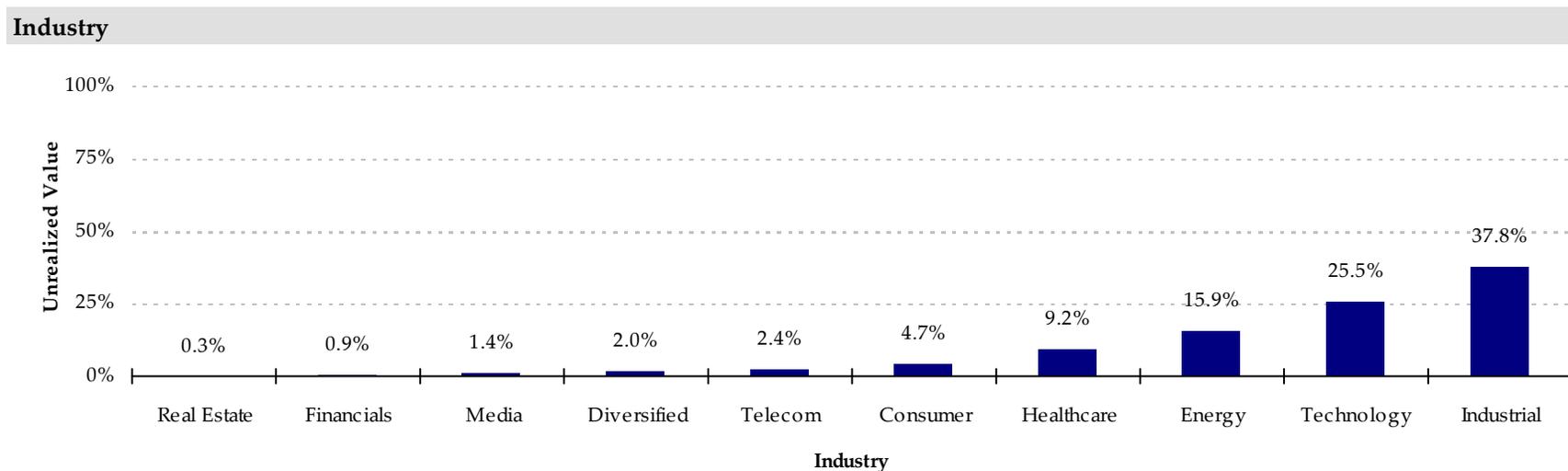
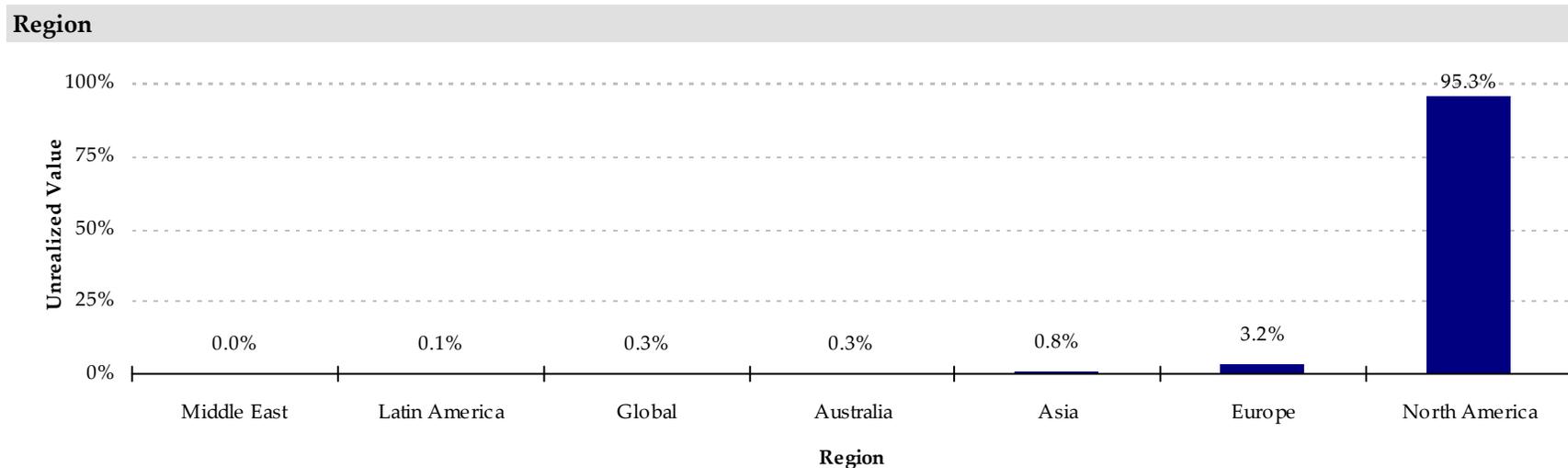


- Unrealized Value represents the value of portfolio holdings as reported by fund managers.
- Values are estimated based on the investor's percent interest in each fund's portfolio holdings.
- Values are converted to the investor's currency, when applicable, as of the Report Date.

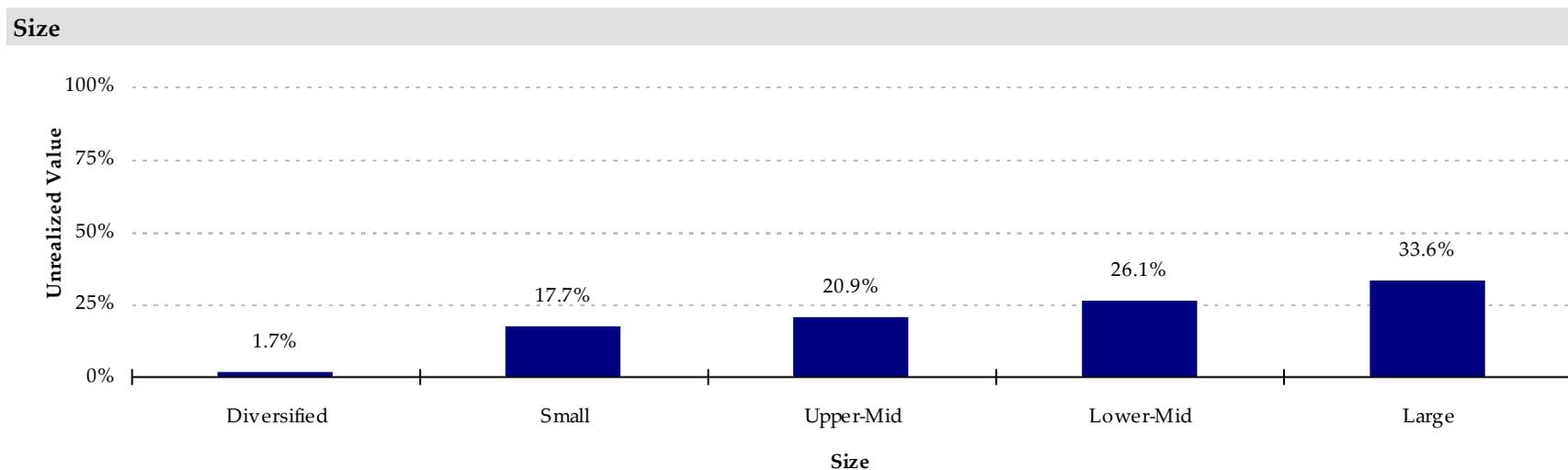
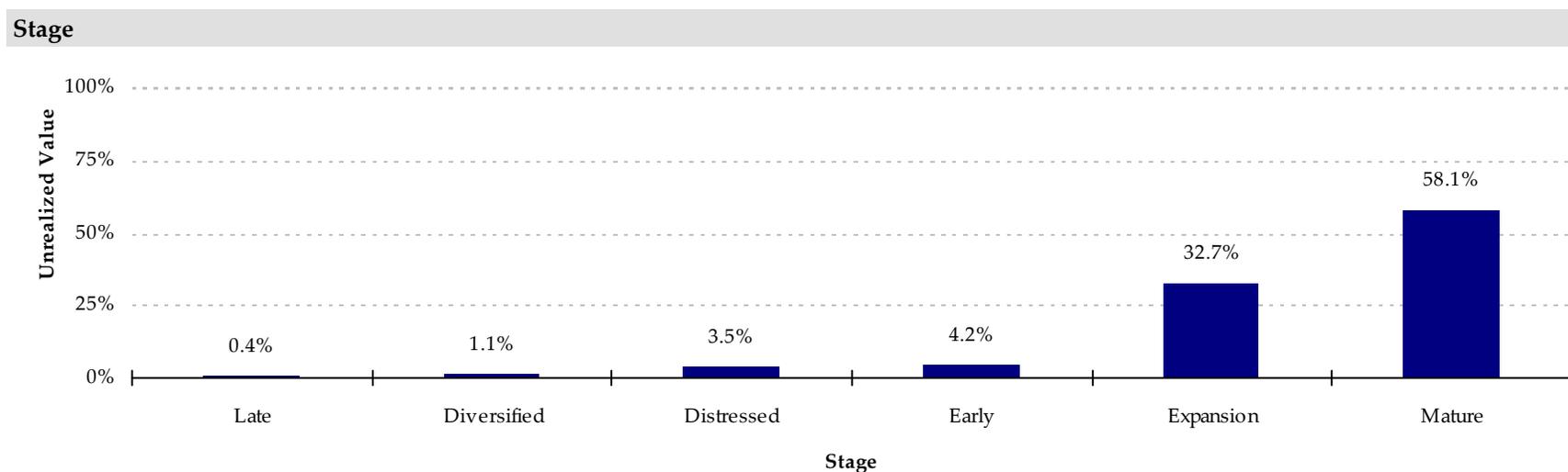


- Unrealized Value is the value of portfolio holdings as reported by the fund manager.
- Values are estimated based on the investor's percent interest in each fund's portfolio holdings.
- Values converted to the investor's currency, when applicable, as of the Report Date.

## Holdings by Region and Industry (ex Fund Holdings)



- Fund investments in other funds were excluded from this analysis.
- Unrealized Value represents the value of portfolio holdings as reported by fund managers.
- Values are estimated based on the investor's percent interest in each fund's portfolio holdings.
- Values are converted to the investor's currency, when applicable, as of the Report Date.

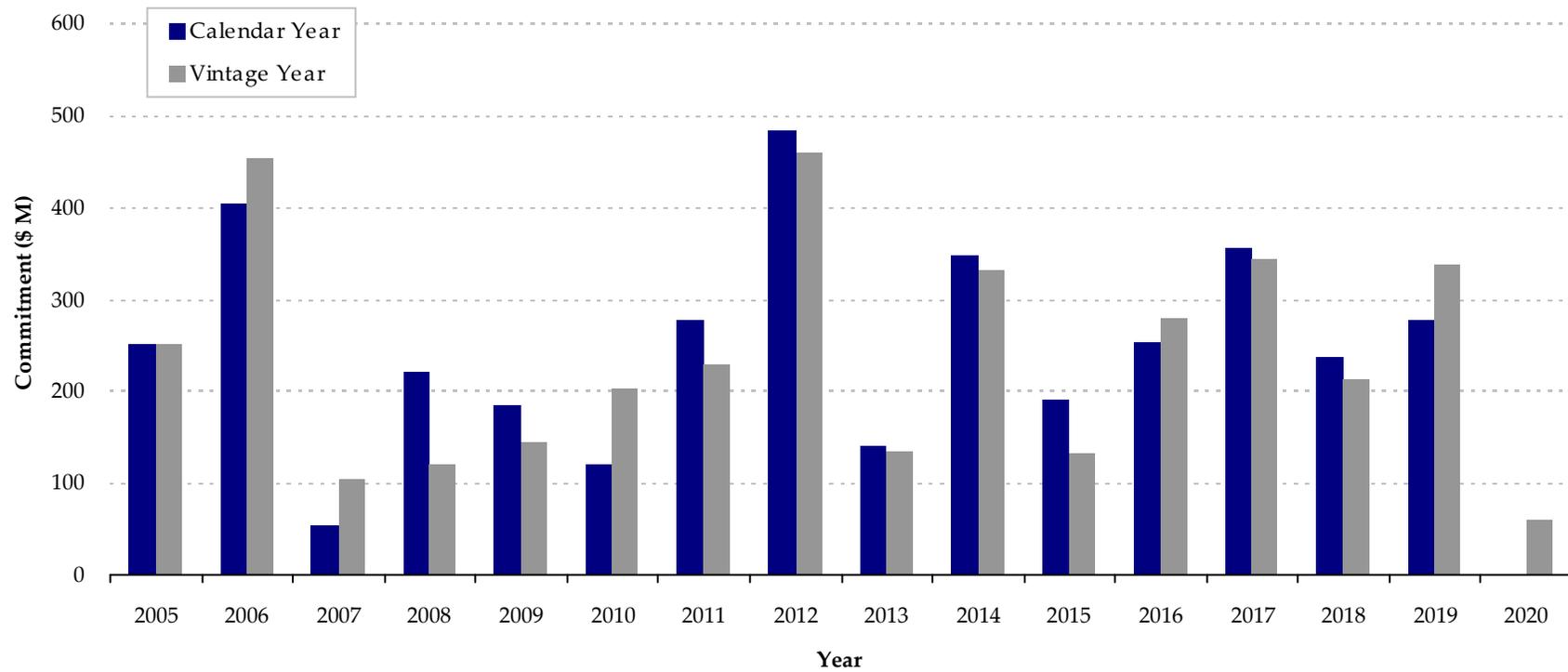


- Fund investments in other funds were excluded from this analysis.
- Unrealized Value represents the value of portfolio holdings as reported by fund managers.
- Values are estimated based on the investor's percent interest in each fund's portfolio holdings.
- Values are converted to the investor's currency, when applicable, as of the Report Date.

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## Recent Activity

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- Vintage Year represents the year in which investors first contribute capital to a fund.
- Calendar Year represents the year in which a commitment to a fund formally closed.
- Commitments made in a foreign currency have been converted into U.S. dollars using an exchange rate as of the Report Date, if applicable.
- Commitments were compiled through the Report Date.

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## Glossary

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Term	Definition	Term	Definition
Barclays US Corporate High Yield Index	The Barclays US Corporate High Yield Bond Index measures the USD-denominated, high yield, fixed-rate corporate bond market. Securities are classified as high yield if the middle rating of Moody's, Fitch and S&P is Ba1/BB+/BB+ or below. Bonds from issuers with an emerging markets country of risk, based on Barclays EM country definition, are excluded.	Dow Jones US Total Stock Market Total Return Index	The Dow Jones US Total Stock Market Total Return Index measures all U.S. equity securities with readily available prices. It is a free float-adjusted market capitalization weighted index and is calculated with dividend reinvestment.
Bridge Financing	Temporary funding that will eventually be replaced by permanent capital from equity investors or debt lenders	DPI	Ratio of Distributed Capital to Contributed Capital
Buyout	Fund whose strategy is to acquire controlling interests in companies	Early Stage	A company's first Stage of development. Company is generally generating modest or no revenues
Co/Direct Investment	Investment made directly into a company, rather than indirectly through a fund	Equity	Security type that signifies ownership of a company (e.g. common stock, preferred stock, warrants, etc.)
Committed Capital	Total dollar amount of capital pledged to a fund	Expansion Stage	A company's third Stage of development. Company is generally experiencing high growth and nearing profitability
Contributed Capital	Total capital contributed to a fund for investments, fees and expenses, including late closing interest paid, less returns of excess capital called	Exposure	Sum of Remaining Value plus Unfunded Commitment
Cost Basis	Remaining amount of invested capital	Fund-of-Funds	Fund whose strategy is to make investments in other funds
Debt	Security type that signifies a repayment obligation by a company (e.g. senior debt, subordinated debt, bridge loan etc.)	Geographic Region	Market location of a company: North America, Western Europe, Africa/Middle East, Latin America, Asia/Pacific Rim
Distressed	A company's final Stage of development. Company is generally experiencing operational or financial distress	Growth Equity	Fund whose strategy is to invest in companies to expand or restructure operations, enter new markets or finance an acquisition without a change of control of the business
Distressed Debt	<ul style="list-style-type: none"> <li>• Distressed Trading – Fund whose strategy is to invest and trade debt of financially stressed companies</li> <li>• Distressed Restructuring – Fund whose strategy is to acquire and restructure debt of financially stressed companies</li> <li>• Opportunistic Credit – Fund whose strategy is to flexibly invest in debt securities and income-producing assets of any kind, where the issuer or holder is financially stressed</li> <li>• Structured Capital – Fund whose strategy is to issue hybrid debt and equity securities to mature companies</li> </ul>	Hard Assets	Fund whose strategy is to invest in natural resources or infrastructure
Distributed Capital	Capital distributed to the limited partners, including late closing interest earned	Infrastructure	Fund whose strategy is to acquire interests in physical structures and networks that provide the essential services for society's economic and social needs, e.g. roads, tunnels, communication networks, etc.
		Internal Rate of Return (IRR)	The discount rate that results in a net present value of zero of a series of cash flows. The IRR considers both cash flow timing and amount and is the preferred performance measure for private market funds
		Invested Capital	Capital invested by a fund in portfolio holdings
		Investment Type	Classification of an investment vehicle: Primary Fund, Secondary Fund, Fund-of-Funds

Term	Definition	Term	Definition
J-Curve	Refers to the shape of the curve illustrating a fund's performance over time. During the initial years of a fund's life, as a result of illiquidity, stagnant valuations, fees and expenses, a fund's performance tends to be negative (the bottom of the "J"). Eventually, as portfolio companies are realized or increase in value and fees become a smaller percentage of overall contributions, performance improves and investors' returns move up the "J" shaped curve	Net IRR	Annualized effective compound rate of return using daily contributions, distributions and Remaining Value as of the Report Date, net of all fees and expenses, including late closing interest
Large	Company with a Size greater than \$1 billion	Percent Interest	Represents an investor's economic interest in a fund based upon the investor's commitment divided by total fund commitments
Late Stage	A company's second Stage of development. Company is generally generating high revenue growth and high losses	Primary Investment	An interest in a private equity fund acquired directly from the fund manager during the fundraising period
Lower-Mid	Company with a Size greater than \$100 million, but less than \$250 million	Public Market Equivalent (PME)	A private equity benchmark that represents the performance of a public market index expressed in terms of an IRR, using the same cash flows and timing as the investor's investment activity in private equity. The PME serves as a proxy for the return the investor could have achieved by investing in the public market. The PME benchmark return assumes cash flows are invested at the end of each day
Mature	A company's fourth Stage of development. Company is generally generating modest to no growth and operating profitably	Publication Date	Refers to the date this report was created as reflected in the Executive Summary
Mezzanine	<ul style="list-style-type: none"> <li>• Sponsored Mezzanine – Fund whose strategy is to issue subordinated loans to companies owned by private equity fund sponsors</li> <li>• Non-Sponsored Mezzanine – Fund whose strategy is to issue subordinated loans to companies not owned by private equity fund sponsors</li> </ul>	Real Assets	Fund whose strategy is to invest in assets that are tangible or physical in nature such as land, machinery, and livestock
MSCI ACWI Index - Total Return	The MSCI ACWI Total Return is a reflection of the performance of the MSCI ACWI Index, including dividend reinvestment, as calculated by Bloomberg. The MSCI ACWI Index is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets. The MSCI ACWI consists of 45 country indices comprising 24 developed and 21 emerging market country indices.	Real Estate	Fund whose strategy is to acquire interests in real estate property
Natural Resources	Fund whose strategy is to acquire interests in naturally-occurring, economically valuable raw materials and all physical facilities and capabilities required for the extraction, refinement, and delivery to end users, e.g. oil and gas properties, timberland, etc.	Realized Capital	Capital distributed to a fund from portfolio holdings
NCREIF Property Index	The NCREIF Property Index is a quarterly, unleveraged composite total return for private commercial real estate properties held for investment purposes only.	Recallable / Recyclable Capital	Capital that has been previously distributed by a fund to investors but may be called again for investment purposes. It is generally associated with realizations that have occurred in the early years of a fund or refers to uninvested capital that has been temporarily returned (i.e. returns of excess capital)
		Recapitalization	The reorganization of a company's capital structure
		Remaining Value	Capital account balance as reported by the General Partner, generally on a fair value basis
		Report Date	Refers to the end date of the reporting period as reflected on the cover page
		Return on Investment (ROI)	Ratio of Realized Capital plus Unrealized Value to Invested Capital

Term	Definition	Term	Definition
Russell 1000® Total Return Index	The Russell 1000® Total Return Index measures the performance, including dividend reinvestment, of the large-cap segment of the U.S. equity universe. It is a subset of the Russell 3000® Index and includes approximately 1000 of the largest securities based on a combination of their market cap and current index membership. The Russell 1000 represents approximately 92% of the U.S. market.	Size	Capitalization size of a company: Large, Upper-Mid, Lower-Mid, Small
Russell 3000® Total Return Index	The Russell 3000® Total Return Index measures the performance, including dividend reinvestment, of the largest 3000 U.S. companies representing approximately 98% of the investable U.S. equity market.	Small	Company with a Size of less than \$100 million
S&P 500 Price Index	The S&P 500 Price Index is a capitalization-weighted index of 500 stocks. The index is designed to measure performance of the broad domestic economy through changes in the aggregate market value of 500 stocks representing all major industries.	Small Business Investment Company (SBIC)	Lending and investment firms that are licensed and regulated by the Small Business Administration (SBA). The licensing enables them to borrow from the federal government to supplement the private funds of their investors
S&P 500 Total Return Index	The S&P 500 Total Return Index is a reflection of the performance of the S&P 500 Index, including dividend reinvestment. All regular cash dividends are assumed to be reinvested in the S&P 500 Index on the ex-date. Special cash dividends trigger a price adjustment in the price return index.	Small Buyout	Fund whose strategy is to acquire or recapitalize Small businesses
Secondary Investment	Investments that involve the purchase of private equity fund interests or portfolios of direct investments in privately held companies from existing institutional investors	Special Assets	<ul style="list-style-type: none"> <li>• Healthcare Royalties – Fund whose strategy is to acquire royalty or revenue interests, or issue loans, backed by approved life science products</li> <li>• Music Royalties – Fund whose strategy is to acquire royalty or revenue interests, or issue loans, backed by music copyright assets</li> <li>• Aircraft Leasing – Fund whose strategy is to acquire and lease commercial aircraft</li> <li>• Life Settlement - Fund whose strategy is to acquire life insurance policies</li> <li>• Shipping – Fund whose strategy is to acquire and charter commercial shipping vessels</li> <li>• Asset Backed Securities – Fund whose strategy is to acquire or structure securities that are backed by income-producing assets</li> </ul>
Sector	Industry in which the company operates: technology, telecommunications, healthcare, financial services, diversified, industrial, consumer, energy, etc.	Stage	The course of development through which a company passes from its inception to its termination: Early, Late, Expansion, Mature, Distressed
Senior Debt	<ul style="list-style-type: none"> <li>• Direct Lending – Fund whose strategy is to issue senior loans to mature companies</li> <li>• Unitranche – Fund whose strategy is to issue hybrid senior and subordinated loans to mature companies</li> <li>• Venture Debt – Fund whose strategy is to issue loans to venture stage companies</li> <li>• Asset Based Lending – Fund whose strategy is to issue loans to companies where the amount of allowable borrowing outstanding is based on asset collateral value</li> <li>• Rescue Financing – Fund whose strategy is to issue loans to financially stressed companies</li> </ul>	Sub-Asset Class	Private equity investments are generally classified as Buyout, Venture Capital, Mezzanine, Distressed/Turnaround, and Fund-of-Funds
		TVPI	Ratio of Distributed Capital plus Remaining Value to Contributed Capital
		Unfunded Commitment	Amount of capital that remains to be contributed to a fund as defined in a fund's limited partnership agreement
		Unrealized Value	Holding value of a portfolio company assigned by the General Partner, which generally represents fair value
		Upper-Mid	Company with a Size greater than \$250 million but less than \$1 billion
		Venture Capital	Fund whose strategy is to make investments in Early Stage and/or Late Stage companies

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<b>Term</b>	<b>Definition</b>
Vintage Year	The calendar year in which an investor first contributes capital to a fund

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## End Notes

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The information contained in this report is confidential and may contain proprietary information. The information contained herein is strictly for the use of Arkansas Teacher Retirement System and, subject to applicable law, may not be reproduced, transmitted or used in whole or in part for any other purpose without the expressed written consent of Franklin Park.

Information regarding the Arkansas Teacher Retirement System portfolio, trends and performance returns are based on or derived from information and data provided by third-party sources, including Arkansas Teacher Retirement System's historical records. Franklin Park assumes that such information is accurate and that the sources from which it has been obtained are reliable. For example, the performance figures contained within this report are calculated by Franklin Park based on information provided by the managers of Arkansas Teacher Retirement System's private equity fund investments (General Partners). The General Partners have not verified the performance figures presented by Franklin Park and such figures may differ from those calculated by General Partners or other investors.

Franklin Park presents Net IRR performance as recommended by the CFA Institute. The IRR calculation is a dollar-weighted return measurement, which considers both cash flow timing and amount, and is net of fees, expenses and carried interest. The total portfolio Net IRR presented herein is net of fees, expenses and carried interest paid by underlying private equity fund investments, but is gross of fees and expenses paid to Franklin Park. The IRR is most commonly used for measuring the performance of private equity funds. Until a fund is liquidated, typically over 10 to 12 years, the IRR is only an interim estimated return. An IRR is particularly not meaningful in the first two years of a fund's life given the J-curve effect (see footnote). The actual IRR of any private equity fund investment is not known until final liquidation.

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◦ The J-curve refers to the shape of the curve that illustrates a private equity fund's performance over time. During the initial years of a fund's life, due to fees and expenses, a fund's performance tends to be negative (the bottom of the "J"). Eventually, as portfolio company investments increase in value, fund performance improves and returns move up the "J" shaped curve.



Recommendation Report  
BVIP Fund X, L.P..

## Executive Summary

<b>Fund</b>	BVIP Fund X, L.P. (the "Fund")
<b>General Partner</b>	BV Investment Partners (the "General Partner")
<b>Report Date</b>	January 2020
<b>Fundraising</b>	The General Partner is targeting capital commitments of \$1.0 billion, with an expected cap of \$1.1 billion. The General Partner is targeting a first and final closing on February 28, 2020.
<b>Source</b>	Franklin Park sourced the fund offering directly from the General Partner.
<b>Investment Strategy</b>	The Fund is being formed to primarily make acquisitions of U.S. middle market companies in the tech-enabled business services and IT services sectors. The General Partner will generally pursue leveraged buyouts and recapitalizations. The General Partner typically targets family-owned companies.
<b>Management Team</b>	Based in Boston, the General Partner was founded in 1983 as Boston Ventures. In 2011, the General Partner rebranded to BV Investment Partners. Today, the General Partner is led by seven partners (the "Principals"), who are supported by four mid-level and four junior investments professionals, a COO, an Operating Partner, a CFO, a Controller and a 14-member Operating Advisory Board ("OAB").
<b>Track Record</b>	The General Partner has raised nine prior funds. The team has evolved significantly over the last decade, and only the prior three funds ("Funds VII-IX") are largely attributable to the current team. The following chart summarizes the performance of the prior three funds, as of June 30, 2019 (\$000).

 Aggregate Performance Summary<sup>1</sup>

Fund (Vintage)	Fund Size	Rizd Deals / #		Invested	Realized	Unrealized	Gross ROI	Gross IRR
		Deals	#					
Fund VII (2006)	434,507	8	/ 11	327,234	446,165	148,139	1.8x	11.1%
Fund VIII (2012)	486,800	6	/ 11	409,199	592,494	483,818	2.6x	61.6%
Fund IX (2017)	750,000	0	/ 9	471,628	1,478	547,181	1.2x	21.5%
<b>Total</b>		<b>14</b>	<b>/ 31</b>	<b>1,208,061</b>	<b>1,040,137</b>	<b>1,179,138</b>	<b>1.8x</b>	<b>19.6%</b>

**Notes:**

(1) Gross of fees and carried interest expenses. The unrealized investments were valued by the General Partner.

<b>Investment Evaluation</b>	<p>1. <b>The Fund's strategy is compelling.</b> The tech-enabled business services and IT services sectors have a number of favorable investment traits, including strong secular growth drivers, high recurring revenues and high cash flow margins. Moreover, these sectors are large, comprise numerous industry segments and contain thousands of companies. Further, the General Partner invests at the</p>
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smaller, inefficient end of the market where there is less deal competition and more non-auctioned transactions available.

2. **The General Partner is well-positioned competitively in its target market.** BV possesses a number of advantages relative to generalist investment funds that opportunistically invest in its target sectors. The team is highly knowledgeable about the forces shaping each of its target segments, industry cycles and valuations, the value drivers that determine investment potential, what constitutes best operating practices, and how performance can be improved through management initiatives. In addition, BV has a network of relationships with industry executives and deal sources.
3. **The team has substantial experience executing the Fund's strategy.** The Principals average 13 years of private equity experience and five of the seven Principals have been investing together for ten years.

However, the team has evolved significantly over the last five years. Four partners have left the firm since 2015. The turnover is attributed to individual performance. Three of the former partners had mixed track records and a limited role in Fund VIII. The fourth partner was brought on in 2016 to focus on deal origination, but the General Partner determined it did not require a dedicated person in that role going forward. With the launch of the Fund, three investment professionals have been promoted to Managing Director. These professionals do not have lead deal track records, however, they average ten years of private equity experience and two of the three have been with BV for over ten years.

4. **The General Partner's overall track record is attractive.** The prior three funds have generated an aggregate 1.8x ROI and a 19.6% gross IRR. In particular, Fund VIII has generated a 2.6x ROI and 61.6% gross IRR with six realizations generating an aggregate 3.9x ROI and 85.4% gross IRR. Fund VIII's net return ranks in the first quartile relative to its peer universe. Fund IX is early, but performing on plan.

However, Fund VII's net performance has been moderate. Fund VII has produced a moderate 1.8x ROI and 11.1% gross IRR and its net return ranks in the third quartile relative to its peer universe. However, six of the eleven deals in Fund VII were led by professionals that are no longer active with the General Partner, including one of the two realized losses in the portfolio and the only unrealized investment currently held below cost.

5. **Fund IX was invested relatively quickly and at higher median entry multiples than Fund VIII.** Seven of the nine investment in Fund IX were made within a one-year period and five investments were made in the first half of 2019. However, the first two investments in 2019 had long closing processes and were effectively 2018 deals. Adjusting for those two investments, the General Partner



notes its pacing has been consistent at 3-4 platforms and approximately \$175 million invested per year.

Median entry pricing in Fund IX increased to 12.6x EBITDA from 10.0x EBITDA in Fund VIII. However, Fund IX's companies have experienced faster growth earlier in their lives than did the Fund VIII companies. The General Partner's approach is to target a single digit EBITDA multiple or a path to a single digit multiple within the first 12-18 months of ownership through growth.

**Recommendation** Franklin Park recommends a commitment of up to \$30 million to the Fund, subject to satisfactory negotiation of final documentation, based on the following:

- The General Partner's strategy is compelling;
- The General Partner is well-positioned in its target sectors; and
- The team has deep experience and an attractive track record.

**ARKANSAS TEACHER RETIREMENT SYSTEM  
1400 West Third Street  
Little Rock, Arkansas 72201**

**RESOLUTION  
No. 2020-09**

**Approving Investment in BVIP Fund X, L.P.**

**WHEREAS**, the Board of Trustees (Board) of the Arkansas Teacher Retirement System (ATRS) is authorized to invest and manage trust assets for the benefits of its plan participants; and

**WHEREAS**, the ATRS Board has reviewed the recommendation of its private equity consultant, Franklin Park Associates, LLC, along with the recommendation of the Investment Committee and ATRS staff regarding a potential investment in **BVIP Fund X, L.P.**, a fund that seeks to make acquisitions of U.S. middle market companies in the tech-enabled business services and information technology services sectors;

**THEREFORE, BE IT RESOLVED**, that the ATRS Board approves an investment of up to **\$30 million dollars (\$30,000,000.00)** in **BVIP Fund X, L.P.** The total investment amount is to be determined by the private equity consultant and ATRS staff based upon the allocation available to ATRS and the overall investment objectives set by the ATRS Board; and

**FURTHER, BE IT RESOLVED**, that the ATRS staff is hereby authorized to take all necessary and proper steps to implement this investment, if acceptable terms are reached.

**Adopted this 3rd day of February 2020.**

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**Mr. Danny Knight, Chair**  
**Arkansas Teacher Retirement System**

# ATRS Board Policy 2

## BOARD OBJECTIVES

A.C.A. § 24-7-401

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### I. Board Financial Objectives

A. Sustain actuarial soundness. The goals are for:

1. The funded status to increase towards a 100% funded ratio.
2. The funding period to decrease to below an eighteen (18) year amortization period in order to avoid "negative amortization".
3. The funded ratio to increase and the funding period to decrease unless knowingly modified by Board action or as a result of events over which the Board has no control.
4. The actuarial methodology and economic assumptions to be comparable to other teacher retirement systems.<sup>1</sup>

B. Manage contributions effectively. The goals are for:

- Employer contributions to be collected and invested in a timely manner.
- Aged receivables will ~~Receivables of more than 30, 60, and 90 days to~~ be reported to the Board as requested.

C. Maximize investment returns within the bounds of prudence.

1. Asset Allocation

The Board, in conjunction with its investment consultants, shall set and adjust the System's asset allocation ranges as necessary to provide an optimal allocation to obtain its target returns.

~~Investments shall be within the minimum and maximum ranges established by the Board and will approximate the targeted levels unless the Board is advised as to reasons for a deviation.~~

2. Investment Return

Total Fund - Recognizing the purpose of the System is to remain actuarially sound and pay member benefits, the overall investment ~~The overall~~ goal is to achieve, over a period of years, the greatest rate of return for the System ~~actuarial interest assumption rate~~ with due consideration being given to preserving ~~preservation of~~ capital and its purchasing power and to maintain an appropriate level ~~maintaining the element~~ of risk consistent with the obligations of a prudent investor

level.

D. Ensure budget credibility

The goals are for:

1. Total operating expenses (excluding investment expenses) of existing programs and services to be maintained or reduced in relation to the ~~latest available experience study~~ ~~five-year rolling average of increases in members and inflation~~.
2. Investment related expenses to be maintained or reduced in relation to investment assets once each asset category reaches its target allocation.
3. Proposed programs or services to have a "business plan" that includes:
  - a. A description of the need to be met.
  - b. The method by which the need will be met.
  - c. The method by which members will learn about the program or services.
  - d. Staffing requirements.
  - e. Other resources that are needed.
  - f. The method by which the programs or services will be evaluated.

**II. Board Objectives for Members**

A. Promote contribution rates, benefits, and services comparable to other teacher retirement systems.<sup>1</sup> The goals are for:

1. Employer contribution rates to be comparable to other teacher retirement systems.
2. Total benefits paid to be comparable to other teacher retirement systems.
  - a. Average regular benefits paid to be comparable to other teacher retirement systems.
  - b. Average disability benefits paid to be comparable to other teacher retirement systems.
  - c. Average survivor benefits paid to be comparable to other teacher retirement systems.
3. Age and length of service requirements for unreduced retirement benefits to be comparable to other teacher retirement systems.

4. Plan of payment options for regular benefits to be comparable to other teacher retirement systems.

B. Increase awareness of trust fund stewardship. The goals are for:

1. Recent investment and actuarial reports to be provided to members through the ATRS website.

~~1. ATRS to receive the "Certificate of Achievement for Excellence in Financial Reporting" each year as presented by the Government Finance Officers Association of the United States and Canada.~~

~~2. ATRS to receive the Public Pension Coordinating Council's "Public Pension Principles Achievement Award" each year it is available.~~

23. A comprehensive annual financial report, or abstract thereof, to be provided to each employer of ATRS, the Legislative Council, and the Governor [A.C.A. §§ 24-2-702 and 24-7-305(d)].

C. Promote retirement education and communications. The goals are for:

1. Special programming for new ATRS members (those with less than five years of service) to be developed and disseminated to increase awareness of ATRS and its benefits.

2. The number and percentage of members participating in retirement education events sponsored by the ATRS to increase or remain the same from one year to the next.

3. Printed communications from ATRS to be evaluated~~judged~~ as well written, attractively formatted, and helpful as determined by any comments received from by a sample of the members targeted by the communication.

D. Improve overall service level. The goals are for:

1. The overall service level of ATRS to be at a level that promotes member satisfaction in above the median for its peer group<sup>2</sup> and at a cost effective manner that is comparable to its peer group.<sup>3</sup>

2. The overall service level to include the following functions within ATRS:

a. Paying pensions

b. Pension inception

c. Pension estimates

d. Counseling

e. Member telephone calls

- f. Communication
  - i. Group presentations
  - ii. Website and E-mail
  - iii. Newsletters
  - iv. Other written material
- g. Collections
  - i. Annual member statements
  - ii. Employer services
- h. Refunds, terminating payments
  - i. Service credit purchases
  - j. Disability pensions
- k. Financial control & governance
  - i. The Annual Report

### **III. Board Governance Objectives**

- A. Administer retirement laws in a timely, accurate, and consistent manner. The goals are for:
  - 1. The average turn-around time for processing retirement [applications](#) to improve or remain the same from the previous year.
  - 2. Retirement benefits to be calculated accurately and consistently.
- B. Provide member benefits and services (1) at a level that promotes member satisfaction and (2) in a cost effective manner. The goals are for:
  - 1. The satisfaction level of members regarding benefits and services to increase from one year to the next.
- C. Process improvement. The goals are for:
  - 1. “Business critical” processes to be identified.
  - 2. “Business critical” processes to be analyzed and redesigned as needed.
  - 3. Processes to be continually reevaluated.
- D. Effectively manage new projects and initiatives. The goals are for:
  - 1. New projects and initiatives to be undertaken with a detailed plan, including projected completion dates and resource requirements.
  - 2. Periodic progress reports to be made to the Board on major projects or

initiatives.

E. Promote effective communication. The goal is for:

1. Communications with the Board, members, and employees that are clear, concise, and timely.

F. Promote knowledge-based decision-making. The goal is for:

1. Management decisions based on facts and expert opinions.

#### **IV. Staff Learning and Growth Objectives**

A. Foster a positive, innovative work environment. The goal is for:

1. Professional and support staff ~~responses to an organizational climate survey~~ to indicate a stable or more positive and innovative work environment from one year to the next.

B. Employ and retain highly capable employees. The goals are for:

1. The average educational level of the professional and support staffs to increase or at least remain the same from one year to the next.
2. ~~Adjusted for current System requirements the~~ The net turnover rate <sup>4-</sup> of the professional and support ~~staff~~staffs to decrease or at least remain the same from one year to the next.

C. Recruit and retain a diverse work force. The goal is for:

1. The gender, race, and age of the professional and support staffs to show progress toward approximating the respective work forces in the Little Rock Metropolitan Statistical Area from one year to the next.

D. Enhance training and development opportunities. The goals are for:

1. The average number of days spent in training by the professional and support staffs to increase or at least remain the same from one year to the next.
2. The number and percentage of professional and support staff having recognized job-specific or job-related credentials to increase or at least remain the same from one year to the next.

#### **HISTORY**

Adopted: April 26, 2007 as Rule 2-1 through 2-4

Amended: February 11, 2008

Amended: December 18, 2009

Amended: June 3, 2019 as Board Policy 2

1 "Other teacher retirement systems" as used here includes those statewide retirement systems in the United States whose: (a) membership is predominately teachers, (b) members contribute to Social Security, (c) membership is within  $\pm 50\%$  of ATRS, and (d) assets are within  $\pm 50\%$  of ATRS.

~~2 "Peer group" as used here refers to a number of retirement systems selected by Cost Effective Measurement, Inc., that are most like ATRS.~~

~~3 It is understood that the first time data will be collected for this and the following goal will be in 2003 for the 2002-2003 fiscal year.~~

~~4 The net turnover rate is the total separations less retirements, disabilities, and deaths divided by the average number of employees during the year.~~

SUMMARY OF DISABILITY APPLICATIONS SUBMITTED  
FOR CONSIDERATION BY THE MEDICAL COMMITTEE

The Medical Committee met in executive session in the first floor conference room at 9:39 a.m. on December 4, 2019. Those members present were Dr. Eddie Phillips, Dr. Hoyte Pyle, and Dr. Jim Morse. Anne Marie Lehman Berardi of the Teacher Retirement System was also in attendance.

A total of thirteen disability applications were considered. Of the thirteen applicants, eight were approved. Four were denied. One had more information requested.

Respectfully Submitted,



Eddie Phillips, CMO  
Medical Committee Chairman

Respectfully Submitted,



Anne Marie Lehman Berardi  
Retirement Benefits Counselor

SUMMARY OF DISABILITY APPLICATIONS SUBMITTED  
FOR CONSIDERATION BY THE MEDICAL COMMITTEE

The Medical Committee met in executive session in the first floor conference room at 1:00 p.m. on January 8, 2020. Those members present were Dr. Eddie Phillips, Dr. Hoyte Pyle, and Dr. Jim Morse. Anne Marie Lehman Berardi of the Teacher Retirement System was also in attendance.

A total of eight disability applications were considered. Of the eight applicants, seven were approved. One was denied.

Respectfully Submitted,



Eddie Phillips, CMO  
Medical Committee Chairman

Respectfully Submitted,



Anne Marie Lehman Berardi  
Retirement Benefits Counselor