**TUCSON SUPPLEMENTAL RETIREMENT SYSTEM**
**BOARD OF TRUSTEES**
**Notice of Regular Meeting / Agenda**

| | |
|---|---|
| **DATE:** | **Monday, August 19, 2019** |
| **TIME:** | **1:30 p.m.** |
| **PLACE:** | **Human Resource Conference Room, 3rd floor East**<br>**City Hall, 255 West Alameda**<br>**Tucson, Arizona 85701** |

A. **Consent Agenda**
1. Retirement Ratifications for July 2019
2. Retirement Ratifications for August 2019
3. June 2019 TSRS Budget Vs. Actual Expenses
4. July 2019 TSRS Budget Vs. Actual Expenses
5. June 2019 Board Meeting Minutes
6. TSRS June Investment Measurement Service Monthly Review
7. TSRS July Investment Measurement Services Monthly Review [Note 1]

B. **Call to Audience**

C. **Investment Activity Report**
1. Investment Manager Review – JPMorgan Asset Management – Shawn Parris
2. TSRS Quarterly Investment Review for 06/30/19 - Callan
3. Final Asset/Liability Model Report – Updated Scenarios – Gordon Weightman – Callan
4. Infrastructure Allocation

D. **Administrative Discussions**
1. PRBI Research

E. **Articles & Readings for Board Member Education / Discussion**
1. Sweeping Changes Proposed for NM Pensions
2. US Yield Curve Sends Strongest Recession Warning Since 2007
3. Lower Interest Rates Continue to Plague DB Plan Funded Status

F. **Future Agenda Items**
1. PRBI Research

G. **Adjournment**

**Please Note: Legal Action may be taken on any agenda item**

*****Pursuant to A.R.S. 38-431.03(A)(3) and (4): the board may hold an executive session for the purposes of obtaining legal advice from an attorney or attorneys for the Board or to consider its position and instruct its attorney(s) in pending or contemplated litigation. The board may also hold an executive session pursuant to A.R.S. 38-431.03(A)(1) for the discussion or consideration of matters specific to an identified public officer, appointee, or employee or pursuant to A.R.S. 38-431.03(A)(2) for purposes of discussion or consideration of records, information or testimony exempt by law from public inspection.

Note 1 – This information will be delivered on/or before Friday, August 16th

# Ratification Report for TSRS Board of Trustees

**Application Dates: 06/11/19 - 07/10/19** | **Report Date: July 2019**

| Name of Applicant | Type | Retirement Date | Age | Credited Service | Estimated calc or Final calc* | Avg Final Monthly Pay | Option | Pension Amount |
|---|---|---|---|---|---|---|---|---|
| Dorothy D Weideman | Normal Retirement | 6/14/2019 | 60.93 | 20.52 | Final | 5,037.89 | Single Life | 2,325.88 |
| Jane S Slama | Deferred Retirement | 6/20/2019 | 65.00 | 6.04 | Final | 6,123.24 | J&S 50 | 628.97 |
| Viola Romero | Normal Retirement | 7/2/2019 | 53.91 | 26.21 | Estimate | 8,149.58 | Single Life | 4,805.74 |
| Cynthia A Dunn | Normal Retirement | 7/6/2019 | 62.03 | 21.93 | Estimate | 3,762.68 | Single Life | 1,856.34 |
| Cecilio Flores | Normal Retirement | 7/6/2019 | 67.09 | 24.37 | Estimate | 5,348.44 | J&S 50 | 2,628.94 |
| Josie B Cuestas | Normal Retirement | 7/6/2019 | 61.69 | 27.94 | Estimate | 3,425.84 | J&S 50 | 2,034.46 |
| Michael F Cuestas | Normal Retirement | 7/6/2019 | 62.57 | 18.75 | Estimate | 4,612.62 | J&S 75 | 1,765.47 |
| Mark A Phielix | Normal Retirement | 7/10/2019 | 50.81 | 31.83 | Estimate | 4,085.82 | Single Life | 2,925.99 |
| Thomas Wolfgang | Normal Retirement | 7/10/2019 | 60.77 | 19.25 | Estimate | 3,132.39 | Single Life | 1,356.46 |

* Calculation of average final monthly pay and pension amount is estimated based on all available data and becomes a final calculation after the applicant has received payment for all accrued leave balances.

Source Material: GRS/Payroll

Prepared By: [signature]

Reviewed By: Pete Saxton

# Ratification Report for TSRS Board of Trustees

**Application Dates: 07/11/19 - 08/10/19** | **Report Date: August 2019**

| Name of Applicant | Type | Retirement Date | Age | Credited Service | Estimated calc or Final calc* | Avg Final Monthly Pay | Option | Pension Amount |
|---|---|---|---|---|---|---|---|---|
| Robert Szelewski | Deferred Retirement | 7/11/2019 | 65.09 | 7.07 | Final | 4,968.45 | J&S 50 | 601.42 |
| Alberto Moreno | Normal Retirement | 8/3/2019 | 61.22 | 32.03 | Estimate | 4,470.67 | J&S 100 | 2,944.53 |
| Ernesto Encinas | Normal Retirement | 8/10/2019 | 60.84 | 26.17 | Estimate | 6,773.58 | J&S100 | 3,487.24 |

* Calculation of average final monthly pay and pension amount is estimated based on all available data and becomes a final calculation after the applicant has received payment for all accrued leave balances.

Source Material: GRS/Payroll

Prepared By: Dawn M Davis

Reviewed By: Pete Sutton

**Report ID** : FIN-COT-BA-0001
**Run Date** : 08/12/2019
**Run Time** : 08:41 AM

# City of Tucson
## Budget vs Actual Expenses
## Through: 14th Period, 2019
## For Fiscal Year 2019

## Parameter Page

**Parameters and Prompts**

| | |
|---|---|
| **Fiscal Year** | 2019 |
| **Accounting Period** | 14 |
| **Fund** | 072 |
| **Department** | * |
| **Unit** | * |
| **Object Code** | * |

**Report Description**

The Expenses vs. Actual Report shows expenditures and encumbrances for the selected accounting period and for the selected fiscal year compared against the current expense budget and the unobligated budget balance. The report is sectioned by Department, Fund and Unit and summarized by Object.

**Report ID** : FIN-COT-BA-0001
**Run Date** : 08/12/2019
**Run Time** : 08:41 AM

# City of Tucson
## Budget vs Actual Expenses
## Through: 14th Period, 2019
## For Fiscal Year 2019

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9001 - Normal Retiree Benefit

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 105 - PAYROLL PENSION | 0.00 | 0.00 | 0.00 | 0.00 | 67,849,255.37 | 67,849,255.37 | 72,000,000 | 4,150,744.63 | 5.76 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **0.00** | **0.00** | **0.00** | **67,849,255.37** | **67,849,255.37** | **72,000,000** | **4,150,744.63** | **5.76 %** |
| **Total for Unit 9001 - Normal Retiree Benefit** | **0.00** | **0.00** | **0.00** | **0.00** | **67,849,255.37** | **67,849,255.37** | **72,000,000** | **4,150,744.63** | **5.76 %** |

**Report ID** : FIN-COT-BA-0001
**Run Date** : 08/12/2019
**Run Time** : 08:41 AM

# City of Tucson
## Budget vs Actual Expenses
## Through: 14th Period, 2019
## For Fiscal Year 2019

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9003 - Normal Retiree Beneficiary Benefit

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 105 - PAYROLL PENSION | 0.00 | 0.00 | 0.00 | 0.00 | 4,355,468.02 | 4,355,468.02 | 3,900,000 | (455,468.02) | -11.68 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **0.00** | **0.00** | **0.00** | **4,355,468.02** | **4,355,468.02** | **3,900,000** | **(455,468.02)** | **-11.68 %** |
| **Total for Unit 9003 - Normal Retiree Beneficiary Benefit** | **0.00** | **0.00** | **0.00** | **0.00** | **4,355,468.02** | **4,355,468.02** | **3,900,000** | **(455,468.02)** | **-11.68 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: 14th Period, 2019
## For Fiscal Year 2019

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9020 - Disability Retiree Benefit

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 105 - PAYROLL PENSION | 0.00 | 0.00 | 0.00 | 0.00 | 1,994,170.81 | 1,994,170.81 | 2,100,000 | 105,829.19 | 5.04 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **0.00** | **0.00** | **0.00** | **1,994,170.81** | **1,994,170.81** | **2,100,000** | **105,829.19** | **5.04 %** |
| **Total for Unit 9020 - Disability Retiree Benefit** | **0.00** | **0.00** | **0.00** | **0.00** | **1,994,170.81** | **1,994,170.81** | **2,100,000** | **105,829.19** | **5.04 %** |

**Report ID** : FIN-COT-BA-0001
**Run Date** : 08/12/2019
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# City of Tucson
## Budget vs Actual Expenses
## Through: 14th Period, 2019
## For Fiscal Year 2019

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9021 - Pension Fund Administration

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 101 - SALARIES & WAGES FOR PERMANENT EMPLOYEES | 0.00 | 0.00 | 0.00 | 0.00 | 240,597.36 | 240,597.36 | 276,420 | 35,822.64 | 12.96 % |
| 102 - EXTRA TIME | 0.00 | 0.00 | 0.00 | 0.00 | 2.17 | 2.17 | 0 | (2.17) | 0.00% |
| 103 - OVERTIME WAGES | 0.00 | 0.00 | 0.00 | 0.00 | 140.04 | 140.04 | 0 | (140.04) | 0.00% |
| 105 - PAYROLL PENSION | 0.00 | 0.00 | 0.00 | 0.00 | 3,971.22 | 3,971.22 | 0 | (3,971.22) | 0.00% |
| 108 - DOWNTOWN ALLOWANCE & DISCOUNTED TRANSIT PASSES | 0.00 | 0.00 | 0.00 | 0.00 | 1,107.79 | 1,107.79 | 2,310 | 1,202.21 | 52.04 % |
| 113 - TSRS PENSION CONTRIBUTION | 0.00 | 0.00 | 0.00 | 0.00 | 62,937.94 | 62,937.94 | 76,010 | 13,072.06 | 17.20 % |
| 114 - FICA (SOCIAL SECURITY) | 0.00 | 0.00 | 0.00 | 0.00 | 18,113.13 | 18,113.13 | 20,090 | 1,976.87 | 9.84 % |
| 115 - WORKERS COMPENSATION INSURANCE | 0.00 | 0.00 | 0.00 | 0.00 | 1,767.42 | 1,767.42 | 4,500 | 2,732.58 | 60.72 % |
| 116 - GROUP PLAN INSURANCE | 0.00 | 0.00 | 0.00 | 0.00 | 29,033.42 | 29,033.42 | 27,000 | (2,033.42) | -7.53 % |
| 117 - STATE UNEMPLOYMENT | 0.00 | 0.00 | 0.00 | 0.00 | 270.21 | 270.21 | 380 | 109.79 | 28.89 % |
| 125 - ONE-TIME DISTRIBUTION | 0.00 | 0.00 | 0.00 | 0.00 | 5,250.00 | 5,250.00 | 0 | (5,250.00) | 0.00% |
| 196 - INTERDEPARTMENTAL LABOR | 0.00 | 0.00 | 0.00 | 0.00 | 96,000.00 | 96,000.00 | 96,000 | 0.00 | 0.00% |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **0.00** | **0.00** | **0.00** | **459,190.70** | **459,190.70** | **502,710** | **43,519.30** | **8.66 %** |
| 202 - TRAVEL | 0.00 | 0.00 | 0.00 | 0.00 | 8,926.88 | 8,926.88 | 4,000 | (4,926.88) | ####### |
| 204 - TRAINING | 0.00 | 0.00 | 0.00 | 0.00 | 3,223.18 | 3,223.18 | 14,000 | 10,776.82 | 76.98 % |
| 205 - PARKING SERVICE | 0.00 | 0.00 | 0.00 | 0.00 | 546.00 | 546.00 | 500 | (46.00) | -9.20 % |
| 212 - CONSULTANTS AND SURVEYS | 0.00 | 0.00 | 0.00 | 0.00 | 254,867.25 | 254,867.25 | 50,000 | (204,867.25) | ####### |
| 213 - LEGAL | 0.00 | 0.00 | 0.00 | 0.00 | 26,694.50 | 26,694.50 | 50,000 | 23,305.50 | 46.61 % |

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# City of Tucson
## Budget vs Actual Expenses
## Through: 14th Period, 2019
## For Fiscal Year 2019

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9021 - Pension Fund Administration

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 215 - AUDITING AND BANK SERVICES | 0.00 | 67,131.19 | 67,131.19 | 0.00 | 289,028.52 | 289,028.52 | 60,000 | (229,028.52) | ####### |
| 219 - MISCELLANEOUS PROFESSIONAL SERVICES | 0.00 | 0.00 | 0.00 | 0.00 | 1,635.00 | 1,635.00 | 9,900,000 | 9,898,365.00 | 99.98 % |
| 221 - INSUR-PUBLIC LIABILITY | 0.00 | 0.00 | 0.00 | 0.00 | 34,595.97 | 34,595.97 | 31,000 | (3,595.97) | -11.60 % |
| 228 - HAZARDOUS WASTE INSURANCE | 0.00 | (2.82) | (2.82) | 0.00 | 0.00 | 0.00 | 0 | 0.00 | 0.00% |
| 232 - R&M MACHINERY & EQUIPMENT | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,200 | 1,200.00 | 100.00 % |
| 234 - COMPUTER HARDWARE MAINTENANCE | 0.00 | 0.00 | 0.00 | 0.00 | 258.35 | 258.35 | 0 | (258.35) | 0.00% |
| 245 - TELEPHONE | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,200 | 1,200.00 | 100.00 % |
| 252 - RENTS EQUIPMENT | 0.00 | 0.00 | 0.00 | 0.00 | 303.97 | 303.97 | 0 | (303.97) | 0.00% |
| 260 - COMPUTER SOFTWARE MAINTENANCE AGREEMENTS | 0.00 | 0.00 | 0.00 | 0.00 | 38,000.00 | 38,000.00 | 51,000 | 13,000.00 | 25.49 % |
| 263 - PUBLIC RELATIONS | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2,560 | 2,560.00 | 100.00 % |
| 264 - INVESTMENT MGT FEES & COMMISSIONS | 0.00 | (727,926.64) | (727,926.64) | 0.00 | 1,796,761.01 | 1,796,761.01 | 0 | (1,796,761.01) | 0.00% |
| 265 - SECURITIES LENDING (STOCK FEES) | 0.00 | 41,114.00 | 41,114.00 | 0.00 | 81,972.47 | 81,972.47 | 0 | (81,972.47) | 0.00% |
| 277 - CARRIED INTEREST EXPENSE | 0.00 | 1,044,510.96 | 1,044,510.96 | 0.00 | 2,055,754.79 | 2,055,754.79 | 0 | (2,055,754.79) | 0.00% |
| 284 - MEMBERSHIPS AND SUBSCRIPTIONS | 0.00 | 0.00 | 0.00 | 0.00 | 901.00 | 901.00 | 1,500 | 599.00 | 39.93 % |
| **Total for 200 - PROF CHARGES** | **0.00** | **424,826.69** | **424,826.69** | **0.00** | **4,593,468.89** | **4,593,468.89** | **10,166,960** | **5,573,491.11** | **54.82 %** |
| 311 - OFFICE SUPPLIES | 0.00 | 0.00 | 0.00 | 0.00 | 1,081.88 | 1,081.88 | 9,000 | 7,918.12 | 87.98 % |
| 312 - PRINTING,PHOTOGRAPHY,REPRODUCTION | 0.00 | 0.00 | 0.00 | 0.00 | 10,358.67 | 10,358.67 | 9,000 | (1,358.67) | -15.10 % |
| 314 - POSTAGE | 0.00 | 0.00 | 0.00 | 0.00 | 11,044.77 | 11,044.77 | 12,000 | 955.23 | 7.96 % |
| 317 - COMPUTER SOFTWARE < $100,000 | 0.00 | 0.00 | 0.00 | 0.00 | 71.91 | 71.91 | 0 | (71.91) | 0.00% |

# City of Tucson
## Budget vs Actual Expenses
## Through: 14th Period, 2019
## For Fiscal Year 2019

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM

**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM

**Unit** 9021 - Pension Fund Administration

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 341 - BOOK, PERIODICALS AND RECORDS | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 250 | 250.00 | 100.00 % |
| 345 - FURNISHINGS, EQUIPMENT AND TOOLS < $5,000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,000 | 1,000.00 | 100.00 % |
| 346 - COMPUTER EQUIPMENT < $5,000 | 0.00 | 0.00 | 0.00 | 0.00 | 1,764.33 | 1,764.33 | 1,000 | (764.33) | -76.43 % |
| 359 - NON OFFICE SUPPLIES | 0.00 | 0.00 | 0.00 | 0.00 | 2,600.74 | 2,600.74 | 0 | (2,600.74) | 0.00% |
| **Total for 300 - SUPPLIES** | **0.00** | **0.00** | **0.00** | **0.00** | **26,922.30** | **26,922.30** | **32,250** | **5,327.70** | **16.52 %** |
| **Total for Unit 9021 - Pension Fund Administration** | **0.00** | **424,826.69** | **424,826.69** | **0.00** | **5,079,581.89** | **5,079,581.89** | **10,701,920** | **5,622,338.11** | **52.54 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: 14th Period, 2019
## For Fiscal Year 2019

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9022 - Disability Retiree Beneficiary Benefit

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 105 - PAYROLL PENSION | 0.00 | 0.00 | 0.00 | 0.00 | 416,811.12 | 416,811.12 | 370,000 | (46,811.12) | -12.65 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **0.00** | **0.00** | **0.00** | **416,811.12** | **416,811.12** | **370,000** | **(46,811.12)** | **-12.65 %** |
| **Total for Unit 9022 - Disability Retiree Beneficiary Bene** | **0.00** | **0.00** | **0.00** | **0.00** | **416,811.12** | **416,811.12** | **370,000** | **(46,811.12)** | **-12.65 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: 14th Period, 2019
## For Fiscal Year 2019

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9023 - ACTIVE MEMBER REFUNDS-CONTRBS

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 186 - TSRS REFUNDS | 0.00 | 0.00 | 0.00 | 0.00 | 1,547,702.02 | 1,547,702.02 | 2,736,000 | 1,188,297.98 | 43.43 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **0.00** | **0.00** | **0.00** | **1,547,702.02** | **1,547,702.02** | **2,736,000** | **1,188,297.98** | **43.43 %** |
| **Total for Unit 9023 - ACTIVE MEMBER REFUNDS-CON** | **0.00** | **0.00** | **0.00** | **0.00** | **1,547,702.02** | **1,547,702.02** | **2,736,000** | **1,188,297.98** | **43.43 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: 14th Period, 2019
## For Fiscal Year 2019

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9025 - INTEREST ON REFUNDS

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 186 - TSRS REFUNDS | 0.00 | 0.00 | 0.00 | 0.00 | 39,144.78 | 39,144.78 | 50,000 | 10,855.22 | 21.71 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **0.00** | **0.00** | **0.00** | **39,144.78** | **39,144.78** | **50,000** | **10,855.22** | **21.71 %** |
| **Total for Unit 9025 - INTEREST ON REFUNDS** | **0.00** | **0.00** | **0.00** | **0.00** | **39,144.78** | **39,144.78** | **50,000** | **10,855.22** | **21.71 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: 14th Period, 2019
## For Fiscal Year 2019

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9026 - DWE SYSTEM BENEFIT PAYMENT

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 186 - TSRS REFUNDS | 0.00 | 0.00 | 0.00 | 0.00 | 313,066.46 | 313,066.46 | 200,000 | (113,066.46) | -56.53 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **0.00** | **0.00** | **0.00** | **313,066.46** | **313,066.46** | **200,000** | **(113,066.46)** | **-56.53 %** |
| **Total for Unit 9026 - DWE SYSTEM BENEFIT PAYMENT** | **0.00** | **0.00** | **0.00** | **0.00** | **313,066.46** | **313,066.46** | **200,000** | **(113,066.46)** | **-56.53 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: 14th Period, 2019
## For Fiscal Year 2019

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9027 - CREDITABLE SERVICE TRANS(ASRS)

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 186 - TSRS REFUNDS | 0.00 | 0.00 | 0.00 | 0.00 | 70,303.95 | 70,303.95 | 0 | (70,303.95) | 0.00% |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **0.00** | **0.00** | **0.00** | **70,303.95** | **70,303.95** | **0** | **(70,303.95)** | **0.00%** |
| **Total for Unit 9027 - CREDITABLE SERVICE TRANS(AS** | **0.00** | **0.00** | **0.00** | **0.00** | **70,303.95** | **70,303.95** | **0** | **(70,303.95)** | **0.00%** |

# City of Tucson
## Budget vs Actual Expenses
## Through: 14th Period, 2019
## For Fiscal Year 2019

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM
**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM
**Unit** 9028 - EXCESS SER TRS/CTY CONT(ASRS)

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 186 - TSRS REFUNDS | 0.00 | 0.00 | 0.00 | 0.00 | 294.01 | 294.01 | 0 | (294.01) | 0.00% |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **0.00** | **0.00** | **0.00** | **294.01** | **294.01** | **0** | **(294.01)** | **0.00%** |
| **Total for Unit 9028 - EXCESS SER TRS/CTY CONT(ASR** | **0.00** | **0.00** | **0.00** | **0.00** | **294.01** | **294.01** | **0** | **(294.01)** | **0.00%** |
| **Total for Fund 072 - TUCSON SUPP RETIREMENT SYS** | **0.00** | **424,826.69** | **424,826.69** | **0.00** | **81,665,798.43** | **81,665,798.43** | **92,057,920** | **10,392,121.57** | **11.29 %** |
| **Total for Department 900 - TUCSON SUPPL RETIREME** | **0.00** | **424,826.69** | **424,826.69** | **0.00** | **81,665,798.43** | **81,665,798.43** | **92,057,920** | **10,392,121.57** | **11.29 %** |
| **Grand Totals** | **0.00** | **424,826.69** | **424,826.69** | **0.00** | **81,665,798.43** | **81,665,798.43** | **92,057,920** | **10,392,121.57** | **11.29 %** |

**Report ID** : FIN-COT-BA-0001
**Run Date** : 08/12/2019
**Run Time** : 08:48 AM

# City of Tucson
## Budget vs Actual Expenses
## Through: July, 2020
## For Fiscal Year 2020

## Parameter Page

**Parameters and Prompts**

| | |
|---|---|
| **Fiscal Year** | 2020 |
| **Accounting Period** | 1 |
| **Fund** | 072 |
| **Department** | * |
| **Unit** | * |
| **Object Code** | * |

**Report Description**

The Expenses vs. Actual Report shows expenditures and encumbrances for the selected accounting period and for the selected fiscal year compared against the current expense budget and the unobligated budget balance. The report is sectioned by Department, Fund and Unit and summarized by Object.

# City of Tucson
## Budget vs Actual Expenses
## Through: July, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM

**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM

**Unit** 9001 - Normal Retiree Benefit

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 105 - PAYROLL PENSION | 0.00 | 5,733,849.59 | 5,733,849.59 | 0.00 | 5,733,849.59 | 5,733,849.59 | 71,300,000 | 65,566,150.41 | 91.96 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **5,733,849.59** | **5,733,849.59** | **0.00** | **5,733,849.59** | **5,733,849.59** | **71,300,000** | **65,566,150.41** | **91.96 %** |
| **Total for Unit 9001 - Normal Retiree Benefit** | **0.00** | **5,733,849.59** | **5,733,849.59** | **0.00** | **5,733,849.59** | **5,733,849.59** | **71,300,000** | **65,566,150.41** | **91.96 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: July, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM

**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM

**Unit** 9003 - Normal Retiree Beneficiary Benefit

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 105 - PAYROLL PENSION | 0.00 | 372,406.09 | 372,406.09 | 0.00 | 372,406.09 | 372,406.09 | 4,600,000 | 4,227,593.91 | 91.90 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **372,406.09** | **372,406.09** | **0.00** | **372,406.09** | **372,406.09** | **4,600,000** | **4,227,593.91** | **91.90 %** |
| **Total for Unit 9003 - Normal Retiree Beneficiary Benefit** | **0.00** | **372,406.09** | **372,406.09** | **0.00** | **372,406.09** | **372,406.09** | **4,600,000** | **4,227,593.91** | **91.90 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: July, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM

**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM

**Unit** 9020 - Disability Retiree Benefit

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 105 - PAYROLL PENSION | 0.00 | 164,887.24 | 164,887.24 | 0.00 | 164,887.24 | 164,887.24 | 2,100,000 | 1,935,112.76 | 92.15 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **164,887.24** | **164,887.24** | **0.00** | **164,887.24** | **164,887.24** | **2,100,000** | **1,935,112.76** | **92.15 %** |
| **Total for Unit 9020 - Disability Retiree Benefit** | **0.00** | **164,887.24** | **164,887.24** | **0.00** | **164,887.24** | **164,887.24** | **2,100,000** | **1,935,112.76** | **92.15 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: July, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM

**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM

**Unit** 9021 - Pension Fund Administration

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 101 - SALARIES & WAGES FOR PERMANENT EMPLOYEES | 0.00 | 13,094.23 | 13,094.23 | 0.00 | 13,094.23 | 13,094.23 | 300,770 | 287,675.77 | 95.65 % |
| 108 - DOWNTOWN ALLOWANCE & DISCOUNTED TRANSIT PASSES | 0.00 | 42.87 | 42.87 | 0.00 | 42.87 | 42.87 | 2,700 | 2,657.13 | 98.41 % |
| 113 - TSRS PENSION CONTRIBUTION | 0.00 | 3,493.58 | 3,493.58 | 0.00 | 3,493.58 | 3,493.58 | 82,720 | 79,226.42 | 95.78 % |
| 114 - FICA (SOCIAL SECURITY) | 0.00 | 907.31 | 907.31 | 0.00 | 907.31 | 907.31 | 21,680 | 20,772.69 | 95.81 % |
| 115 - WORKERS COMPENSATION INSURANCE | 0.00 | 652.45 | 652.45 | 0.00 | 652.45 | 652.45 | 6,550 | 5,897.55 | 90.04 % |
| 116 - GROUP PLAN INSURANCE | 0.00 | 2,155.35 | 2,155.35 | 0.00 | 2,155.35 | 2,155.35 | 34,840 | 32,684.65 | 93.81 % |
| 196 - INTERDEPARTMENTAL LABOR | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 96,000 | 96,000.00 | 100.00 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **20,345.79** | **20,345.79** | **0.00** | **20,345.79** | **20,345.79** | **545,260** | **524,914.21** | **96.27 %** |
| 202 - TRAVEL | 0.00 | 1,110.00 | 1,110.00 | 0.00 | 1,110.00 | 1,110.00 | 18,000 | 16,890.00 | 93.83 % |
| 204 - TRAINING | 0.00 | 330.00 | 330.00 | 0.00 | 330.00 | 330.00 | 14,000 | 13,670.00 | 97.64 % |
| 205 - PARKING SERVICE | 0.00 | 67.00 | 67.00 | 0.00 | 67.00 | 67.00 | 500 | 433.00 | 86.60 % |
| 212 - CONSULTANTS AND SURVEYS | 0.00 | 65,000.00 | 65,000.00 | 0.00 | 65,000.00 | 65,000.00 | 436,000 | 371,000.00 | 85.09 % |
| 213 - LEGAL | 0.00 | 9,739.50 | 9,739.50 | 0.00 | 9,739.50 | 9,739.50 | 50,000 | 40,260.50 | 80.52 % |
| 215 - AUDITING AND BANK SERVICES | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 380,000 | 380,000.00 | 100.00 % |
| 219 - MISCELLANEOUS PROFESSIONAL SERVICES | 0.00 | 10.00 | 10.00 | 0.00 | 10.00 | 10.00 | 884,000 | 883,990.00 | 100.00 % |
| 221 - INSUR-PUBLIC LIABILITY | 0.00 | 17.55 | 17.55 | 0.00 | 17.55 | 17.55 | 2,970 | 2,952.45 | 99.41 % |
| 228 - HAZARDOUS WASTE INSURANCE | 0.00 | 7.88 | 7.88 | 0.00 | 7.88 | 7.88 | 660 | 652.12 | 98.81 % |
| 232 - R&M MACHINERY & EQUIPMENT | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,200 | 1,200.00 | 100.00 % |

# City of Tucson
## Budget vs Actual Expenses
## Through: July, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM

**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM

**Unit** 9021 - Pension Fund Administration

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 245 - TELEPHONE | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,200 | 1,200.00 | 100.00 % |
| 260 - COMPUTER SOFTWARE MAINTENANCE AGREEMENTS | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 51,000 | 51,000.00 | 100.00 % |
| 263 - PUBLIC RELATIONS | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2,560 | 2,560.00 | 100.00 % |
| 264 - INVESTMENT MGT FEES & COMMISSIONS | 0.00 | 354,883.74 | 354,883.74 | 0.00 | 354,883.74 | 354,883.74 | 3,750,000 | 3,395,116.26 | 90.54 % |
| 265 - SECURITIES LENDING (STOCK FEES) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 60,000 | 60,000.00 | 100.00 % |
| 277 - CARRIED INTEREST EXPENSE | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4,500,000 | 4,500,000.00 | 100.00 % |
| 284 - MEMBERSHIPS AND SUBSCRIPTIONS | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,500 | 1,500.00 | 100.00 % |
| **Total for 200 - PROF CHARGES** | **0.00** | **431,165.67** | **431,165.67** | **0.00** | **431,165.67** | **431,165.67** | **10,153,590** | **9,722,424.33** | **95.75 %** |
| 311 - OFFICE SUPPLIES | 0.00 | 46.78 | 46.78 | 0.00 | 46.78 | 46.78 | 9,000 | 8,953.22 | 99.48 % |
| 312 - PRINTING,PHOTOGRAPHY,REPRODUCTION | 0.00 | 826.13 | 826.13 | 0.00 | 826.13 | 826.13 | 9,000 | 8,173.87 | 90.82 % |
| 314 - POSTAGE | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 12,000 | 12,000.00 | 100.00 % |
| 341 - BOOK, PERIODICALS AND RECORDS | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 250 | 250.00 | 100.00 % |
| 345 - FURNISHINGS, EQUIPMENT AND TOOLS < $5,000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,000 | 1,000.00 | 100.00 % |
| 346 - COMPUTER EQUIPMENT < $5,000 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1,000 | 1,000.00 | 100.00 % |
| 359 - NON OFFICE SUPPLIES | 0.00 | 92.37 | 92.37 | 0.00 | 92.37 | 92.37 | 0 | (92.37) | 0.00% |
| **Total for 300 - SUPPLIES** | **0.00** | **965.28** | **965.28** | **0.00** | **965.28** | **965.28** | **32,250** | **31,284.72** | **97.01 %** |
| **Total for Unit 9021 - Pension Fund Administration** | **0.00** | **452,476.74** | **452,476.74** | **0.00** | **452,476.74** | **452,476.74** | **10,731,100** | **10,278,623.26** | **95.78 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: July, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM

**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM

**Unit** 9022 - Disability Retiree Beneficiary Benefit

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 105 - PAYROLL PENSION | 0.00 | 34,734.26 | 34,734.26 | 0.00 | 34,734.26 | 34,734.26 | 370,000 | 335,265.74 | 90.61 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **34,734.26** | **34,734.26** | **0.00** | **34,734.26** | **34,734.26** | **370,000** | **335,265.74** | **90.61 %** |
| **Total for Unit 9022 - Disability Retiree Beneficiary Bene** | **0.00** | **34,734.26** | **34,734.26** | **0.00** | **34,734.26** | **34,734.26** | **370,000** | **335,265.74** | **90.61 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: July, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM

**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM

**Unit** 9023 - ACTIVE MEMBER REFUNDS-CONTRBS

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 186 - TSRS REFUNDS | 0.00 | 90,787.33 | 90,787.33 | 0.00 | 90,787.33 | 90,787.33 | 2,736,000 | 2,645,212.67 | 96.68 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **90,787.33** | **90,787.33** | **0.00** | **90,787.33** | **90,787.33** | **2,736,000** | **2,645,212.67** | **96.68 %** |
| **Total for Unit 9023 - ACTIVE MEMBER REFUNDS-CON** | **0.00** | **90,787.33** | **90,787.33** | **0.00** | **90,787.33** | **90,787.33** | **2,736,000** | **2,645,212.67** | **96.68 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: July, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM

**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM

**Unit** 9025 - INTEREST ON REFUNDS

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 186 - TSRS REFUNDS | 0.00 | 127.78 | 127.78 | 0.00 | 127.78 | 127.78 | 50,000 | 49,872.22 | 99.74 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **127.78** | **127.78** | **0.00** | **127.78** | **127.78** | **50,000** | **49,872.22** | **99.74 %** |
| **Total for Unit 9025 - INTEREST ON REFUNDS** | **0.00** | **127.78** | **127.78** | **0.00** | **127.78** | **127.78** | **50,000** | **49,872.22** | **99.74 %** |

# City of Tucson
## Budget vs Actual Expenses
## Through: July, 2020
## For Fiscal Year 2020

**Department** 900 - TUCSON SUPPL RETIREMENT SYSTEM

**Fund** 072 - TUCSON SUPP RETIREMENT SYSTEM

**Unit** 9026 - DWE SYSTEM BENEFIT PAYMENT

| Object | Current Period Encumbrance | Current Period Expenditure | Current Total Obligations | YTD Encumbrance | YTD Expenditure | YTD Total Obligations | Current Budgeted Amount | Unobligated Budget Balance | Percent |
|---|---|---|---|---|---|---|---|---|---|
| 186 - TSRS REFUNDS | 0.00 | 29,829.21 | 29,829.21 | 0.00 | 29,829.21 | 29,829.21 | 200,000 | 170,170.79 | 85.09 % |
| **Total for 100 - PAYROLL CHGS** | **0.00** | **29,829.21** | **29,829.21** | **0.00** | **29,829.21** | **29,829.21** | **200,000** | **170,170.79** | **85.09 %** |
| **Total for Unit 9026 - DWE SYSTEM BENEFIT PAYMENT** | **0.00** | **29,829.21** | **29,829.21** | **0.00** | **29,829.21** | **29,829.21** | **200,000** | **170,170.79** | **85.09 %** |
| **Total for Fund 072 - TUCSON SUPP RETIREMENT SYS** | **0.00** | **6,879,098.24** | **6,879,098.24** | **0.00** | **6,879,098.24** | **6,879,098.24** | **92,087,100** | **85,208,001.76** | **92.53 %** |
| **Total for Department 900 - TUCSON SUPPL RETIREME** | **0.00** | **6,879,098.24** | **6,879,098.24** | **0.00** | **6,879,098.24** | **6,879,098.24** | **92,087,100** | **85,208,001.76** | **92.53 %** |
| **Grand Totals** | **0.00** | **6,879,098.24** | **6,879,098.24** | **0.00** | **6,879,098.24** | **6,879,098.24** | **92,087,100** | **85,208,001.76** | **92.53 %** |

# TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
# BOARD OF TRUSTEES
# MEETING MINUTES

**DATE:** **Thursday, June, 27, 2019**
**TIME:** **8:30 a.m.**
**PLACE:** **Human Resource Conference Room, 3rd floor East**
**City Hall, 255 West Alameda**
**Tucson, Arizona 85701**

Members Present: Joyce Garland, Finance Director
Mark Rubin, Chairman
James Wysocki, Elected Retiree Representative
Jorge Hernández, Elected Representative
Kevin Larson, City Manager Appointee

Staff Present Art Cuaron, Pension & Benefits Administrator
Pete Saxton, Pension Manager
Dawn Davis, Lead Pension Analyst

Guests Present Catherine Langford, Yoder & Langford – TSRS Legal Counsel (via Telephone)
Dave Deibel, Deputy City Attorney (arrived at 8:39 am)
Gordon Weightman, Callan LLC (via Telephone)
Paul Erlandson, Callan LLC (via Telephone)

Absent/Excused: Ana Urquijo, HR Director
Michael Coffey, Elected Representative

Chairman Mark Ruben called the meeting to order at 8:30 am.

A. **Consent Agenda**
1. Retirement Ratifications for June 2019
2. May 2019 TSRS Budget Vs. Actual Expenses
3. May 2019 Special Board Meeting Minutes
4. May 2019 Board Meeting Minutes
5. TSRS May Investment Measurement Service Monthly Review

A motion to approve the consent agenda was made by James Wysocki, 2nd by Joyce Garland and passed by a vote of 4 to 0 (Chairman Rubin abstained, Ana Urquijo and Michael Coffey absent/excused).

B. **Call to Audience**

None heard.

C. **Investment Activity Report**
1. Final Asset/Liability Model Report – Updated Scenarios – Gordon Weightman – Callan
2. Infrastructure Allocation

A motion to move these items to the July 2019 agenda was made by Jorge Hernández, 2nd by Joyce Garland.

Kevin Larson advised he was not able to attend the July 2019 meeting and model 3 was his preference but he was comfortable with the Board approving model 2, 3, or 4.

The motion passed by a vote of 4 to 0 (Chairman Rubin abstained, Ana Urquijo and Michael Coffey absent/excused).

The Board agreed the Infrastructure Allocation should be discussed with the Asset/Liability Study at the July 2019 meeting.

D. **Administrative Discussions**

1. TSRS Rules and Regulations

Art Cuaron advised the Board that adopting rule 7 of the TSRS Rules and Regulations would provide the flexibility to cancel meetings as needed without disrupting retirement ratifications.

A Motion to adopt rule 7 was made by James Wysocki, 2nd by Kevin Larson and passed by a vote of 4 to 0 (Chairman Rubin abstained, Ana Urquijo and Michael Coffey absent/excused).

2. Disability Audit Update

Art Cuaron stated all 31 disability retirees audited had responded and no retirement benefits would be suspended this year.

3. Internal Audit Update – Dual Electronic Control

Art Cuaron told the Board the dual electronic control for money transfers between BNY Melon accounts and the City had been implemented as recommended by the internal auditor.

E. **Articles & Readings for Board Member Education / Discussion**

1. Infrastructure Facing an Era of Risk
2. Oil Prices Stumble on Fears of Falling Demand
3. Be a Faithful Fiduciary

F. **Future Agenda Items**

1. PRBI Research
2. Asset Allocation Study
3. Infrastructure Allocation

G. **Adjournment**

A motion to adjourn was made by Kevin Larson, 2nd by James Wysocki and passed by a vote of 4 to 0 (Chairman Rubin abstained, Ana Urquijo and Michael Coffey absent/excused).

Meeting Adjourned at 8:48 am.

| | | | |
|---|---|---|---|
| _____ | _____ | _____ | _____ |
| Mark Rubin | Date | Art Cuaron | Date |
| Chairman of the Board | | Pension & Benefits Administrator | |

Callan

June 30, 2019

# Tucson Supplemental Retirement System

## Investment Measurement Service Monthly Review

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## Table of Contents
## Tucson Supplemental Retirement System
## June 30, 2019


Actual vs. Target Asset Allocation 1

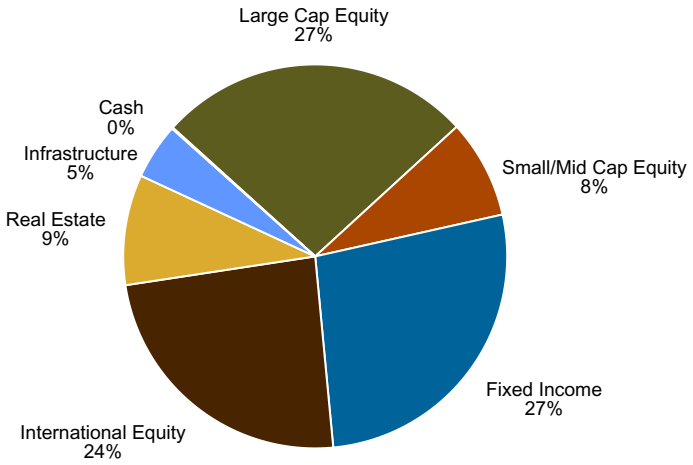
Asset Allocation Across Investment Managers 2

Investment Manager Performance 3

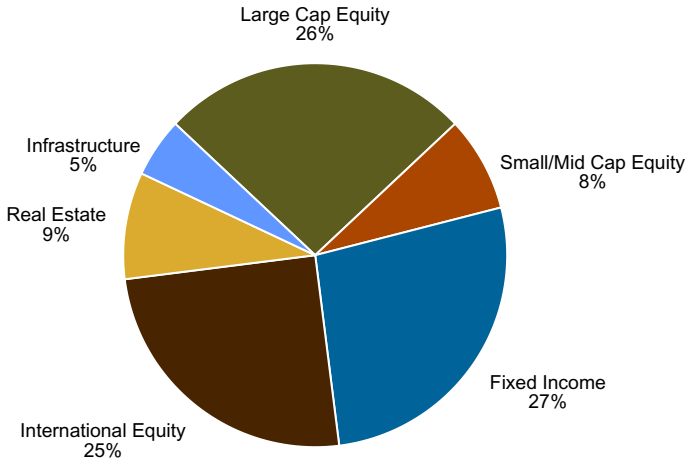
## Actual vs Target Asset Allocation

The first chart below shows the Fund's asset allocation as of June 30, 2019. The second chart shows the Fund's target asset allocation as outlined in the investment policy statement.

### Actual Asset Allocation




### Target Asset Allocation




| Asset Class | $000s Actual | Percent Actual | Percent Target | Percent Difference | $000s Difference |
|---|---|---|---|---|---|
| Large Cap Equity | 222,145 | 26.5% | 26.0% | 0.5% | 4,586 |
| Small/Mid Cap Equity | 69,246 | 8.3% | 8.0% | 0.3% | 2,304 |
| Fixed Income | 226,316 | 27.0% | 27.0% | 0.0% | 390 |
| International Equity | 201,638 | 24.1% | 25.0% | (0.9%) | (7,553) |
| Real Estate | 77,626 | 9.3% | 9.0% | 0.3% | 2,317 |
| Infrastructure | 38,964 | 4.7% | 5.0% | (0.3%) | (2,875) |
| Cash | 830 | 0.1% | 0.0% | 0.1% | 830 |
| Total | 836,765 | 100.0% | 100.0% | | |

*Current Month Target Performance is calculated using monthly rebalancing.

## Investment Manager Asset Allocation

The table below contrasts the distribution of assets across the Fund's investment managers as of June 30, 2019, with the distribution as of May 31, 2019. The change in asset distribution is broken down into the dollar change due to Net New Investment and the dollar change due to Investment Return.

### Asset Distribution Across Investment Managers

| | June 30, 2019 | | | | May 31, 2019 | |
|---|---|---|---|---|---|---|
| | Market Value | Weight | Net New Inv. | Inv. Return | Market Value | Weight |
| **Domestic Equity** | **$291,390,567** | **34.82%** | **$(1,002,424)** | **$18,447,944** | **$273,945,047** | **33.96%** |
| **Large Cap Equity** | **$222,144,979** | **26.55%** | **$(1,005,623)** | **$14,261,563** | **$208,889,039** | **25.90%** |
| Alliance S&P Index | 67,345,430 | 8.05% | (999,768) | 4,477,667 | 63,867,531 | 7.92% |
| PIMCO StocksPLUS | 34,150,105 | 4.08% | 0 | 2,262,261 | 31,887,844 | 3.95% |
| BlackRock Russell 1000 Value | 60,419,879 | 7.22% | (5,800) | 4,044,216 | 56,381,462 | 6.99% |
| T. Rowe Price Large Cap Growth | 60,229,565 | 7.20% | (56) | 3,477,419 | 56,752,202 | 7.04% |
| **Small/Mid Cap Equity** | **$69,245,588** | **8.28%** | **$3,200** | **$4,186,380** | **$65,056,008** | **8.07%** |
| Champlain Mid Cap | 34,290,459 | 4.10% | 632 | 1,899,888 | 32,389,938 | 4.02% |
| Pyramis Small Cap | 34,955,130 | 4.18% | 2,568 | 2,286,492 | 32,666,070 | 4.05% |
| **International Equity** | **$201,638,481** | **24.10%** | **$(137,901)** | **$10,530,964** | **$191,245,419** | **23.71%** |
| Causeway International Opps | 78,532,446 | 9.39% | 0 | 4,351,474 | 74,180,973 | 9.20% |
| Aberdeen EAFE Plus | 83,449,553 | 9.97% | (137,901) | 3,691,497 | 79,895,958 | 9.90% |
| American Century Non-US SC | 39,656,482 | 4.74% | 0 | 2,487,994 | 37,168,488 | 4.61% |
| **Fixed Income** | **$226,316,271** | **27.05%** | **$(14,716)** | **$4,011,879** | **$222,319,108** | **27.56%** |
| BlackRock U.S. Debt Fund | 111,703,222 | 13.35% | (14,716) | 1,398,485 | 110,319,454 | 13.68% |
| PIMCO Fixed Income | 114,613,049 | 13.70% | 0 | 2,613,394 | 111,999,654 | 13.88% |
| **Real Estate** | **$77,626,196** | **9.28%** | **$0** | **$(1,304,232)** | **$78,930,428** | **9.79%** |
| JPM Strategic Property Fund | 51,853,651 | 6.20% | 0 | (1,304,232) | 53,157,883 | 6.59% |
| JPM Income and Growth Fund | 25,772,545 | 3.08% | 0 | 0 | 25,772,545 | 3.20% |
| **Infrastructure** | **$38,963,665** | **4.66%** | **$0** | **$272,840** | **$38,690,826** | **4.80%** |
| Macquarie European | 12,707,974 | 1.52% | 0 | 272,840 | 12,435,134 | 1.54% |
| SteelRiver Infrastructure | 26,255,691 | 3.14% | 0 | 0 | 26,255,691 | 3.25% |
| **Total Cash** | **$830,226** | **0.10%** | **$(669,128)** | **$2,562** | **$1,496,792** | **0.19%** |
| Cash | 830,226 | 0.10% | (669,128) | 2,562 | 1,496,792 | 0.19% |
| **Total Fund** | **$836,765,407** | **100.0%** | **$(1,824,169)** | **$31,961,957** | **$806,627,620** | **100.0%** |

## Investment Manager Returns

The table below details the rates of return for the fund's investment managers over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

### Returns for Periods Ended June 30, 2019

| | Last Month | Quarter to Date | Last 12 Months | Last 36 Months | Last 60 Months |
|---|---|---|---|---|---|
| **Gross of Fees** | | | | | |
| **Domestic Equity** | **6.74%** | **3.88%** | **9.87%** | **15.93%** | **11.45%** |
| Total Domestic Equity Target (1) | 7.06% | 3.98% | 8.32% | 13.78% | 10.05% |
| **Large Cap Equity** | **6.83%** | **3.88%** | **9.94%** | **15.73%** | **11.20%** |
| S&P 500 Index | 7.05% | 4.30% | 10.42% | 14.19% | 10.71% |
| Alliance S&P Index | 7.02% | 4.28% | 10.39% | 14.14% | 10.68% |
| S&P 500 Index | 7.05% | 4.30% | 10.42% | 14.19% | 10.71% |
| PIMCO StocksPLUS | 7.09% | 4.56% | 10.64% | 14.57% | 10.68% |
| S&P 500 Index | 7.05% | 4.30% | 10.42% | 14.19% | 10.71% |
| BlackRock Russell 1000 Value | 7.17% | 3.85% | 8.61% | 10.30% | 7.55% |
| Russell 1000 Value Index | 7.18% | 3.84% | 8.46% | 10.19% | 7.46% |
| T. Rowe Price Large Cap Growth | 6.13% | 3.09% | 10.46% | 23.63% | 15.63% |
| Russell 1000 Growth Index | 6.87% | 4.64% | 11.56% | 18.07% | 13.39% |
| **Small/Mid Cap Equity** | **6.44%** | **3.89%** | **9.76%** | **16.57%** | **12.32%** |
| Russell 2500 Index | 7.09% | 2.96% | 1.77% | 12.34% | 7.66% |
| Champlain Mid Cap | 5.87% | 3.26% | 16.06% | 19.11% | 14.29% |
| Russell MidCap Index | 6.87% | 4.13% | 7.83% | 12.16% | 8.63% |
| Pyramis Small Cap | 7.00% | 4.51% | 2.94% | 13.72% | 10.10% |
| Russell 2000 Index | 7.07% | 2.10% | (3.31%) | 12.30% | 7.06% |
| **International Equity** | **5.52%** | **2.63%** | **(1.87%)** | **8.78%** | **1.90%** |
| Total International Equity Target (2) | 5.80% | 2.74% | 0.26% | 9.17% | 2.03% |
| Causeway International Opps | 5.87% | 1.32% | (2.57%) | 8.85% | 2.15% |
| MSCI ACWI ex US | 6.02% | 2.98% | 1.29% | 9.39% | 2.16% |
| Aberdeen EAFE Plus | 4.62% | 3.17% | 3.04% | 8.01% | 0.90% |
| MSCI ACWI x US (Net) | 6.02% | 2.98% | 1.29% | 9.39% | 2.16% |
| American Century Non-US SC | 6.77% | 4.12% | (9.14%) | 10.98% | - |
| MSCI ACWI ex US Small Cap | 4.41% | 1.21% | (5.94%) | 7.76% | 2.77% |
| **Fixed Income** | **1.80%** | **3.38%** | **9.29%** | **4.70%** | **4.24%** |
| Blmbg Aggregate Index | 1.26% | 3.08% | 7.87% | 2.31% | 2.95% |
| BlackRock U.S. Debt Fund | 1.27% | 3.09% | 7.97% | 2.41% | 3.06% |
| Blmbg Aggregate Index | 1.26% | 3.08% | 7.87% | 2.31% | 2.95% |
| PIMCO Fixed Income | 2.33% | 3.66% | 10.57% | 6.50% | 5.19% |
| Custom Index (3) | 2.42% | 3.43% | 9.56% | 4.01% | 4.00% |

(1) The Total Domestic Equity target is currently composed of 76% S&P 500 and 24% Russell 2500 Index.

(2) The Total International Equity Target reflects the MSCI ACWI ex-US (Net Div) through May 2016 and the MSCI ACWI ex-US IMI (Net Div) thereafter.

(3) The PIMCO custom index is composed of 25% Barclays Mortgage, 25% Barclays Credit, 25% Barclays High Yield, and 25% JP Morgan EMBI Global. Previously the index was composed of 70% Barclays Mortgage, 15% Barclays Credit, and 15% Barclays High Yield.

## Investment Manager Returns

The table below details the rates of return for the fund's investment managers over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

**Returns for Periods Ended June 30, 2019**

| | Last Month | Quarter to Date | Last 12 Months | Last 36 Months | Last 60 Months |
|---|---|---|---|---|---|
| **Gross of Fees** | | | | | |
| **Real Estate** | **(1.65%)** | **(1.24%)** | **2.24%** | **5.97%** | **8.48%** |
| NFI-ODCE Value Weight Gr* | 0.47% | 1.42% | 6.86% | 7.72% | 9.85% |
| JPM Strategic Property Fund | (2.45%) | (1.85%) | 1.65% | 5.76% | 8.30% |
| JPM Income and Growth Fund** | 0.00% | 0.00% | 3.46% | 6.41% | 9.03% |
| NFI-ODCE Value Weight Gr* | 0.47% | 1.42% | 6.86% | 7.72% | 9.85% |
| **Infrastructure** | **0.71%** | **12.66%** | **23.76%** | **18.38%** | **12.68%** |
| CPI + 4% | 0.28% | 1.76% | 5.45% | 6.01% | 5.25% |
| Macquarie European Infrastructure Fund | 2.19% | 52.43% | 57.37% | 44.55% | 23.86% |
| SteelRiver Infrastructure North Amer.** | 0.00% | 0.00% | 12.29% | 5.29% | 7.81% |
| CPI + 4% | 0.28% | 1.76% | 5.45% | 6.01% | 5.25% |
| **Total Fund** | **3.97%** | **3.32%** | **6.58%** | **10.34%** | **7.54%** |
| Total Fund Target | 4.25% | 3.21% | 6.32% | 8.75% | 6.44% |

* Current Month Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

*The NFI-ODCE Value Weight benchmark current quarter return is preliminary.

**SteelRiver Infrastructure and JPM I&G performance reflect prior month's market values as current data is not yet available.

## Investment Manager Returns

The table below details the rates of return for the fund's investment managers over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

### Returns for Periods Ended June 30, 2019

| | Last Month | Quarter to Date | Last 12 Months | Last 36 Months | Last 60 Months |
|---|---|---|---|---|---|
| **Net of Fees** | | | | | |
| **Domestic Equity** | **6.73%** | **3.88%** | **9.69%** | **15.64%** | **11.16%** |
| Total Domestic Equity Target (1) | 7.06% | 3.98% | 8.32% | 13.78% | 10.05% |
| **Large Cap Equity** | **6.83%** | **3.88%** | **9.84%** | **15.58%** | **11.05%** |
| S&P 500 Index | 7.05% | 4.30% | 10.42% | 14.19% | 10.71% |
| Alliance S&P Index | 7.02% | 4.28% | 10.37% | 14.10% | 10.64% |
| S&P 500 Index | 7.05% | 4.30% | 10.42% | 14.19% | 10.71% |
| PIMCO StocksPLUS | 7.09% | 4.56% | 10.64% | 14.57% | 10.68% |
| S&P 500 Index | 7.05% | 4.30% | 10.42% | 14.19% | 10.71% |
| BlackRock Russell 1000 Value | 7.16% | 3.83% | 8.57% | 10.26% | 7.51% |
| Russell 1000 Value Index | 7.18% | 3.84% | 8.46% | 10.19% | 7.46% |
| T. Rowe Price Large Cap Growth | 6.13% | 3.09% | 10.16% | 23.15% | 15.16% |
| Russell 1000 Growth Index | 6.87% | 4.64% | 11.56% | 18.07% | 13.39% |
| **Small/Mid Cap Equity** | **6.44%** | **3.89%** | **9.31%** | **15.80%** | **11.52%** |
| Russell 2500 Index | 7.09% | 2.96% | 1.77% | 12.34% | 7.66% |
| Champlain Mid Cap | 5.87% | 3.26% | 15.57% | 18.24% | 13.40% |
| Russell MidCap Index | 6.87% | 4.13% | 7.83% | 12.16% | 8.63% |
| Pyramis Small Cap | 7.00% | 4.51% | 2.54% | 13.04% | 9.39% |
| Russell 2000 Index | 7.07% | 2.10% | (3.31%) | 12.30% | 7.06% |
| **International Equity** | **5.51%** | **2.58%** | **(2.15%)** | **8.35%** | **1.37%** |
| Total International Equity Target (2) | 5.80% | 2.74% | 0.26% | 9.17% | 2.03% |
| Causeway International Opps | 5.87% | 1.32% | (2.75%) | 8.49% | 1.68% |
| MSCI ACWI ex US | 6.02% | 2.98% | 1.29% | 9.39% | 2.16% |
| Aberdeen EAFE Plus | 4.62% | 3.17% | 2.70% | 7.41% | 0.25% |
| MSCI ACWI x US (Net) | 6.02% | 2.98% | 1.29% | 9.39% | 2.16% |
| American Century Non-US SC | 6.69% | 3.87% | (10.00%) | 9.91% | - |
| MSCI ACWI ex US Small Cap | 4.41% | 1.21% | (5.94%) | 7.76% | 2.77% |
| **Fixed Income** | **1.80%** | **3.38%** | **9.14%** | **4.46%** | **3.96%** |
| Blmbg Aggregate Index | 1.26% | 3.08% | 7.87% | 2.31% | 2.95% |
| BlackRock U.S. Debt Fund | 1.25% | 3.08% | 7.96% | 2.37% | 3.01% |
| Blmbg Aggregate Index | 1.26% | 3.08% | 7.87% | 2.31% | 2.95% |
| PIMCO Fixed Income | 2.33% | 3.66% | 10.30% | 6.07% | 4.73% |
| Custom Index (3) | 2.42% | 3.43% | 9.56% | 4.01% | 4.00% |

(1) The Total Domestic Equity target is currently composed of 76% S&P 500 and 24% Russell 2500 Index.

(2) The Total International Equity Target reflects the MSCI ACWI ex-US (Net Div) through May 2016 and the MSCI ACWI ex-US IMI (Net Div) thereafter.

(3) The PIMCO custom index is currently composed of 25% Barclays Mortgage, 25% Barclays Credit, 25% Barclays High Yield, and 25% JP Morgan EMBI Global. Prior to 2/1/2012, the custom index was composed of 70% Barclays Mortgage, 15% Barclays Credit, and 15% Barclays High Yield.

## Investment Manager Returns

The table below details the rates of return for the fund's investment managers over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

**Returns for Periods Ended June 30, 2019**

| | Last Month | Quarter to Date | Last 12 Months | Last 36 Months | Last 60 Months |
|---|---|---|---|---|---|
| **Net of Fees** | | | | | |
| **Real Estate** | **(1.65%)** | **(1.24%)** | **1.64%** | **5.07%** | **7.47%** |
| NFI-ODCE Value Weight Gr* | 0.47% | 1.42% | 6.86% | 7.72% | 9.85% |
| JPM Strategic Property Fund | (2.45%) | (1.85%) | 1.15% | 4.87% | 7.33% |
| JPM Income and Growth Fund** | 0.00% | 0.00% | 2.66% | 5.46% | 7.91% |
| NFI-ODCE Value Weight Gr* | 0.47% | 1.42% | 6.86% | 7.72% | 9.85% |
| **Infrastructure** | **0.71%** | **9.98%** | **19.74%** | **12.96%** | **9.26%** |
| CPI + 4% | 0.28% | 1.76% | 5.45% | 6.01% | 5.25% |
| Macquarie European Infrastructure Fund | 2.19% | 38.52% | 40.10% | 28.24% | 15.04% |
| SteelRiver Infrastructure North Amer.** | 0.00% | 0.00% | 11.77% | 4.88% | 7.18% |
| CPI + 4% | 0.28% | 1.76% | 5.45% | 6.01% | 5.25% |
| **Total Fund** | **3.96%** | **3.20%** | **6.19%** | **9.69%** | **6.97%** |
| Total Fund Target | 4.25% | 3.21% | 6.32% | 8.75% | 6.44% |

* Current Month Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

*The NFI-ODCE Value Weight benchmark current quarter return is preliminary.

**SteelRiver Infrastructure and JPM I&G performance reflect prior month's market values as current data is not yet available.

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# Tucson Supplemental Retirement System

## J.P. Morgan Asset Management

### Strategic Property Fund and U.S. Real Estate Income and Growth Fund | August 19th, 2019

**Melissa Anezinis,** Executive Director
(312) 732-7915, melissa.m.anezinis@jpmorgan.com

**Shawn Parris,** Vice President
(415) 315-5100, shawn.parris@jpmorgan.com

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# Presenters

**Melissa Anezinis,** *Executive Director*, is a client portfolio manager in J.P. Morgan Asset Management - Real Estate Americas, where she is responsible for capital raising and client advisory across the firm's Real Estate Americas investment platform. Melissa was previously a Relationship Manager on the North America Institutional sales team working with institutional investors in the Midwest. She joined J.P. Morgan Asset Management in 2011 after roles in the Hedge Funds industry as Director of Partner Relations for SLS Capital in New York and as Head of the Capital Introductions Group for Cantor Fitzgerald Prime Services. Previously Melissa held a client associate role at J.P. Morgan Asset Management in New York and was with The Torrenzano Group, where she provided strategic investor relations counsel to financial companies. She earned a B.S. in journalism, cum laude, from the Honors Tutorial College at Ohio University and an M.B.A. from Columbia Business School. She holds Series 3, 7 and 63 licenses.

**Shawn Parris,** *Vice President*, is a Client Advisor within J.P Morgan Asset Management. He is responsible for providing asset management solutions for defined benefit, defined contribution, endowment and foundations for U.S. institutional investors, including corporations, municipalities, not-for-profits, higher education and healthcare systems. Shawn previously worked at Schroders Investment Management as an Institutional Manager. At Schroders he led the relationship management and business development efforts of the firm in the western region. Prior to Schroders, Shawn worked at Philadelphia International Advisors, where he marketed the firm's investment products to clients across North America. Shawn received a B.Sc. in Finance from Drexel University and an MBA from the Lebow School of Business. He holds the FINRA Series 7, 66 and 3 licenses.

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# Investment review

## Table of contents

Page


I. Real Estate Americas Platform Overview 7

II. Strategic Property Fund 11

III. U.S. Real Estate Income and Growth Fund 23

IV. Investment Summary and Performance 37

V. Appendix 41

- U.S. Real Estate Market Overview
- Supplemental Exhibits
- Schedule of Investments
- Biographies of Key Professionals
- Important Risks and Disclaimers

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# Real Estate Americas Platform Overview

# Real Estate Americas

We are one of the industry's premier real assets investment managers

| | |
|---|---|
| **SCALE, STABILITY AND STRENGTH** | **$66 billion**[1] in AUM across the U.S.<br>**45+ years** of real estate investment management experience<br>**200+ professionals** in six offices across the country |
| **CAPABILITIES AND EXPERIENCE** | Part of a **global platform** of real estate, private equity and credit, infrastructure, transportation, liquid alternatives, and hedge fund strategies<br>**Disciplined investment process** consistently implemented across investment types and regions<br>Local **expertise** across strategies, sectors and regions, and complex transactions |
| **INFORMATION ADVANTAGE** | JPMAM's **size** provides access to outstanding proprietary and external data sources<br>**Dedicated research team** provides market research and portfolio construction analysis<br>Over **$10 billion** of annual transaction activity provides extensive market knowledge |
| **CLIENT FOCUS** | Trusted advisor and fiduciary to over **1,000 clients** worldwide<br>A legacy of **trusted partnership** built on a promise to put clients interest ahead of our own<br>Focus on open communication, **transparency** and shared information |

Source: J.P. Morgan Asset Management as June 30, 2019.[1]Preliminary as of June 30, 2019

# J.P. Morgan Asset Management – Real Estate Americas

**Chairman, Real Estate Americas**
Kevin Faxon, MD – *32 years experience*

**Head of Real Estate Americas**
Mike Kelly, MD – *30 years experience*

**Global Head of Client Strategy**
Ann Cole, MD - *30 yrs exp.*

**Director of Research and Data Science**
Dave Esrig, MD
*27 years experience*

Aric Chang, ED

Luigi Cerreta, ED

*17 years average experience*

**Chief Investment Officer**
Doug Schwartz, MD
*25 years experience*

**Region Heads**

**Northeast:**
Gerard Norcia, ED
Peter Sibilia, MD

**Southeast:**
Allina Boohoff, MD
Preston Meyer, MD

**Central:**
Andrew Ruffo, ED
Scott Strauss, MD

**West:**
Morgan Lingle, MD

**Mezzanine Debt:**
Candace Chao, MD

**Sector Strategists**

**Industrial:** Nick Firth, ED
**Multifamily:** Brett Kahn, ED
**Office:** Erik Grabowski, ED
**Retail:** Adria Savarese, ED

*18 years average experience*

**Head of Separate Accts & Portfolio Strategy**
Brian Nottage, MD
*21 years experience*

**Separate Accounts:**

Alice Cao, ED

Wayne Comer, MD

Eric Johnson, MD

Dan Volpano, MD

*31 years average experience*

**Portfolio Analytics**
Samantha King, ED
*16 years experience*

**Funds Portfolio Management**

**Strategic Property Fund**
Kim Adams, MD, Senior PM
Susan Kolasa, MD, PM
Steve Zaun, MD, PM

**Income & Growth Fund**
Nancy Brown, MD, PM

**Special Situation Property Fund**
Craig Theirl, MD, PM

**U.S. Real Estate Mezzanine Debt Fund**
Candace Chao, MD, PM
Whit Wilcox, MD, PM

*25 years average experience*

**REA Chief Operating Officer**
Bill Schultz, MD
*28 years experience*

**Debt Capital Markets**
Cassandra Clark, MD
*17 years experience*

**Head of Asset Management**
Mark Bonapace, MD
*26 years experience*

**Development & Engineering**
Jim Kennedy, MD
*29 years experience*

**Americas:**
Melissa Anezinis, ED
Rebekah Brown, ED
Tom Klugherz, ED
Larry Ostow, MD

**Asia Pacific:**
Seungmin Oh, ED
Masami Takizawa, ED

**Europe:**
Marie-Claire Bolton, ED

**Defined Contribution:**
Jaclyn Beck, ED
Jani Venter, ED

*24 years average experience*

**Functional Partners**

**Finance**
Al Dort, MD
*27 years experience*

**DC Trading**
Barney Fahey, MD
*30 years experience*

**Valuations**
Ruchi Pathela, ED
*20 years experience*

**Global Product Development**
Steve Greenspan, MD
*34 years experience*

**Alternative Investment Strategy & Solutions**
Pulkit Sharma, MD
*12 years experience*

**Client Relations**
Ravi Sharma, MD
*21 years experience*

July 2019. There can be no assurance that professionals currently employed by JPMAM will continue to be employed by JPMAM or that past performance or success of any professional serves as an indicator of professional's future performance or success.



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# Strategic Property Fund

# Strategic Property Fund is core real estate

## Residential

Van Ness Residential, Boston, MA

## Retail

Valley Fair Mall, San Jose, CA

## Industrial

South Florida Logistics Center, Miami, FL

## Office

Century Park, Los Angeles, CA

These examples represent some of the investments of the Fund. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment by the Fund in the future. Any investments mentioned throughout the presentation are shown for illustrative purposes. A full list of SPF holdings are included in the appendix. **See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

# A core real estate investment strategy

**High quality stabilized assets**

- Focus on attractive, **stabilized** investments with **high quality** physical improvements
- Invest only in the four **traditional property types**: office, retail, residential and industrial
- Excellent location factors with **dominant** competitive market positions
- Assets located in **primary markets** with strong growth demographics

**Large, well-diversified portfolio**

- Focus on **large assets**, which have consistently outperformed
- Meaningful sector, geographic and intra-market **diversification**
- Fund size provides **unique deal access**
- **Research-based** portfolio construction

**Low beta and outperformance over cycles**

- Focus on **long-term outperformance** with **lower risk**
- **Conservative approach to leverage**
- High producing regional malls provide **stability**
- **Minimal development**

It should not be assumed that Fund positioning in the future will be profitable or will equal past performance.

# Balance Sheet and Portfolio Construction

## Balance sheet

- USD 42.7bn gross asset value
- USD 32.7bn net asset value
- 23.3% LTV
- 3.4% cash position
- Over USD 890mm of annual net cash flow[1]
- USD 325.3mm contribution queue (as of August 9, 2019)
- Quarterly withdrawals accepted not less than 30 days prior to the last day of each calendar quarter / Contributions accepted monthly

## Portfolio metrics

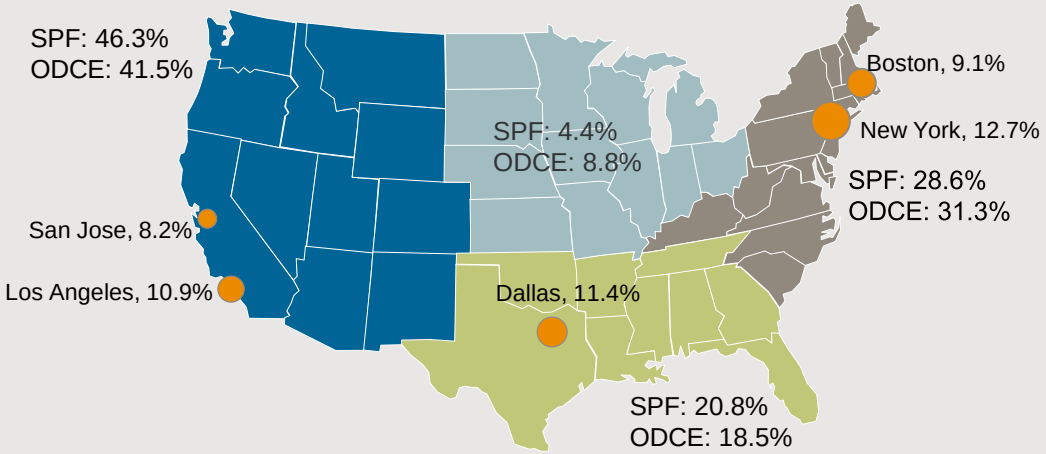
- Occupancy: 93.6%
- TTM total net operating income growth: 6.7%
- Weighted average lease term: 5.6 years[3]
- 2019 Projected NOI Growth: 8.4%

## Investments

- 60 office buildings
- 165 industrial buildings
- 25,746 apartment units in 78 complexes
- 11 super regional and regional malls
- 180+ neighborhood and community retail centers
- 7 lifestyle and urban centers

## Fund diversification[2]

| | SPF (%) | ODCE (%) | Mid-Year 2020 Target Range |
|---|---|---|---|
| Office | 36.5 | 34.0 | 36% ↓ |
| Industrial | 15.0 | 18.7 | 18% ↑ |
| Residential | 21.9 | 25.0 | 23% ↑ |
| Retail | 25.8 | 17.7 | 21% ↓ |
| Other | 0.7 | 4.5 | |
| Total | 100.0 | 100.0 | |




[1]Rolling 12 months ending 2Q19. [2]Net of debt; values may not total 100% due to rounding. [3]Excludes Residential; SPF diversification is direct real estate with land. Diversification does not guarantee investment returns and does not eliminate the risk of loss. **See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

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# Managing Strategic Property Fund to a lower risk profile

## Leverage profile

- LTV: 23.3%
- Fixed debt: 95%[1]
- Weighted avg. interest rate: 4.2%
- No recourse
- No fund level or unsecured debt

## Asset selection

- High quality investments across the four traditional property types
- Major markets with institutional liquidity and strong demographics
- Focus on active asset management, sustainability and ESG
  - Ranked #1 by GRESB

## Investment profile

| | SPF | Next 4 Peers[2] |
|---|---|---|
| Non-core property types | 0.0% | 6.1% |
| Development (% GAV) | 2.8% | 7.1% |

## Beta

- Volatility (Beta) of the Fund is **0.91x** the peer set

## Full cycle performance

- SPF outperformed ODCE by **46 bps** over a full market cycle[3]

**Village of Merrick Park, Coral Gables, FL**

As of 6/30/2019, unless otherwise noted. [1]Fixed vs floating loan designation impacted by derivatives (i.e. swapped loans are considered fixed); [2]As 03/31/2019 (latest available); LTV = Loan to Value; Non-core property types are Self-Storage and Hotel (gross of debt as reported by IPD), based on the MSCI-ACOE index excluding SPF. [3]Full market cycle is calculated from Q4'07 to Q2'19 This example is a representative investment. However, you should not assume that this type of investment will be available to or, if available, will be selected for investment in the future. This example is included due to its aesthetic appeal only. A full list of SPF holdings are included in the appendix. **See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

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# Related: Performance overview

| Annualized returns as of June 30, 2019 (%) | Three months[1] | YTD[1] | One year | Three years | Five years | Ten years | Since incep. 1/1/98 |
|---|---|---|---|---|---|---|---|
| **SPF Total Gross** | **1.1** | **1.6** | **5.4** | **7.1** | **9.1** | **9.7** | **9.4** |
| NFI-ODCE Total – Value Gross | 1.0 | 2.4 | 6.4 | 7.6 | 9.8 | 9.9 | 8.8 |
| | | | | | | | |
| **SPF Total Net** | **0.9** | **1.1** | **4.3** | **6.0** | **8.0** | **8.7** | **8.3** |
| NFI-ODCE Total – Value Net | 0.8 | 2.0 | 5.5 | 6.6 | 8.8 | 8.9 | 7.8 |

| Yearly returns since inception 1998 (%) | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SPF Total Gross** | **16.4** | **14.7** | **14.1** | **7.6** | **5.1** | **10.6** | **12.3** | **25.1** | **16.6** | **16.7** | **-8.1** | **-26.6** | **14.2** | **16.0** | **12.1** | **15.9** | **11.1** | **15.2** | **8.4** | **7.2** | **8.0** |
| NFI-ODCE Gross | 16.4 | 13.2 | 14.3 | 5.6 | 5.5 | 9.3 | 13.1 | 21.4 | 16.3 | 16.0 | -10.0 | -29.8 | 16.4 | 16.0 | 10.9 | 13.9 | 12.5 | 15.0 | 8.8 | 7.6 | 8.3 |
| **SPF Total Net** | **15.2** | **13.5** | **13.0** | **6.5** | **4.1** | **9.5** | **11.2** | **23.9** | **15.5** | **15.5** | **-9.0** | **-27.3** | **13.0** | **14.8** | **11.0** | **14.8** | **10.0** | **14.1** | **7.3** | **6.1** | **7.0** |
| NFI-ODCE Net | 15.3 | 12.0 | 13.2 | 4.6 | 4.6 | 8.3 | 12.0 | 20.2 | 15.3 | 14.9 | -10.7 | -30.4 | 15.3 | 15.0 | 9.8 | 12.9 | 11.5 | 13.9 | 7.8 | 6.7 | 7.4 |

[1]non-annualized returns.

**The performance shown above is not the actual performance of any private placement investment vehicle. Performance is that of a predecessor fund that was managed in a similar manner by the portfolio manager. Past performance is not a reliable indicator of current and future results. See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).** Total return assumes the reinvestment of income. Performance results are gross of investment management fees. Net returns are based on the highest applicable fee rate for this strategy. The deduction of an advisory fee reduces an investor's return. Actual account performance will vary depending on individual portfolio security selection and the applicable fee schedule.

Total return assumes the reinvestment of income. Performance results are gross of investment management fees. Net returns are based on the highest applicable fee rate for this strategy. The deduction of an advisory fee reduces an investor's return. Actual account performance will vary depending on individual portfolio security selection and the applicable fee schedule

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# Retail portfolio: Reduce overweight in near term

## Allocation over time

| 12/31/2015 | | 6/30/2019 | Mid-Year 2020 Target Range |
|---|---|---|---|
| 23.9% | → | 25.8% | 21% |

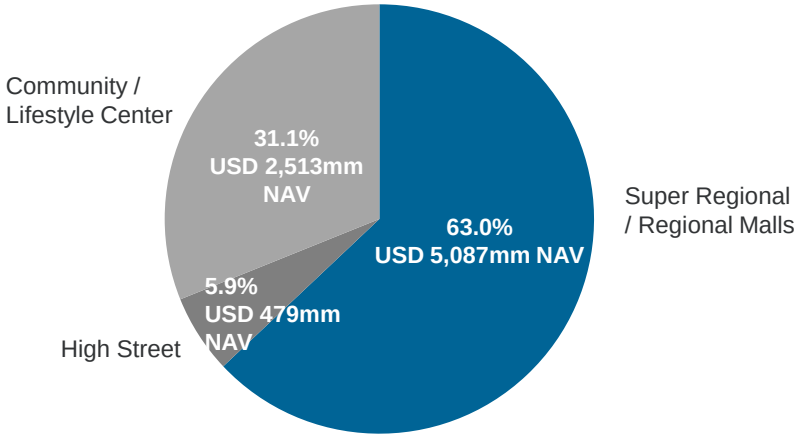
## Unleveraged sector return TTM

| 2019'Q1 | |
|---|---|
| SPF | Peer Group |
| 3.6% | 6.8% |

## Strategy overview

- Reduce overall allocation in the near term
- Complete capital projects critical to achieving trade area dominance for flagship California investments
- Continue to attract first to market and digitally native retailers
- Fine tune operating efficiencies of grocery anchored entity holdings

## Retail portfolio composition




| | Mall Sales PSF |
|---|---|
| SPF | USD 976 |
| Industry Average | USD 520[1] |
| Simon Property Group | USD 660 |
| Macerich | USD 746 |
| General Growth Properties | USD 765 |
| Taubman | USD 919 |

Source for Mall Sales PSF: J.P. Morgan, Green Street Advisors and as reported by respective companies as of 2019Q1; [1]As of 4/30/2019; Royal Hawaiian, which is not rated but would be rated A++ based on sales PSF. Unleveraged sector return source: NCREIF, MSCI/IPD, as of Q1'19. Unleveraged sector returns shown for the years indicated; peer group represented by MSCI/IPD U.S. ACOE excluding JPMorgan SPF. **The performance shown above is not the actual performance of any private placement investment vehicle. Performance is that of a predecessor fund that was managed in a similar manner by the portfolio manager. Past performance is not a reliable indicator of current and future results. See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

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# Office portfolio

## Allocation over time

| 12/31/2015 | | 6/30/2019 | Mid-Year 2020 Target Range |
|---|---|---|---|
| 48.2% | → | 36.5% | 36% |

## Unleveraged sector return TTM

| 2019'Q1 | |
|---|---|
| SPF | Peer Group |
| 7.2% | 7.2% |

## Strategy overview

- Reduce overall allocation in the near term, specifically in the East
- Leverage advantages of Fund scale to cultivate destination locations
  - Hudson Yards, Lincoln Yards, Sunnyvale, the Fenway
- Drive NOI via continued occupancy and rent growth opportunities

## Strategic dispositions

- Suburban Markets
- Non-strategic assets
- Limited NOI growth assets

**Network Drive, Burlington, MA**

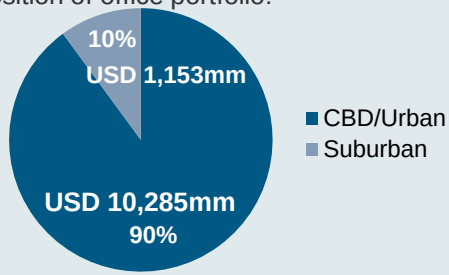
## Investment focus

- Focus on dynamic markets:
  - Boston, San Francisco, Dallas, New York, Los Angeles
- Repositioning for growth

**Century Plaza, Los Angeles, CA**

## Positioned for future growth

- Occupancy:
  - Projected 2019 YE: 94%[1]
- NOI Growth:
  - 2019 total projected NOI growth: 10-11%
- Weighted Average Lease Term: 6.5 years[1]
- Composition of office portfolio:




[1]Represents 1Q19; Unleveraged sector return source: NCREIF, MSCI/IPD, as of Q1'19. Unleveraged sector returns shown for the years indicated; peer group represented by MSCI/IPD U.S. ACOE excluding JPMorgan SPF. **The performance shown above is not the actual performance of any private placement investment vehicle. Performance is that of a predecessor fund that was managed in a similar manner by the portfolio manager. Past performance is not a reliable indicator of current and future results. See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).** Any investment mentioned throughout the presentation are shown for illustrative purposes. A full list of SPF holdings are included in the appendix.

# Multifamily portfolio

## Allocation over time

| 12/31/2015 | | 6/30/2019 | Mid-Year 2020 Target Range |
|---|---|---|---|
| 20.0% | → | 21.9% | 23% |

## Unleveraged sector return

| 2019'Q1 | |
|---|---|
| SPF | Peer Group |
| 7.2% | 5.5% |

## Strategy overview

- Focus on successful completion of current development projects
- Prioritize existing asset operations – drive market rents in renewals and new leases
- Explore opportunities to acquire newly stabilized assets in primary markets below replacement cost

## Operating metrics

- Occupancy: 95.0%
- 2018 total NOI growth: 18.4%
- 2019 total projected NOI growth: 3-6%

**Dispositions**

Selling out of markets with limited pricing power

- **Aqua,** Chicago, IL
- **Nalle Woods,** Austin, TX
- **The Lofts at Rio Salado,** Phoenix, AZ

**Buying & Developing**

Investing in markets with tight supply

- **The Hub,** Brooklyn, NY
- **Beltway Portfolio,** Various
- **Alexan Aspect,** Fullerton, CA

**Development Commitments**

Development spreads narrowing

- **Memorial Park West,** Houston, TX
- **Greystar San Antonio,** Mountain View, CA
- **Washington Place,** Newton, MA

Unleveraged sector return source: NCREIF, MSCI/IPD, as of Q1'19. Unleveraged sector returns shown for the years indicated; peer group represented by MSCI/IPD U.S. ACOE excluding JPMorgan SPF. Total property type allocations exclude land and other sectors and hence do not equal 100%. NOI growth is calculated using the chaining method. **The performance shown above is not the actual performance of any private placement investment vehicle. Performance is that of a predecessor fund that was managed in a similar manner by the portfolio manager. Past performance is not a reliable indicator of current and future results. See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).** Any investment mentioned throughout the presentation are shown for illustrative purposes. A full list of SPF holdings are included in the appendix.

# Industrial portfolio

## Allocation over time

| 12/31/2015 | | 6/30/2019 | Mid-Year 2020 Target Range |
|---|---|---|---|
| 7.7% | → | 15.0% | 18% |

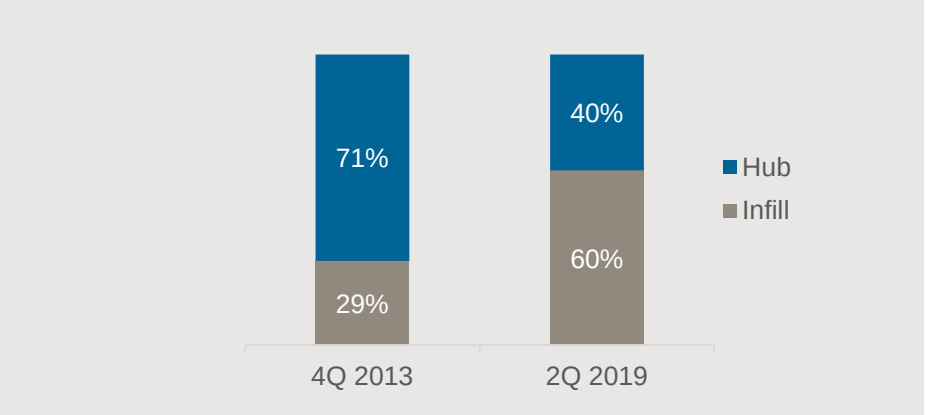
## Unleveraged sector return TTM

| 2019'Q1 | |
|---|---|
| SPF | Peer Group |
| 13.3%[1] | 13.0% |

## Strategy overview

- Increase allocation primarily via development opportunities
- Prioritize infill locations
- Divest of non-strategic holdings with dilutive rent growth projections
- Truck terminal component as income yield enhancement

## Infill vs. Hub Industrial Allocation



**Kimball Business Park, Chino, CA**

[1]Strategic Property Fund total unleveraged Industrial performance for the last 12 months was 13.3%, versus MSCI calculated performance of 12.68%. MSCI methodology for calculating performance is based on simple averaging, actual daily weighting has generated performance 60bps higher over the period. Unleveraged sector return source: NCREIF, MSCI/IPD, as of Q1'19. All case studies are shown for illustrative purposes only and should not be relied upon as advice or interpreted as a recommendation. Results shown are not meant to be representative of actual investment results. **The performance shown above is not the actual performance of any private placement investment vehicle. Performance is that of a predecessor fund that was managed in a similar manner by the portfolio manager. Past performance is not a reliable indicator of current and future results. See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).** Any investment mentioned throughout the presentation are shown for illustrative purposes. A full list of SPF holdings are included in the appendix.

# Drivers of future performance

## Strong NOI growth and portfolio metrics

**2019 Projected NOI Growth:**
8%

**Occupancy:**
92% → 95% by 2019YE

| 2019 total projected NOI growth | |
|---|---|
| **Industrial** | 11 – 12.5% |
| **Office** | 10 - 11% |
| **Multifamily** | 3 – 6% |
| **Retail** | 0 -1.5% |
| **Total** | **8%** |

## Quality bias

A focus on **quality** assets, tenants and markets which translates into **durable income** and **value**

Century Plaza, Los Angeles, CA

## Strategic sector positioning

**Industrial:** Accretively increasing our allocation with a focus on infill

**Office:** Focusing on highly functional assets in growth markets.

**Multifamily:** Focusing on core assets below replacement cost i.e. suburban and middle market housing

**Retail:** Strategically reducing exposure with focus on top tier quality.

[1]Source: IPD ACOE. Asset selection performance shown on a one-year basis. As of Q2'19. Industrial asset selection performance is based on actual daily weighting. All case studies are shown for illustrative purposes only and should not be relied upon as advice or interpreted as a recommendation. Results shown are not meant to be representative of actual investment results. **See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).** Any investment mentioned throughout the presentation are shown for illustrative purposes. A full list of SPF holdings are included in the appendix.

*The target returns are for illustrative purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns similar to the target returns shown above. Because of the inherent limitations of the target returns, potential investors should not rely on them when making a decision on whether or not to invest in the strategy. Please see the complete Target Return disclosure at the conclusion of the presentation for more information on the risks and limitation of target returns.

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# Looking ahead

- Maintain low beta strategy
- Reinvest in existing assets for accretive returns
- New acquisition focus in multifamily and industrial
- Projected 2019 total return in the range of 5%*

**818 Stewart Street, Seattle, WA**

**See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).** Any investment mentioned throughout the presentation are shown for illustrative purposes. A full list of SPF holdings are included in the appendix.

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# U.S. Real Estate Income and Growth Fund

FOR INSTITUTIONAL / WHOLESALE / PROFESSIONAL CLIENTS AND
QUALIFIED INVESTORS ONLY | NOT FOR RETAIL USE OR DISTRIBUTION

ALTs by J.P.Morgan Asset Management

# A core-plus fund

| | |
|---|---|
| **Core asset base** | ■ Competitively positioned, high quality, stabilized properties<br>■ Major markets with economic depth and institutional liquidity<br>■ Focus on 4 primary sectors: office, retail, multifamily, industrial<br>■ Avoid historically volatile and/or specialized property types[1] |
| **The "Plus" component** | ■ Ability to invest up to 25% of NAV in the following:<br>– Mezzanine Debt: Up to 15% of NAV (including construction mezzanine loans)<br>– Build-to-core: Up to 10% of NAV<br>– Improve-to-core<br>– Lease-to-core<br>■ Targets 40% portfolio leverage |
| **Return profile** | ■ 8% to 10% net of fee target IRR[2]<br>– Roughly half from income<br>■ Holding period 5-10 years |

[1] The four primary sectors tend to be less volatile in performance relative to specialized property types such as hotels

[2] IRR stands for the internal rate of return. There can be no assurance that the Fund will achieve this target return. All targeted returns are gross of any applicable taxes (including VAT). Analysis represents Fund-level projections and is not meant to represent an individual client's experience. Portfolio Target Return assuming full reinvestment of dividends and a medium-term holding period. Please see full Target return disclosures at the end of the presentation. It should not be assumed that Fund positioning in the future will be profitable or will equal past performance.

# Portfolio snapshot

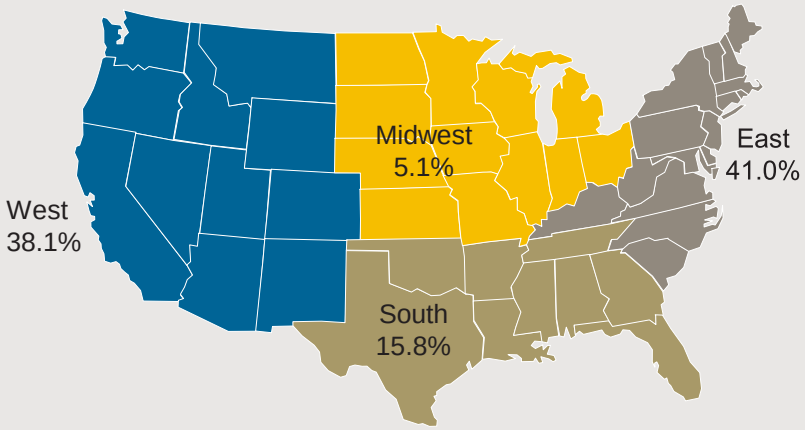
| Fund profile as of June 30, 2019 | |
|---|---|
| Gross Asset Value (GAV) | $ 4,078 mm |
| Net Asset Value (NAV) | $ 2,643 mm |
| Number of Assets | 73 |
| Occupancy[1] | 93% |

| Fund balance sheet as of June 30, 2019 | |
|---|---|
| Current Leverage | 35% (40% guideline) |
| Fixed rate loans | 83% |
| Weighted Average Coupon | 4.1% |
| Weighted Average Time to Maturity | 4.4 years |

Stanford Research Park, Palo Alto, CA

## Diversification by property type and location

| Sector | % of NAV |
|---|---|
| Office | 48.7 |
| Industrial | 19.2 |
| Multifamily | 21.2 |
| Retail | 10.9 |
| **Total** | **100.0** |




| Top MSAs | % of NAV |
|---|---|
| New York | 18.1 |
| Washington, D.C. | 13.0 |
| Silicon Valley | 8.9 |
| Dallas | 7.7 |
| Seattle | 7.6 |
| San Francisco | 6.5 |
| Los Angeles | 5.8 |

[1] Overall occupancy includes The Cirque, Dallas multifamily. The investment is currently undergoing renovations after a mechanical issue, covered by property insurance. The investment is collecting market rents for affected units, resulting in 89% occupancy.

Allocations are subject to change at the discretion of the portfolio manager without notice. Diversification does not guarantee investment returns and does not eliminate the risk of loss.
Source: J.P. Morgan. As of June 30, 2019. Diversification includes Direct Real Estate and Mezzanine investments. Information subject to change.

# 2018: Guideline Revisions

## Guideline Revisions

| | Before | After |
|---|---|---|
| **Asset Base** | Stabilized Core Real Estate | Stabilized Core Real Estate & Value-Add |
| **Leverage Guideline** | 50% | 40% |

**Capacity for additional value-add allocations**

- 93% portfolio occupancy[1]
- Non-stabilized exposure[2]:
  - I&G 5.8%
  - ODCE (MSCI) 8.4%
  - Core Plus (MSCI)[3] 16.8%

As of June 30, 2019 unless otherwise stated.

[1] Overall occupancy includes The Cirque, Dallas multifamily. The investment is currently undergoing renovations after a mechanical issue, covered by property insurance. The investment is collecting market rents for affected units, resulting in 89% occupancy.

[2] Percentage of portfolio made up of properties having occupancy ratios that are less than 75%. Therefore, investments could include development deals as well as assets facing significant lease-up or potentially undergoing material repositionings. Source: MSCI (March 31, 2019).

[3] Core plus index excluding I&G. Source: MSCI (March 31, 2019).

# 2019: A Transformational Year

## Goals

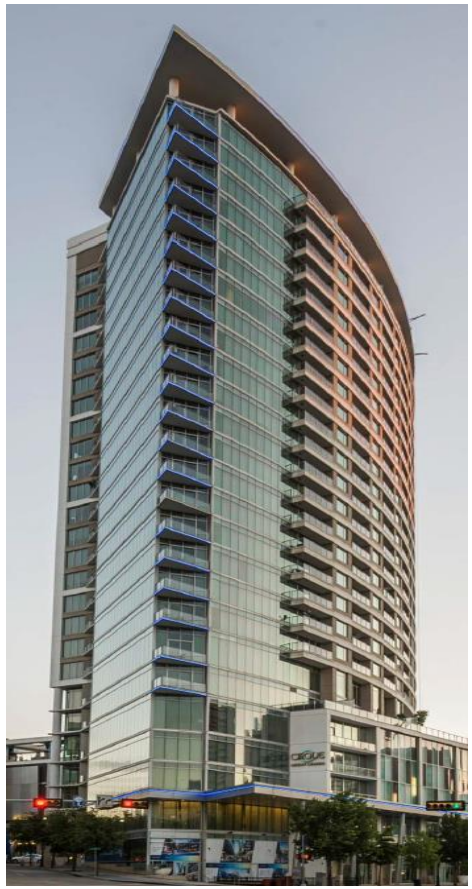
- Maintain defensive positioning
- Incrementally increase value-add exposure
- Monitor capital markets, maintaining the flexibility to ratchet up or pare back value-add activity

## Plan

- Execute sales program targeting assets with limited upside
- Re-deploy proceeds into value-add opportunities, targeting industrial and multifamily
- Directional sector weightings:

| | |
|---|---|
| Industrial ↑ | Office ↓ |
| Multifamily ↑ | Retail ↔ / ↓ |

The Cirque, Dallas, TX



Source: J.P. Morgan as of June 30, 2019. The manager seeks to achieve the stated objectives. There can be no guarantee the objectives will be met. Source: JPMIM
[1] Based on the Fund's trailing twelve month transaction activity and accompanying projected development costs

# I&G – Performance summary

## As of June 30, 2019

| Investment Performance (%) Time-Weighted Rates of Return | Quarter | YTD | 1 Year | 3 Year | 5 Year | 7 Year | 10 Year | Since Inception[1] |
|---|---|---|---|---|---|---|---|---|
| Gross Income | 0.9 | 1.8 | 4.0 | 4.8 | 5.1 | 5.3 | 6.1 | 6.8 |
| Appreciation | (0.2) | (0.4) | 0.1 | 2.0 | 4.0 | 5.5 | 4.5 | 0.7 |
| Total Return[2] | 0.7 | 1.4 | 4.1 | 6.8 | 9.2 | 11.0 | 10.8 | 7.6 |

| Annual Returns | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Income | 9.6 | 9.0 | 9.5 | 7.8 | 7.0 | 6.5 | 7.3 | 9.4 | 7.2 | 6.0 | 6.2 | 5.9 | 5.5 | 5.3 | 5.2 | 4.7 |
| Appreciation | 12.4 | 8.4 | 12.5 | 12.6 | 10.1 | (31.6) | (48.8) | 6.2 | 19.5 | 10.7 | 10.2 | 4.0 | 9.4 | 4.4 | 1.2 | 1.9 |
| **Total** | **23.1** | **18.1** | **23.0** | **21.2** | **17.6** | **(26.7)** | **(44.4)** | **16.0** | **27.7** | **17.2** | **16.8** | **10.1** | **15.3** | **9.9** | **6.5** | **6.6** |

- Long history of performance
- Strong income premium

- Outperformed core universe by 250 bps on an unleveraged basis[3]
- Leverage:
  - Prior LTV guideline: 50-60%
  - Current LTV guideline: 40%
  - Current LTV: 35%

**Past performance is not guarantee of comparable future results.** Performance preliminary as of June 30, 2019. Subject to change.

[1] Performance results are U.S. dollar time-weighted rates of return net of all asset and fund level expenses and have been presented gross of investment management fees and including the effect of leverage. Portfolio returns are calculated gross of Fund Investor Vehicle taxes which may reduce returns. Three years, Five years, Ten years and Since inception returns are reported on an annualized basis. Inception date is February 20, 2002. [2] Income and Appreciation returns may not sum to Total Return due to rounding and/or compounding. Note: Please also note that the returns illustrated in the table above represent the Fund-level returns, and not necessarily the returns achieved by any particular Fund Investor Vehicle. The return achieved by any particular investor may be more or less. Investors should be aware that differences in the returns between the Delaware, Cayman and German KG entities exist and are primarily attributable to the additional taxes payable by the Fund's Cayman/German vehicles. Generally, the net asset value of the Cayman Corporations and German KG will be reduced by an estimate for U.S. tax liability. Such tax liability, as well as actual taxes payable from operations, will effectively lower these Fund Investor Vehicles' returns in comparison to returns achieved by the other Fund Investor Vehicles (e.g., Domestic LP and Direct LP). Past performance is not indicative of future results. Source: J.P. Morgan

[3] Based on annualized, unlevered returns for direct real estate investments over the 2008-2009 period, for I&G vs. MSCI-ACOE.

# Executing 2019 Plan: Recent Sales

## Targeting non-strategic assets with limited NOI growth

**Lexington Pavilion**
**Lexington, SC**

| | |
|---|---|
| Type | Retail |
| Size | 105,000 sf |
| Sales Price[1] | USD 16.0 mm |

- Asset under pressure from ecommerce as a power center and new retail supply in the submarket.

**2000 Duke**
**Alexandria, VA**

| | |
|---|---|
| Type | Office |
| Size | 156,000 |
| Sales Price | USD 75.0 mm |

- Submarket challenged by sluggish leasing velocity and more muted outlook.

**711 Atlantic**
**Boston, MA**

| | |
|---|---|
| Type | Office |
| Size | 99,200 |
| Sales Price | USD 68.5 mm |

- Overall size and smaller floor plates contribute to future leasing risk.

**2929 Wycliff**
**Dallas, TX**

| | |
|---|---|
| Type | Residential |
| Size | 284 units |
| Sales Price | USD 46.4 mm |

- Limited prospective growth expectations due to the market's substantial supply pipeline.

Source: J.P. Morgan as of June 30, 2019. The above examples were selected to illustrate dispositions the Fund has made since the beginning of 2019. These are examples of specific investments made by the Fund and are included solely to illustrate the investment process and strategies that have been utilized by JPMIM. The Fund will include a much larger number of investments than the example set forth. There can be no guarantee or assurance that the Fund will be able to make these investments or similar investments on similar terms in the future. Please see the Target Return disclosure at the conclusion of the presentation for more information on the risks and limitation. Source: JPMIM

[1] Represents Fund's share of gross purchase price

# I&G industrial portfolio: Substantial sector outperformance

### I&G Industrial Exposure

| | NAV (millions) | Allocation |
|---|---|---|
| Current (6/30/2019) | $ 500 | 19.2% |

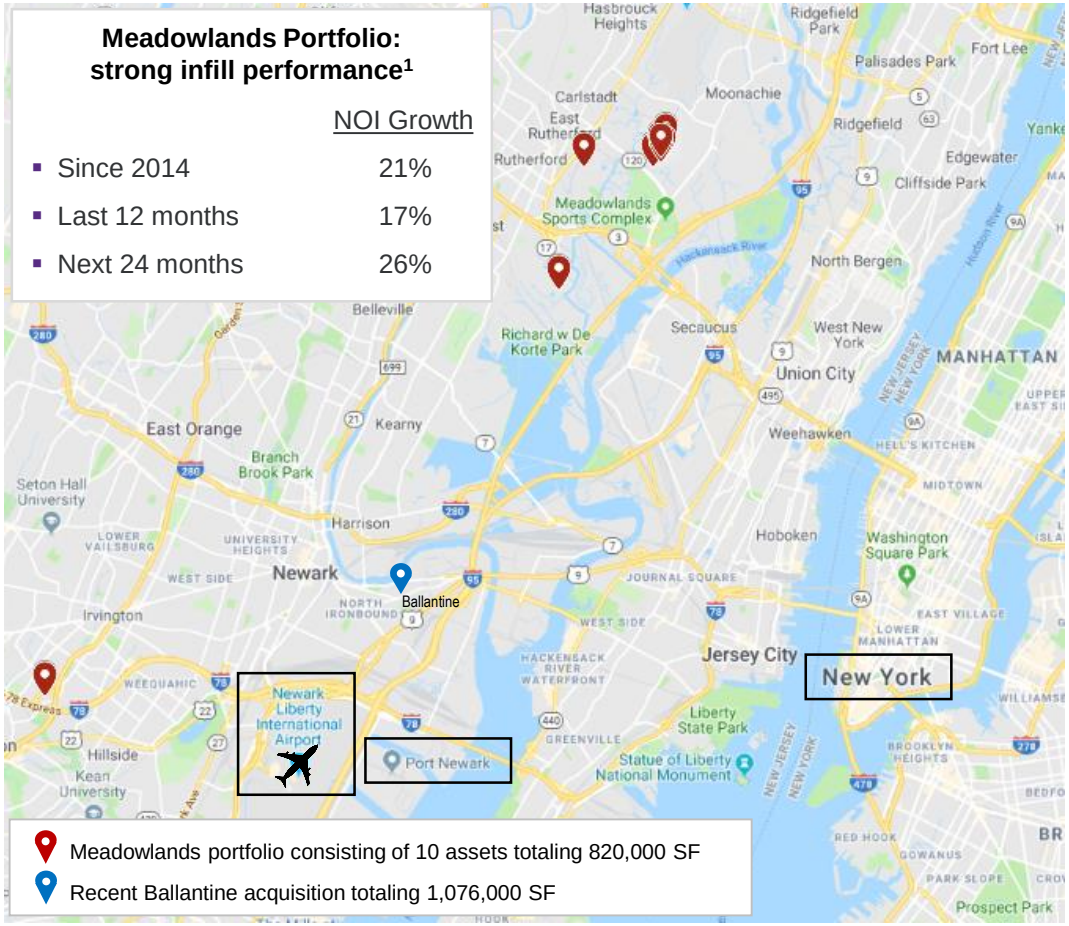
### Portfolio Highlights

- Occupancy: 90%
- Weighted average lease term: 3.7 years

### Near-term Objectives

- Increase weighting through value-add allocation
  - Target development, repositioning and lease-up opportunities in strong markets.
- Focus on:
  - Infill product serving the "last mile" delivery needs of ecommerce.
  - Major distribution hubs integral to the national supply chain.

### New York Metro Infill Industrial Portfolio




As of June 30, 2019. unless otherwise stated. This is a representative example of infill property investments within the Industrial Sector. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment in the future. There can be no guarantee of future success.

[1] Specific to the Meadowlands Industrial Portfolio. **Since 2014**: percentage growth in NOI between first full year of operation (period ending December 31, 2014) and current TTM NOI (period ending June 30, 2019). **Last 12 months**: percentage growth between TTM NOI as of June 30, 2018 and TTM NOI as of June 30, 2019. **Next 24 months:** percentage growth between TTM NOI as of June 30, 2019 and TTM NOI as of June 30, 2021.

TTM = Trailing Twelve-Month, NOI = Net Operating Income



ALTs by J.P.Morgan Asset Management

# I&G industrial portfolio: Recent acquisitions

## Ballantine – Newark, NJ

**Repositioning**

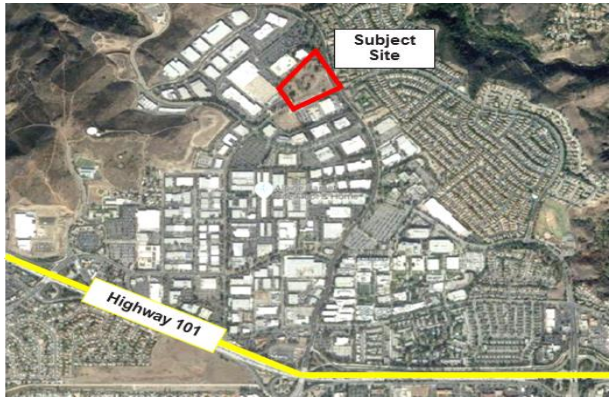
| | |
|---|---|
| Acquisition Date | January 2019 |
| Size | 1,076,000 sf |
| Purchase price | $ 61.0 mm |
| JPM equity | $ 18.9 mm |

- Infill location with high barriers to entry. Close to the NY metro area's dense population. Easy access to Newark Airport, Port of Newark and major highways.
- Investment strategy includes repositioning through capital and operational upgrades and increasing below-market rents to market.

## TO II – Thousand Oaks, CA

**Development**

| | |
|---|---|
| Acquisition Date | June 2019 |
| Size | 167,300 sf |
| Development Budget | $ 31.3 mm |
| JPM equity | $ 13.7 mm |




- Supply constrained submarket characterized by consistent low vacancy over the last decade and no current development activity.
- Strategic regional joint-venture partner with proven track record and substantial deal pipeline.

## Industrial Partnership – First Closing

**Lease-up**

| | |
|---|---|
| Acquisition Date | December 2018 |
| Size | 992,600 sf |
| Purchase price | $ 53.4 mm |
| JPM equity | $ 20.0 mm |

Joliet, IL (Chicago submarket)

- Formed programmatic joint venture with a national third-party logistics (3PL) firm to acquire vacant buildings and develop industrial assets to be leased long term by partner's 3PL.
- Acquired 1st investment of vacant new warehouse concurrent with executing 100% lease, resulting in immediate write-up.

As of June 30, 2019. The above examples were selected to illustrate new acquisitions the Fund has made in the Industrial Sector since the beginning of 4Q18. These are examples of specific investments made by the Fund and are included solely to illustrate the investment process and strategies that have been utilized by JPMIM. The Fund will include a much larger number of investments than the example set forth. There can be no guarantee or assurance that the Fund will be able to make these investments or similar investments on similar terms in the future. Please see the Target Return disclosure at the conclusion of the presentation for more information on the risks and limitation. Source: JPMIM

# I&G multifamily portfolio: Pursuing development over stabilized

## I&G Multifamily Exposure

| | NAV (millions) | Allocation |
|---|---|---|
| Current (6/30/2019) | $ 553 | 21.2% |

### Portfolio Highlights

- Occupancy[1]: 95%
- Composition: 50% suburban
  50% urban

### Near-term Objectives

- Increase weighting through value-add allocations
  - Target development opportunities as well as upgrade executions in existing portfolio and new acquisitions.
- Focus on:
  - Markets with compelling demographics and sustained job growth.
  - Suburban locations with high barriers to entry; select urban submarkets with limited new supply and aging product.

### Carraway, New York City Suburb

**Development**

| | |
|---|---|
| Acquisition Date | November 2018 |
| Size | 421 units |
| Development Budget | $ 158.4 mm |
| JPM equity | $ 42.4 mm |

- Site benefits from strong area demographics in supply constrained suburban market. Easy commute to New York City and area employment centers.
- Reputable, national partner with a 25% interest.

### 144-74 Northern Blvd, New York City

**Development**

| | |
|---|---|
| Acquisition Date | August 2018 |
| Size | 103 units |
| Development Budget | $ 66.7 mm |
| JPM equity | $ 21.0 mm |

- Dense population base in urban location with older housing stock that lacks competitive new supply.
- Partner is an experienced developer in the market and has a 10% interest.

As of June 30, 2019. The above examples were selected to illustrate the Fund's new development acquisitions that are currently under construction. This example is included solely to illustrate the investment process and strategies which have been utilized by the manager. Please note that this investment is not necessarily representative of future investments that the manager will make. There can be no guarantee of future success.

[1] Overall occupancy includes The Cirque, Dallas multifamily. The investment is currently undergoing renovations after a mechanical issue, covered by property insurance. The investment is collecting market rents for affected units, resulting in 89% occupancy.

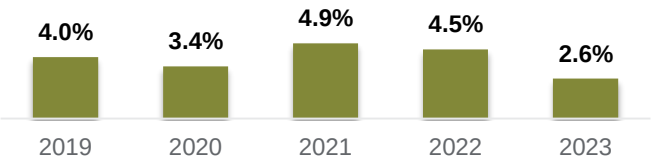
# I&G office portfolio: Durable cash flows

### I&G Office Exposure

| | NAV (millions) | Allocation |
|---|---|---|
| Current (6/30/2019) | $ 1,273 | 48.7% |

### Portfolio Highlights

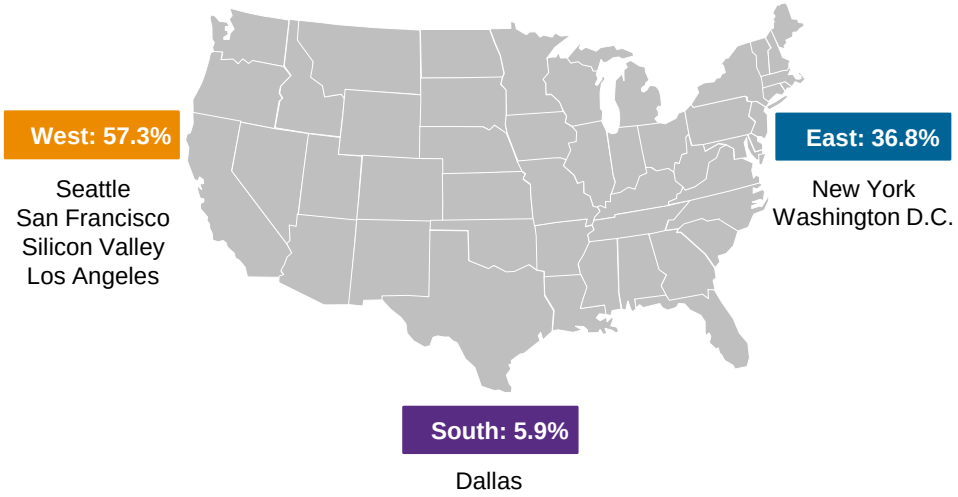
- Durable cash flows
  - Stabilized core asset base
  - 10 year average occupancy of 95%
  - Minimal near term lease rollover:




  - Broadly diversified tenancy across 15+ NAICS
  - Primary markets with complementary industries

### Near Term Objectives

- Maintain foundational footing for portfolio stability through cycles
- Execute strategic dispositions




As of June 30, 2019. Durable cash flows summary and diversification map represent direct real estate holdings only. Source: JPMIM



ALTs by J.P.Morgan Asset Management

# I&G retail portfolio: Continuing to reduce retail exposure

### I&G Retail Exposure

| | NAV (millions) | Allocation |
|---|---|---|
| Current (6/30/2019) | $ 285 | 10.9% |

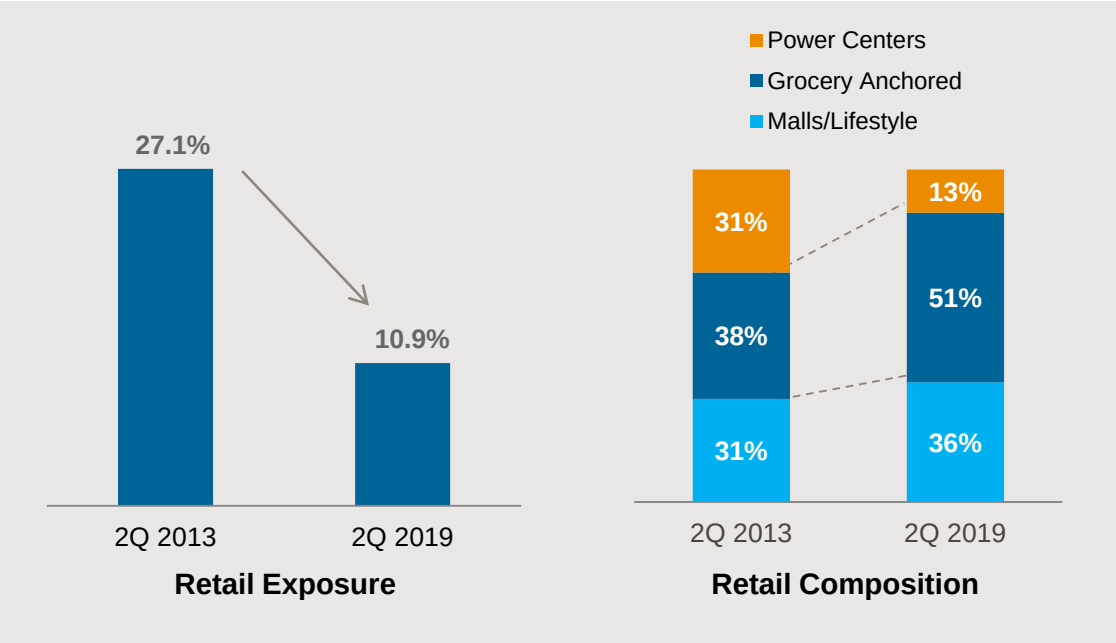
### Portfolio Highlights

- Occupancy: 89%
- Asset management focus on backfilling any vacancies

### Near-term Objectives

- Execute select dispositions

### I&G's Retail Exposure (% of NAV)




### Proactive Approach

- Consistent seller throughout the cycle
- Since 2016, sold 1/3 of retail assets held at that time
- Price discovery from sales guided valuation adjustments on the remaining assets
- Broad based write downs across the retail portfolio began in 2017
- Today, <u>every</u> retail asset has been written down
  - Average 14% decline in GAV across portfolio since 2017

As of June 30, 2019. Source: JPMIM

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# Income and Growth is the core-plus fund of choice

- High quality, stabilized core foundation provides durable income and downside protection
- Capacity and ability to make value-add investments that are accretive to future returns
- Sales program underway to further strengthen existing portfolio and seed value-add investments
- Backed by the resources of our $67B Americas platform
- Confident in return trajectory

675 N Randolph, Ballston, VA

NOTE: The Fund follows an absolute return strategy and seeks to achieve a net IRR of 8-10%[1] over a medium-term hold. Refer to the PPM for further details on the Fund's Investment Objective and Portfolio Return Target. This example of a specific investment is included solely to illustrate the investment process and strategies which have been utilized by the Fund. Please note that this investment is not necessarily representative of future investments that the Fund will make. There can be no guarantee of future success.

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# Investment Summary and Performance

# Tucson Supplemental Retirement System
# Investment summary as of June 30, 2019

| Invested capital | Market value |
|---|---|
| Strategic Property Fund | $51,852,723 |

| Account Performance (%) | Income | Appreciation | Total | ODCE |
|---|---|---|---|---|
| Three months[1] | 0.9 | 0.3 | 1.1 | 1.0 |
| YTD[1] | 1.8 | -0.2 | 1.6 | 2.4 |
| One year | 3.8 | 1.5 | 5.4 | 6.4 |
| Three years | 4.1 | 2.9 | 7.1 | 7.6 |
| Five years | 4.4 | 4.5 | 9.1 | 9.8 |
| Ten years | 5.0 | 4.5 | 9.7 | 9.9 |
| Fifteen years | 5.3 | 3.2 | 8.6 | 8.0 |
| Since inception (10/1/00) | 5.8 | 2.6 | 8.6 | 8.0 |

[1]non-annualized returns.

**Past performance is not a guarantee of comparable future results.** Total return assumes the reinvestment of income. Performance results are gross of investment management fees. The deduction of an advisory fee reduces an investor's return. Actual account performance will vary depending on individual portfolio security selection and the applicable fee schedule.

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# Tucson Supplemental Retirement System
# Investment summary as of June 30, 2019

| US Real Estate Income and Growth Domestic, LP | Net Asset Value |
|---|---|
| Tucson Supplemental Retirement System | $ 25,645,966 |

| Investment Performance time-weighted rates of return (%) | Quarter | YTD | 1 Year | 3 Year | 5 Year | 10 Year | Since Inception[1] |
|---|---|---|---|---|---|---|---|
| Gross Income | 0.9 | 1.9 | 4.2 | 4.9 | 5.3 | 6.5 | 6.6 |
| Appreciation | (0.2) | (0.4) | 0.0 | 2.0 | 4.0 | 4.6 | (1.1) |
| Gross Total Return | 0.7 | 1.5 | 4.2 | 7.0 | 9.4 | 11.3 | 5.4 |
| Net Income | 0.6 | 1.3 | 3.1 | 3.8 | 4.1 | 5.0 | 5.1 |
| Net Total Return | 0.5 | 0.9 | 3.1 | 5.8 | 8.2 | 9.8 | 3.9 |

Note: Past performance not indicative of future performance
[1]Inception Date: November, 2005
Source: J.P. Morgan

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# Appendix – U.S. Real Estate Market Overview

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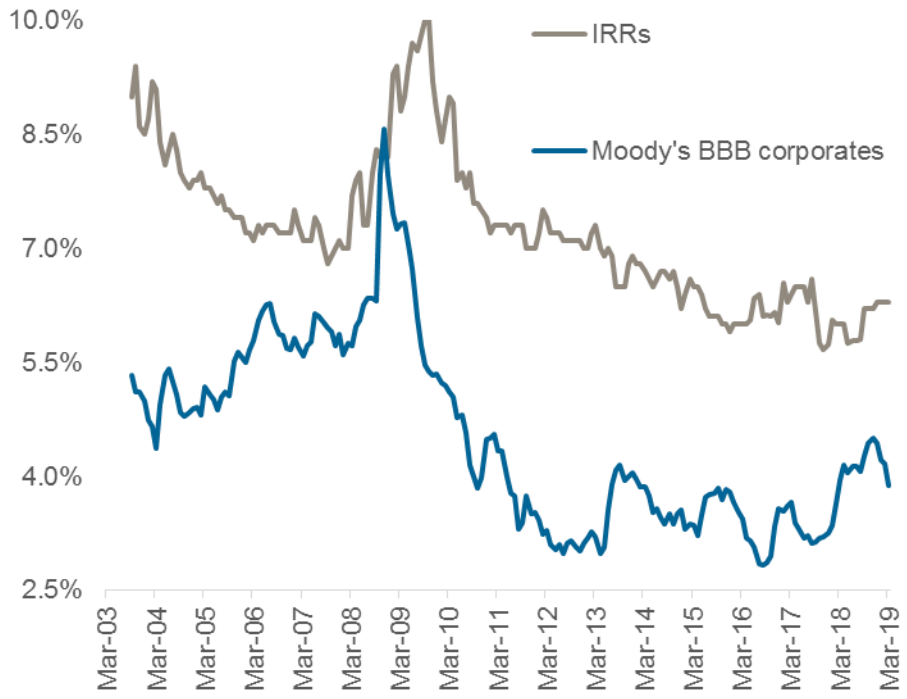
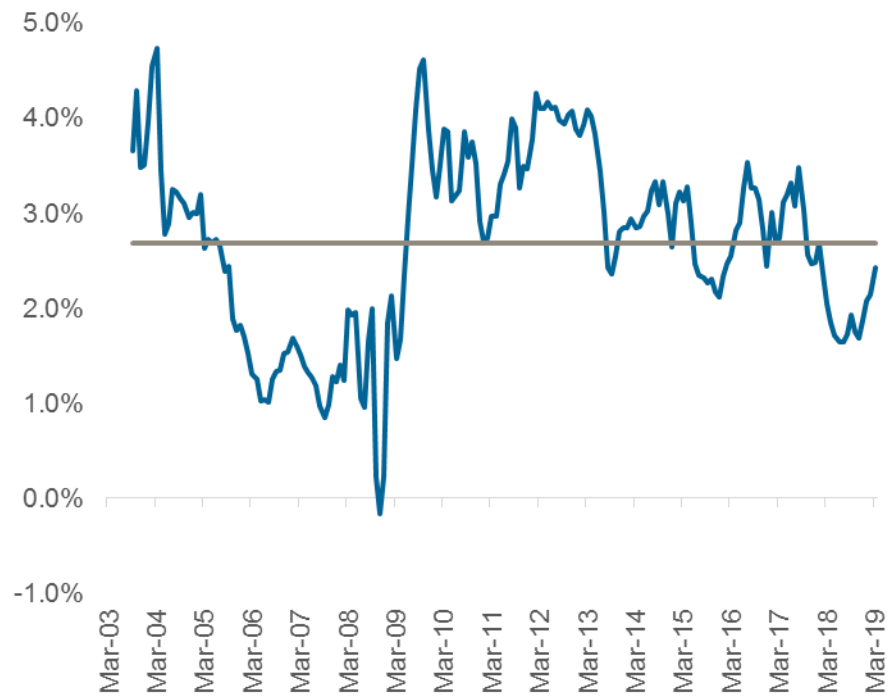
# Core property return premium to fixed income near average

## JPMAM underwriting IRRS and BBB corporate yields




## Spread between IRRs and BBB corporate yields




Sources: JPMAM and Moody's Analytics, as of March 2019

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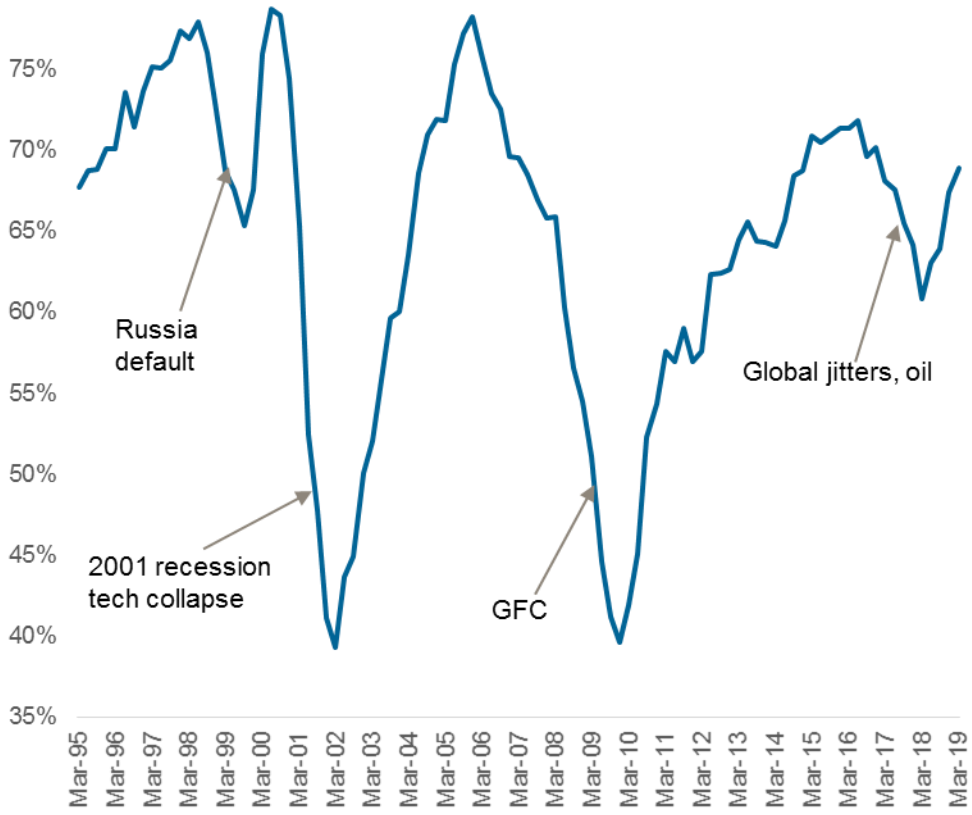
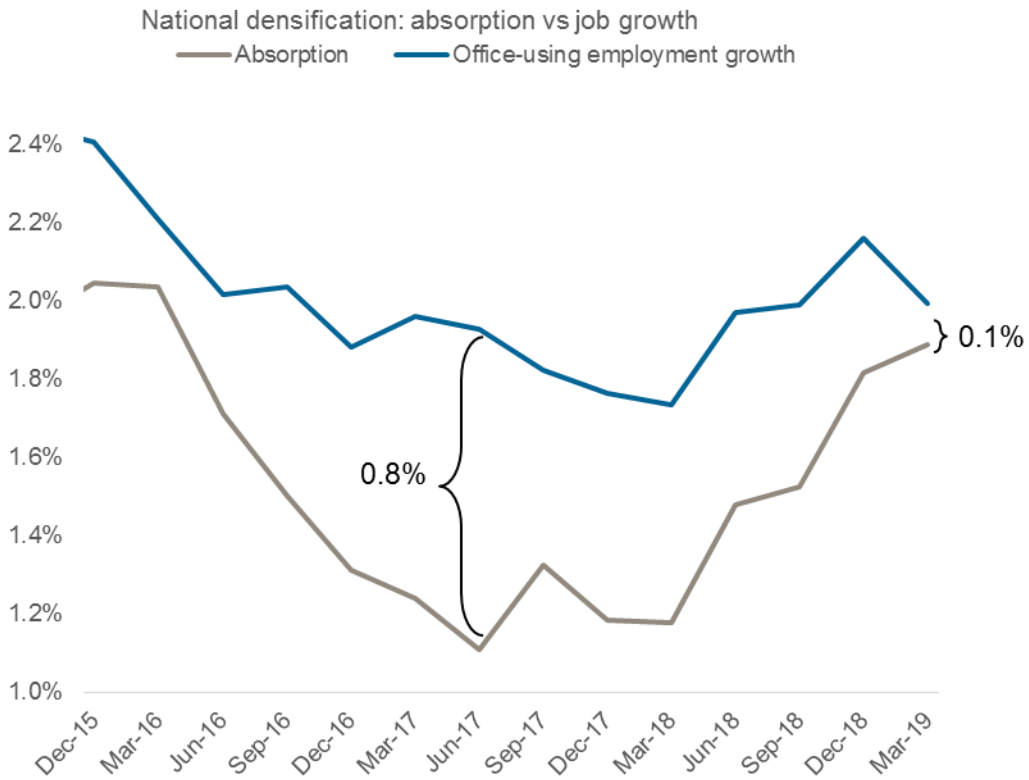
# Office market has bounced thanks to improved business sentiment

## Space growth is nearing office employment growth again – suggesting improved sentiment has increased willingness to lease for future needs

**Share of submarkets with positive yty absorption**




**Slower densification means greater optimism**




Source: CBRE-EA, as of March 2019

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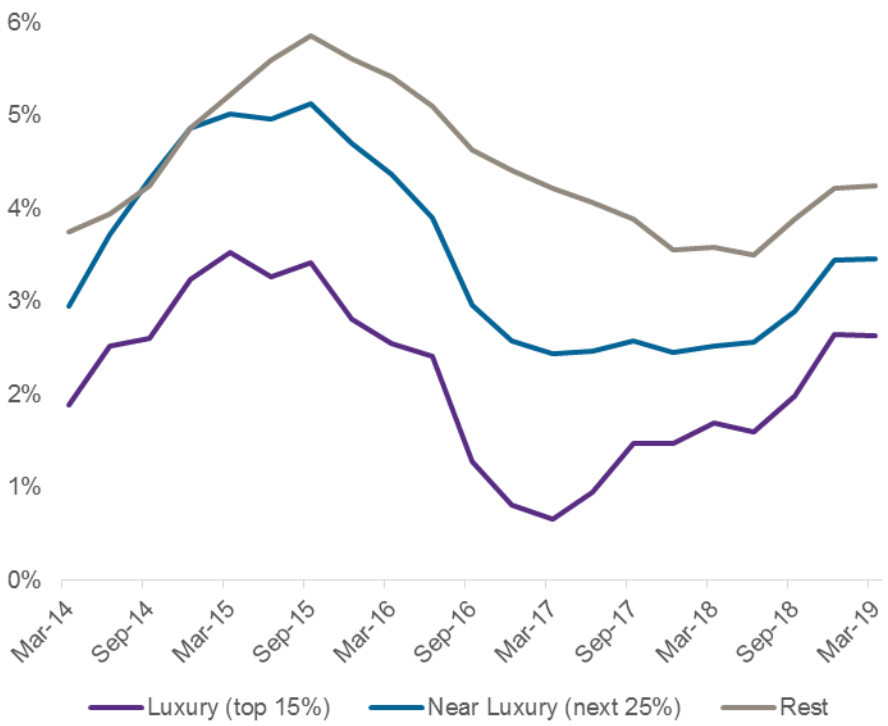
# Stronger labor market and some signs of changing views about homeownership are helping rentals

## All price points are benefitting

### US apartment rent growth, yty % change




### Homeownership rate

Sources: Axiometrics, Bureau of Census; as of March 2019

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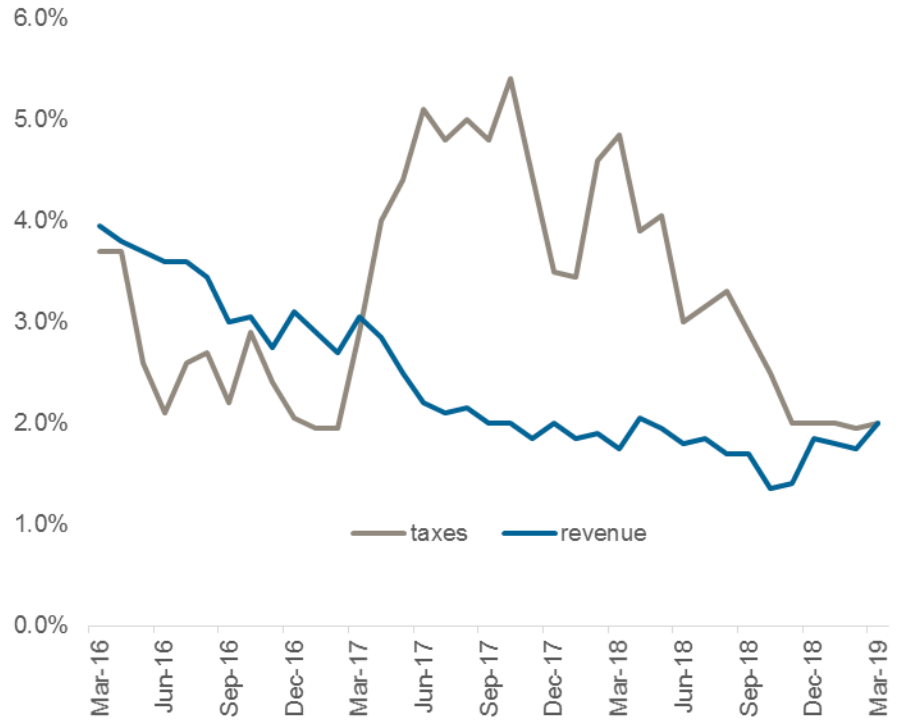
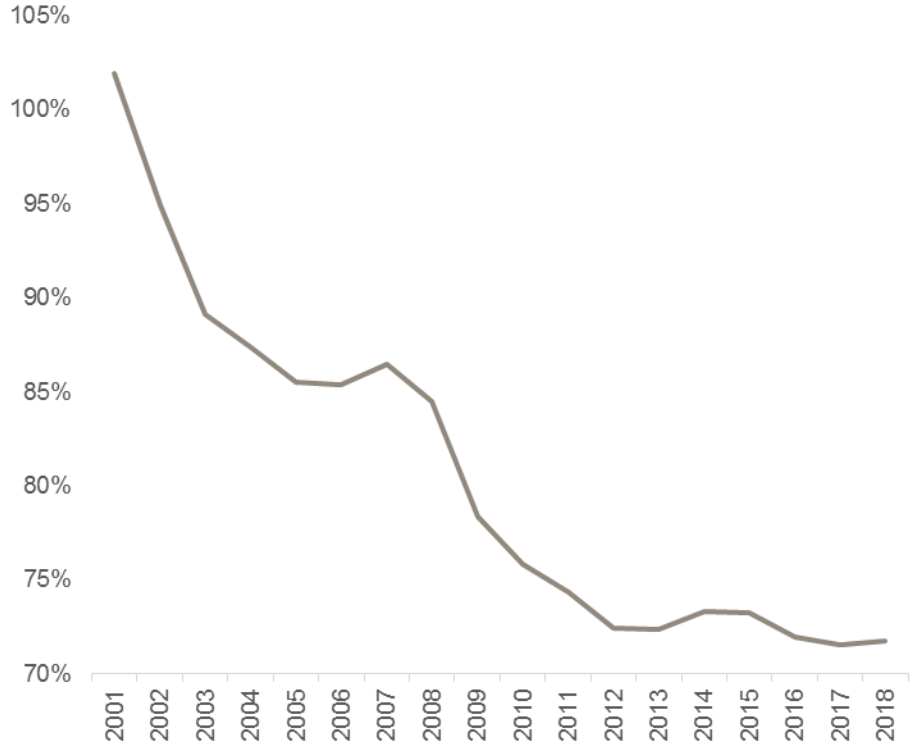
# Slower property tax growth has helped apartment NOI growth but will tax growth rebound?

## States and municipalities need more revenues

### JPMAM apartment revenue and property tax growth




### Pension funded status




Sources: JPMAM, Public Plans Database Center for Retirement Research at Boston College, Left chart as of March 2019, Right chart as of CY 2018

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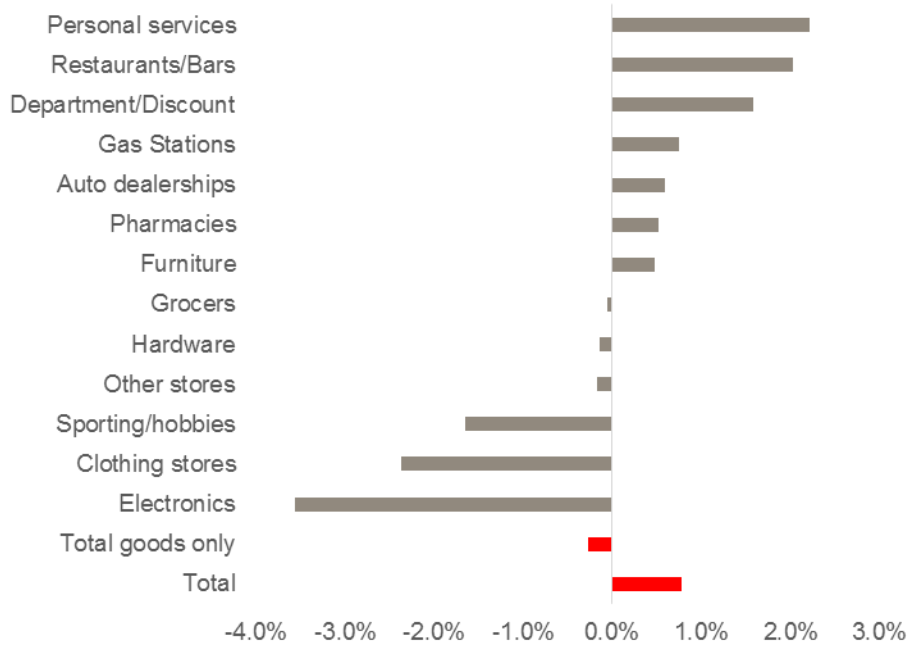
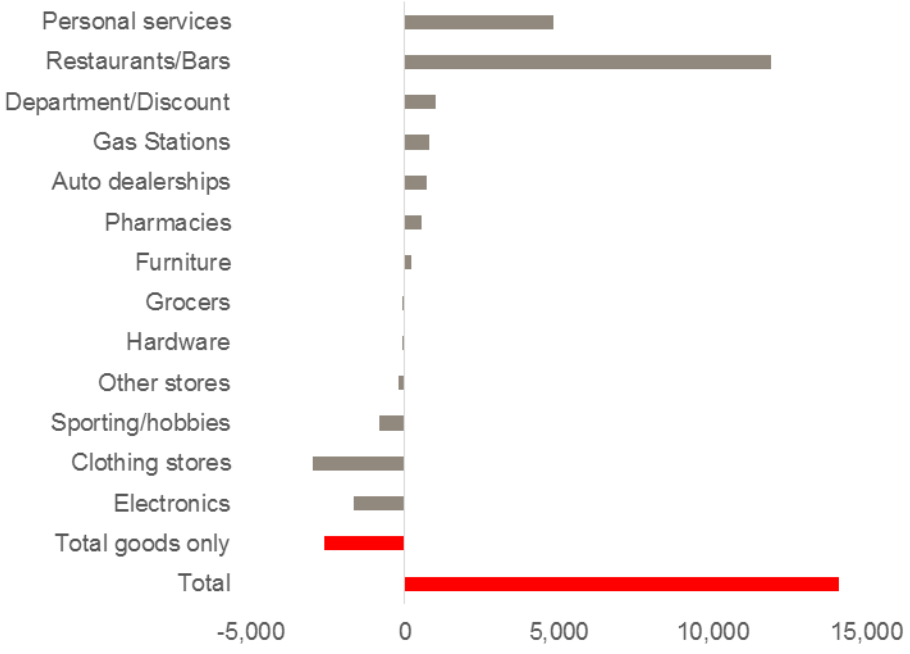
# Retail: Overall store count is up thanks to restaurants and services but churn in goods stores netting negative

**Percentage change in total store count, Q3 2017 – Q3 2018, 4Q MA**




**Net change in total store count, , Q3 2017 – Q3 2018, 4Q MA**




Source: Bureau of Labor Statistics, as of Q3 2018



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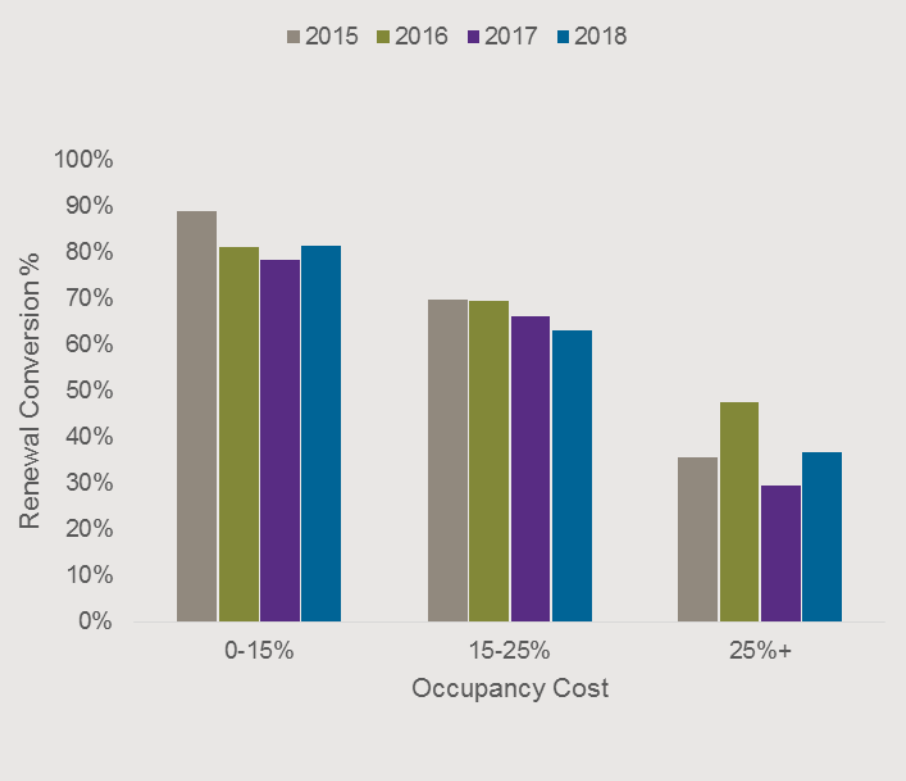
# Retail: In box profitability remains important as online sales squeeze margins

## Renewal conversion by year and occupancy cost




## Retailer Margins

Sources: JPMAM, Bureau of the Census; as of CY 2018

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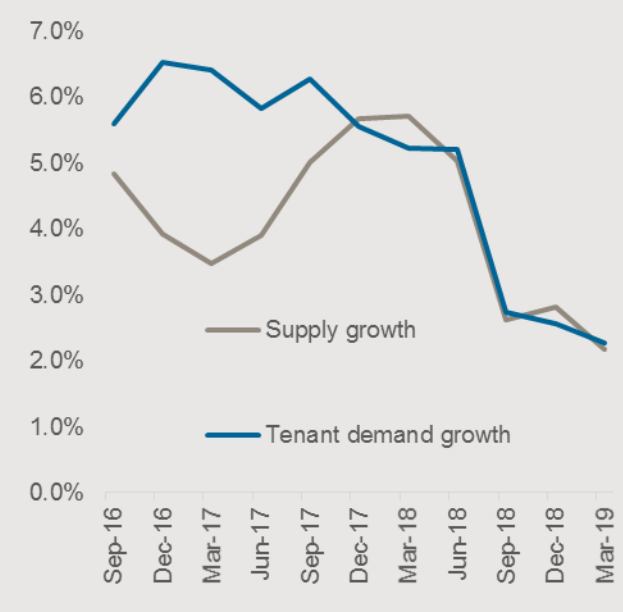
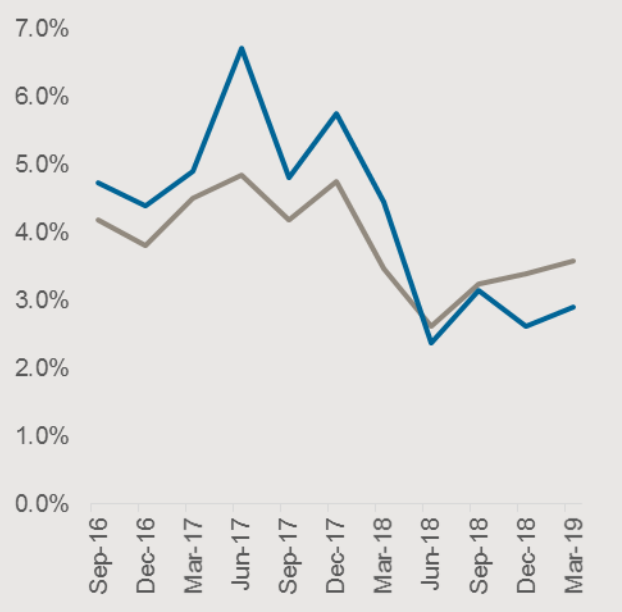
# Outside of infill industrial, the sector is now largely in balance

## Some low density markets are facing oversupply

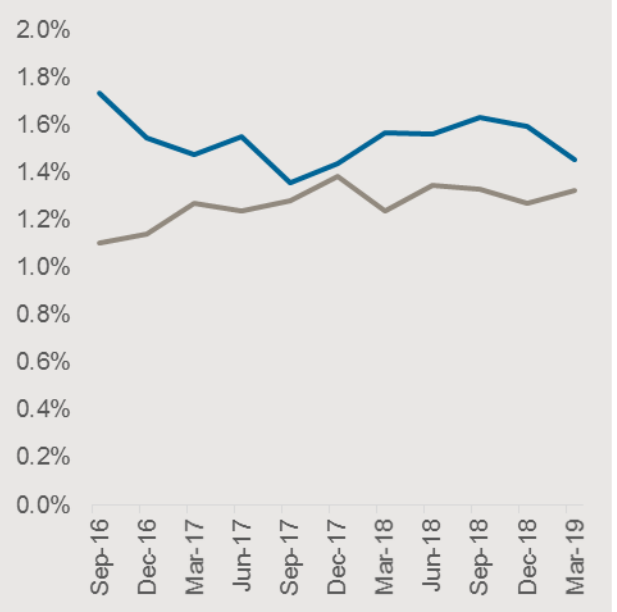
### Rural industrial performance




### Suburban industrial performance




### Infill/urban industrial performance




Source: CoStar, as of March 2019



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# Themes for the next four quarters

## OFFICE

- We expect CBD rebound stays strongest in tech markets and lower cost metros with dynamic downtowns.
- New York and Washington, DC will remain softer than other major markets
- Overall starts have picked up again but deliveries will remain muted.

## INDUSTRIAL

- Overall tenant demand will continue to normalize
- Infill locations should continue to outperform despite sharp rent increases.

## RETAIL

- Overall retail sales have slowed but same store sales at malls remain generally positive.
- Discounters, pharmacies, restaurants, as well as other services, will continue to help leasing.
- Narrow categories – sporting, hobbies, hardware, electronics – will continue to close stores as will non-discount department stores.

## RESIDENTIAL

- Taxes and rising mortgage interest rates favor rentals.
- Property taxes growth may reaccelerate.
- Luxury underperformance will continue.

Forecasts, projections and other forward looking statements are based upon current beliefs and expectations. They are for illustrative purposes only and serve as an indication of what may occur. Given the inherent uncertainties and risks associated with forecasts, projections and other forward statements, actual events, results or performance may differ materially from those reflected or contemplated.

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# Appendix – Supplemental exhibits

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# Strategic Property Fund: Fee schedule

| Tiered Fee Structure Based on NAV of Investor's Shares | | Percentage (per annum) |
|---|---|---|
| Clients < USD100 million | | 1.00% |
| Clients ≥ USD100 million | First USD100 million | 0.92% |
| | Next USD150 million | 0.85% |
| | Next USD250 million | 0.80% |
| | Amounts thereafter | 0.75% |
| | | |
| Fee on Cash | Cash > 5% | 0.15% |

- The fee will only be 0.15% with respect to the market value of cash and cash equivalents in SPF in excess of a 5.0% reserve position for cash and cash equivalents
- No acquisition, disposition or incentive fees
- Fees shall be computed and billed on a calendar quarter basis, in arrears

# Valuation Process

Independent third-party valuation review and approval – Every asset – Every quarter

- Quarterly Valuations
  - Every asset is appraised annually by a third-party appraisal firm
  - In quarters when a third-party appraisal firm does not value an asset, the third-party appraisal management firm, Situs RERC ("RERC") appraises each office, industrial and retail asset
  - For multifamily assets, RERC recommends assets that should be reviewed for a potential interim quarterly valuation and if JPM and RERC agree, JPM produces an interim quarterly valuation that is reviewed and approved by RERC
- Review of Appraisals
  - All third-party appraisals are reviewed and approved by Asset Management, Valuations, and RERC
  - Asset Management reviews all appraisals for factual information, and all three groups review all appraisals for accuracy of leasing conditions and market data
  - Director of Valuations or senior member of Valuations Team reviews valuations for reasonableness of assumptions and final value as well as consistency of pricing parameters within geographic region and property type
- Quarterly Audit
  - PricewaterhouseCoopers performs a quarterly audit review of all appraisals

Select third-party appraisal firms:

- Breakpoint Advisors
- Capright
- CBRE
- Colliers International
- Cushman & Wakefield
- KTR Real Estate Advisors
- National Valuation Consultants
- National Property Valuation Advisors
- The Weitzman Group
- Welsh Chester Galiney Matone

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# Product Design: Risk Management Elements

| Fund guidelines | Strategic Property Fund |
|---|---|
| Leverage Limit: | |
| Portfolio | 35% |
| Asset Specific | 65% |
| Cash Min - Max | 1% - 5% |
| Asset Type Sector Concentration + / - vs. NFI-ODCE[1] | 15% |
| Geographic Sector Concentration + / - vs. NFI-ODCE[1] | 15% |
| Development Property - Non Income Producing Max[2] | 15% |
| JV Single-Partner Largest Concentration[3] | 10% |
| Single Largest Asset Concentration[3] | 5% |
| Annual Gross Turnover (rolling four quarters)[4] | 5% - 20% |
| Annual Sales Turnover (rolling four quarters)[5] | 5% - 20% |

[1]Based on Fund's net asset value (NAV) - direct real estate only, excluding Land [2]Based on Fund's gross asset value (GAV) - direct real estate only, including Land. 5% for new development and up to a total 15% including re-development opportunities. [3]Based on the Fund's net asset value (NAV) [4]Represents, as a percentage of the Fund's quarterly average gross asset value, the total gross acquisitions, gross sales proceeds and capital expenditures over a rolling 12 month period [5]Represents, as a percentage of the Fund's quarterly average gross asset value, total gross sales proceeds over a rolling 12 month period

*The Guidelines set forth herein are not firm restrictions but may fluctuate from time to time due to market conditions, Contributions, repurchases/withdrawals and other factors beyond JPMC's control. Additional information is available upon request. For purposes of applying the investment guidelines set forth herein, the "Fund" includes the value of the "Retained Legacy Investments" in the Fund's gross asset values. As a result, the guideline target percentages for the Other FIVs will vary from those of the overall Fund. Additionally, with respect to Other FIV Investors, the Fund's investments and leverage may vary from these Guidelines initially and for some time following the Fund's launch as the Fund expands its investor and investment base.

**Benchmark information/disclaimer: NFI-ODCE is the Open End Diversified Core Equity Index, a capitalization-weighted, gross of fee, time-weighted return index with an inception date of December 31, 1977. For more information, see https://www.ncreif.org/data-products/funds/. Reference to the NFI-ODCE is solely for comparison purposes. It is not possible to invest directly in an index. Exposure to an asset class represented by an index is available through investable instruments based on that index. Past performance of an index is not an indication or guarantee of future results and the Fund's investments will not necessarily provide the same results.

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# Strategic Property Fund: Key Terms

| Fund Summary | |
|---|---|
| **Fund** | ■ Strategic Property Fund (the "Fund" or "SPF") |
| **Fund Structure** | ■ The Fund is currently comprised of five (5) Fund investor Vehicles (FIVs), each designed for a specific type of investor: (i) FIV 1 (the existing bank comming led investment fund, originally launched in January 1998 and designed for US qualified retirement plans); FIV2 (a Delaware LP, designed for foundations, endowments and US taxable investors), (iii) FIV 3 (a Luxembourg SCSp, designed for Section 892 investors); (iv) FIV4 (a Luxembourg SCSp, designed for Section 897(l) investor) and (v) FIV5 (a Luxembourg SCSp, designed for non-Section 892/897(l) investors). |
| **Fund Inception** | ■ January 1998 |
| **Minimum Commitment** | ■ USD10 million |
| **Gross Asset Value** | ■ USD 42.7 billion as of June 30, 2019 |
| **Net Asset Value** | ■ USD 32.7 billion as of June 30, 2019 |
| **Currency** | ■ SPF is a USD denominated fund |
| **Strategy** | ■ An open-end core fund seeking to produce a compelling risk adjusted return with the majority of return deriving from income and the balance from appreciation. The Fund invests in core real estate projects in the United States, which consist of high quality stabilized assets in the four major property types: office, industrial, retail and residential |
| **Fund Structure** | ■ Open-end, perpetual life |
| **Target Return** | ■ The Fund seeks to outperform the NFI-ODCE Value Weighted Index through asset, geographic and sector selection and active asset management. The Fund anticipates a total gross return for 2019 to be in the mid-5% range[1] (income of 4.0% with the balance in appreciation). |
| **Geographic Concentration** | ■ +/- 15% vs. NFI-ODCE |
| **Asset Type Sector Concentration** | ■ +/- 15% vs. NFI-ODCE[2,] |
| **Leverage Guideline** | ■ Portfolio – 35% / Asset Specific – 65% |
| **Management Fee** | ■ Client NAV < USD100 million: 1.00% per annum ("p.a.")<br>■ Client NAV ≥ USD100m: 0.92% p.a.(first USD100m), 0.85% (next USD150m), 0.80% (next USD250m), 0.75% (amounts thereafter)<br>■ Cash > 5%: 0.15% p.a. |
| **Contributions** | ■ Subscriptions are accepted monthly and placed into a queue. The Fund may, but is not obligated to, call capital on a monthly basis subject to cash needs of the portfolio and contribution queues. |
| **Repurchases/ Redemptions** | ■ Participants may request to withdraw from the Fund once per quarter subject to available cash, as determined by the Trustee. A written redemption request is required to be submitted and accepted not less than 30 days prior to the last day of the calendar quarter. To the extent requests exceed available cash, distributions are considered pro-rata, based on participant's interest in the Fund. |

[1]The target returns are for illustrative purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns similar to the target returns shown above. Because of the inherent limitations of the target returns, potential investors should not rely on them when making a decision on whether or not to invest in the strategy. Please see the complete Target Return disclosure at the conclusion of the presentation for more information on the risks and limitation of target returns. *[2]Based on Fund's net asset value (NAV) - direct real estate only, excluding land. [3]NFI-ODCE diversification excludes hotel and other allocation.* **See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

# U.S. Real Estate Income and Growth Fund
# Summary of terms*

Please refer to the Confidential Private Placement Memorandum dated January 2013 and the Charter Documents for a more detailed discussion of the terms of the Fund.

### LEGAL STRUCTURE

The Fund is currently comprised of two Delaware limited partnerships (the "Partnerships"), a German limited partnership and three Cayman corporations (the "Cayman Corporations" and together with the Partnerships, the "Fund Investor Vehicles"). The Fund may also include, or co-invest with, other entities established from time to time, which are designed to accommodate the needs of particular groups of investors. The U.S. Partnerships are currently managed by a General Partner which is managed by individuals who are employees of the Investment Adviser, and the Cayman Corporations' Boards of Directors are currently comprised of individuals who are employees of the Investment Adviser. The German Limited Partnership is managed by individuals who are affiliated with the Investment Adviser.

### INVESTMENT ADVISER

Investment advisory services are provided by J.P. Morgan Investment Management Inc. (the "Investment Adviser").

### TERM

Each Fund Investor Vehicle has an indefinite term, subject to the conditions set forth in its charter documents.

### TARGET RETURN**

Target net annualized IRR of 8-10% (roughly half coming from income and the remainder from capital appreciation) is net of management fees and expenses, but gross of all applicable taxes (including VAT). There can be no assurance that the Target Return will be achieved.

### FUND MANAGEMENT

While the General Partner and the Board of Directors have management authority for their respective Fund Investor Vehicles, they have delegated investment and asset management authority to the Investment Adviser pursuant to Investment Advisory Agreements.

### FUND LIQUIDITY

Investors have the right, following the date on which their capital commitment is fully drawn, to submit a Request for Repurchase of all or part of their interest.
Repurchases may be made quarterly at the discretion of the relevant General Partner or Board of Directors.

- For the March 31 repurchase date, notice must be given in the period between the preceding December 15 and January 31.
- For the June 30 repurchase date, notice must be given in the period between the preceding March 15 and April 30.
- For the September 30 repurchase date, notice must be given in the period between the preceding June 15 and July 31.
- For the December 31 repurchase date, notice must be given in the period between the preceding September 15 and October 31.

Each Fund Investor Vehicle will determine whether to accept any offers for Repurchase Requests and will decide the final terms and conditions of any Repurchase Request, after considering the availability of proceeds to fund Repurchases and the effect on the Fund of consummating such Repurchases.
If a Fund Investor Vehicle accepts some, but not all, of the Repurchase Requests submitted during a Repurchase Notice Period, it will accept such offers on a pro rata basis unless it determines in its sole discretion to accept such offers on a non-pro rata basis (i) to facilitate compliance with any tax or regulatory requirements or (ii) for any other reason determined in its sole discretion to be in the best interest of the Fund.
Any portion (which may be 100%) of a Repurchase Request submitted during a Repurchase Notice Period that is not accepted on the Repurchase Date to which such Repurchase Notice Period relates will expire and will not continue or carry over to any subsequent Repurchase Notice Period.
The Investment Adviser may establish a queue on a fund-wide basis to pay Repurchase Requests out over more than one Repurchase Date.
Available Cash from the Fund will be re-invested quarterly to purchase new Interests, or at the investor's election, will be distributed.
The Fund may hold cash and certain cash-like instruments to manage Fund liquidity.

*This summary is qualified in its entirety by the terms of the Charter Documents.
** The target returns are for illustrative purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns similar to the target returns shown above. Because of the inherent limitations of the target returns, potential investors should not rely on them when making a decision on whether or not to invest in the strategy. Please see the complete Target Return disclosure at the conclusion of the presentation for more information on the risks and limitation of target returns.

# U.S. Real Estate Income and Growth Fund
# Summary of terms* (cont.)

### REPURCHASE HISTORY

Since inception through June 30, 2019, 100% of repurchase requests made were accepted and funded, with the exception of four repurchase periods as follows: (i) March 31, 2008, 0% of the $193.8 mm in repurchase requests made were accepted and funded; (ii) September 30, 2008, 32% of the $223 mm in repurchase requests made were accepted and funded; (iii) March 31, 2009, 0% of the $154.9 mm in repurchase requests were accepted and funded and (iv) September 30, 2009, 0% of the $125.8 mm in repurchase requests were accepted and funded.

### MINIMUM SUBSCRIPTION AMOUNT

USD 10,000,000 (although the Investment Adviser retains the right to accept lesser investment amounts). Committed capital shall be payable in one or more installments when called by the Investment Adviser.

### PLACEMENT FEE

None

### INCENTIVE FEE

None

### PLACEMENT AGENT

J.P. Morgan Securities LLC, J.P. Morgan Securities Ltd, J.P. Morgan Institutional Investments Inc., and other affiliates and subsidiaries of JPMorgan Chase & Co. and other entities not affiliated with J.P. Morgan, as may be designated from time to time.

### MANAGEMENT FEE (%) [1,2]:

**NAV $10 mm or more, but less than $100 mm:** 1.05
**For NAVs $100 mm or more:**

| | |
|---|---|
| First $50 mm: | 1.05 |
| Next $50 mm: | .90 |
| Next $50 mm: | .85 |
| Next $50 mm: | .80 |
| Remainder: | .75 |

Note: For NAV's less than USD 10,000,000, Management Fee is 1.75%.

### COMMITMENT CANCELATION RIGHT

After giving 90 days notice, each non-defaulting investor shall have the one-time right at any time following the third anniversary of the quarter date as of which such investor's subscription was accepted to cancel its remaining capital commitments subject to the Investment Adviser's right to draw capital during such 90-day period.

### PAYMENT OF SUBSCRIPTION AMOUNT; DETERMINATION OF NAV

Investors will be required to pay their subscription amounts in one or more installments when called by the Investment Adviser. A net asset value ("NAV") is established for each Fund Investor Vehicle on a quarterly basis. When an Investor pays a portion of its subscription amount to a Fund Investor Vehicle, the Investor receives interests in the Fund Investor Vehicle at a price based on the most recently established quarterly NAV for that Fund Investor Vehicle. The Fund intends to generally call capital, on a pro rata basis, fully from those Investors whose subscriptions were accepted as of a given closing before calling capital from Investors whose subscriptions were accepted at any subsequent closing.

[1] Investors will be charged a management fee based on the Net Asset Value of capital they have contributed to the Fund. No management fee shall be assessed on committed capital before it is called. The Investment Adviser reserves the right to vary the management fee with respect to certain Investors

[2] In the event the aggregate market value of the Fund's assets consisting of cash and cash-like investments exceeds 10% of the aggregate market value of the Fund's assets on any three successive valuation dates, the management fee attributable to such excess cash shall be reduced to 0.15% per annum for the period between such second and third occurring valuation dates

* This summary is qualified in its entirety by the terms of the Charter Documents.

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# Appendix – Schedule of Investments

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# SPF Office Investments

## As of June 30, 2019

| Investment Name | Location | Ownership | Square Footage (SF) | NAV (USD 000s) | % of Fund NAV |
|---|---|---|---|---|---|
| 10 Hudson Yards | New York, NY | JV | 1,775,548 | 219,454 | 0.7 |
| 101 Constitution | Washington, DC | JV | 512,976 | 287,268 | 0.9 |
| 10-30 S. Wacker | Chicago, IL | JV | 2,411,577 | 402,815 | 1.2 |
| 111 North Canal | Chicago, IL | WO | 839,601 | 275,881 | 0.8 |
| 125 W55th Street | New York, NY | WO | 586,538 | 351,320 | 1.1 |
| 1345 Avenue of the Americas | New York, NY | JV | 1,849,562 | 743,877 | 2.3 |
| 1918 Eighth Avenue | Seattle, WA | WO | 668,183 | 340,310 | 1.0 |
| 195 Broadway | New York, NY | JV | 1,077,781 | 620,333 | 1.9 |
| 200 Fifth Avenue | New York, NY | JV | 867,350 | 402,582 | 1.2 |
| 2000 Avenue of the Stars | Los Angeles, CA | JV | 792,567 | 355,396 | 1.1 |
| 225 Franklin Street | Boston, MA | JV | 941,861 | 190,972 | 0.6 |
| 60 State Street | Boston, MA | JV | 902,126 | 195,976 | 0.6 |
| 818 Stewart Street | Seattle, WA | WO | 238,806 | 136,876 | 0.4 |
| Alliance Texas - Office | Fort Worth, TX | WO | 115,202 | 16,336 | 0.1 |
| Back Bay - 222 Berkeley | Boston, MA | JV | 548,050 | 206,685 | 0.6 |
| Back Bay - 500 Boylston | Boston, MA | JV | 753,982 | 350,536 | 1.1 |
| Brewery Blocks - Office | Portland, OR | WO | 329,535 | 130,585 | 0.4 |
| Century Plaza Towers | Los Angeles, CA | JV | 2,288,291 | 792,702 | 2.4 |
| China Basin | San Francisco, CA | JV | 927,946 | 684,432 | 2.1 |
| Franklin Park | Franklin, TN | WO | 272,720 | 43,270 | 0.1 |
| Landmark Center | Boston, MA | JV | 956,769 | 629,694 | 1.9 |

Ownership: WO indicates wholly owned investments and JV indicates joint venture investments. Totals may not sum due to rounding. These examples represent some of the investments of the Fund. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment by the Fund in the future. **See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

# SPF Office Investments (cont'd)

## As of June 30, 2019

| Investment Name | Location | Ownership | Square Footage (SF) | NAV (USD 000s) | % of Fund NAV |
|---|---|---|---|---|---|
| Market Square - SPF | San Francisco, CA | JV | 1,088,516 | 356,788 | 1.1 |
| McKinney & Olive | Dallas, TX | WO | 535,767 | 220,094 | 0.7 |
| Metropolitan Midtown - Office | Charlotte, NC | WO | 170,293 | 60,004 | 0.2 |
| One Memorial Drive | Cambridge, MA | JV | 407,389 | 250,357 | 0.8 |
| Park Place at Bay Meadows | San Mateo, CA | WO | 253,258 | 209,135 | 0.6 |
| Sunnyvale City Center | Sunnyvale, CA | WO | 472,442 | 409,970 | 1.3 |
| Sunnyvale Town Center | Sunnyvale, CA | WO | 313,920 | 338,763 | 1.0 |
| Sunnyvale Town Center - Block 3 Office | Sunnyvale, CA | JV | 458,000 | 94,877 | 0.3 |
| Terminus | Atlanta, GA | JV | 1,226,333 | 158,831 | 0.5 |
| The Crescent | Dallas, TX | WO | 1,309,088 | 524,045 | 1.6 |
| The Water Garden - SPF | Santa Monica, CA | JV | 673,659 | 229,906 | 0.7 |
| Trammell Crow Center | Dallas, TX | WO | 1,159,927 | 358,276 | 1.1 |
| Two Franklin Park - Office | Franklin, TN | WO | 278,161 | 40,253 | 0.1 |
| Van Ness Office/Retail | Boston, MA | JV | 267,115 | 180,446 | 0.6 |
| Water Garden II | Santa Monica, CA | WO | 615,426 | 629,288 | 1.9 |
| **TOTAL Office (36 PROJECTS)** | | | **28,886,265 sf** | **11,438,330** | **35.0** |

Ownership: WO indicates wholly owned investments and JV indicates joint venture investments. Totals may not sum due to rounding. These examples represent some of the investments of the Fund. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment by the Fund in the future. **See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

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# SPF Industrial Investments

## As of June 30, 2019

| Investment Name | Location | Ownership | Square Footage (SF) | NAV (USD 000s) | % of Fund NAV |
|---|---|---|---|---|---|
| 2601 Internationale Parkway | Woodridge, IL | WO | 356,621 | 29,717 | 0.1 |
| Alliance Center North 1 | Fort Worth, TX | JV | 1,111,500 | 16,034 | 0.0 |
| Alliance Texas - Industrial | Fort Worth, TX | WO | 13,951,456 | 931,223 | 2.9 |
| Big 5 Distribution Center | Riverside, CA | WO | 953,132 | 89,952 | 0.3 |
| Black Creek Build to Core | Various | JV | N/A | 96,263 | 0.3 |
| Black Creek Open End Fund | Various | JV | N/A | 103,315 | 0.3 |
| DBC / Osage Street Portfolio | Denver, CO | WO | 772,560 | 101,634 | 0.3 |
| Dugan Texas | Various, TX | JV | 6,047,818 | 227,029 | 0.7 |
| Gateway 673 | Pontoon Beach, IL | WO | 673,137 | 36,217 | 0.1 |
| Greater Los Angeles - Mira Loma | Mira Loma, CA | WO | 376,007 | 48,228 | 0.1 |
| Greater Los Angeles Industrials | Various, CA | WO | 2,714,916 | 429,830 | 1.3 |
| Highway 4051 | Grapevine, TX | WO | 540,000 | 36,473 | 0.1 |
| HUB 25 | Denver, CO | WO | 545,523 | 96,040 | 0.3 |
| Kimball Business Park | Chino, CA | JV | 1,030,727 | 172,884 | 0.5 |
| Marina Crossings | Chicago, IL | JV | 633,057 | 35,433 | 0.1 |
| Marshfield Business Park | Rosedale, MD | WO | 1,334,755 | 115,881 | 0.4 |
| Maywood Park | Melrose Park, IL | WO | 623,000 | 18,123 | 0.1 |
| Metro Chicago Industrial Portfolio | Bolingbrook, IL | WO | 81,086 | 7,492 | 0.0 |
| Park West | Hebron, KY | WO | 542,960 | 40,151 | 0.1 |
| Pico Rivera | Pico Rivera, CA | JV | 102,200 | 89,468 | 0.3 |
| Pinnacle | Dallas, TX | JV | 1,338,100 | 89,622 | 0.3 |

Ownership: WO indicates wholly owned investments and JV indicates joint venture investments. Totals may not sum due to rounding. These examples represent some of the investments of the Fund. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment by the Fund in the future.

**See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

# SPF Industrial Investments (cont'd)

## As of June 30, 2019

| Investment Name | Location | Ownership | Square Footage (SF) | NAV (USD 000s) | % of Fund NAV |
|---|---|---|---|---|---|
| PortSouth Bryla | Carteret, NJ | WO | 459,500 | 97,440 | 0.3 |
| Procter & Gamble Distribution Center | Edwardsville, IL | WO | 2,119,452 | 114,726 | 0.4 |
| RealTerm Portfolio | Various | JV | 2,188,173 | 505,009 | 1.5 |
| Sam Houston Center | Houston, TX | JV | 833,720 | 11,203 | 0.0 |
| South Bay Industrials | Compton, CA | JV | 1,528,590 | 155,719 | 0.5 |
| South Florida Logistics Center | Miami, FL | WO | 1,452,202 | 344,151 | 1.1 |
| Toyota Campus | Torrance , CA | JV | 1,897,098 | 250,977 | 0.8 |
| Vineyard Industrial I | Ontario, CA | WO | 1,945,654 | 304,377 | 0.9 |
| Vineyard Industrial II | Ontario, CA | WO | 1,053,225 | 110,821 | 0.3 |
| **TOTAL Industrial (30 PROJECTS)** | | | **47,206,169 sf** | **4,705,428** | **14.4** |

Ownership: WO indicates wholly owned investments and JV indicates joint venture investments. Totals may not sum due to rounding. These examples represent some of the investments of the Fund. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment by the Fund in the future. **See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

# SPF Retail Investments

## As of June 30, 2019

| Investment Name | Location | Ownership | Square Footage (SF) | NAV (USD 000s) | % of Fund NAV |
|---|---|---|---|---|---|
| Brewery Blocks - Retail | Portland, OR | WO | 118,282 | 50,261 | 0.2 |
| Bridgewater Commons - SPF | Bridgewater, NJ | JV | 666,079 | 92,571 | 0.3 |
| Del Amo Fashion Center | Torrance, CA | JV | 1,765,450 | 230,402 | 0.7 |
| DSRG - SPF | Various | JV | 8,098,590 | 996,175 | 3.0 |
| Edens - SPF | Various | JV | 14,713,241 | 1,186,198 | 3.6 |
| Metropolitan Midtown - Retail | Charlotte, NC | WO | 171,729 | 58,996 | 0.2 |
| North Hills | Raleigh, NC | JV | 809,180 | 87,104 | 0.3 |
| NorthPark Center JV | Dallas, TX | JV | 1,936,928 | 637,006 | 2.0 |
| Ontario Mills | Ontario, CA | JV | 1,304,065 | 507,930 | 1.6 |
| Park Meadows Mall - SPF | Littleton, CO | JV | 761,767 | 267,282 | 0.8 |
| Perimeter Mall | Atlanta, GA | JV | 967,450 | 144,129 | 0.4 |
| River Oaks Retail/Office | Houston, TX | WO | 370,970 | 479,453 | 1.5 |
| Royal Hawaiian Center | Honolulu, HI | WO | 327,856 | 931,481 | 2.9 |
| Shadow Creek Ranch Town Center | Pearland, TX | JV | 573,214 | 55,786 | 0.2 |
| Shops at Merrick Park | Coral Gables, FL | JV | 533,330 | 205,394 | 0.6 |
| Sunnyvale Town Center - Retail | Sunnyvale, CA | JV | 136,682 | 39,812 | 0.1 |
| Towson Town Center - SPF | Towson, MD | JV | 642,685 | 59,748 | 0.2 |
| University Towne Center | San Diego, CA | JV | 1,064,270 | 708,908 | 2.2 |
| Valley Fair Mall | San Jose, CA | JV | 731,121 | 1,301,649 | 4.0 |
| Winter Park Village | Winter Park, FL | JV | 461,825 | 38,585 | 0.1 |
| **TOTAL Retail (20 PROJECTS)** | | | **36,154,714 sf** | **8,078,870** | **24.7** |

Ownership: WO indicates wholly owned investments and JV indicates joint venture investments. Totals may not sum due to rounding. These examples represent some of the investments of the Fund. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment by the Fund in the future. **See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

# SPF Residential Investments

## As of June 30, 2019

| Investment Name | Location | Ownership | # Units | NAV (USD 000s) | % of Fund NAV |
|---|---|---|---|---|---|
| 100 at Capitol Yards | Washington, DC | JV | 246 | 27,953 | 0.1 |
| 12th and Otis | San Francisco, CA | JV | 416 | 85,188 | 0.3 |
| 1330 Boylston | Boston, MA | JV | 200 | 80,001 | 0.2 |
| 3500 Westlake | Austin, TX | WO | 175 | 39,120 | 0.1 |
| 70 at Capitol Yards | Washington, DC | JV | 448 | 44,197 | 0.1 |
| 850 Lake Shore Drive | Chicago, IL | WO | 198 | 55,779 | 0.2 |
| 909 at Capitol Yards | Washington, DC | JV | 237 | 27,354 | 0.1 |
| Apollo on H Street | Washington, DC | JV | 431 | 142,359 | 0.4 |
| Ascent at City Center | Houston, TX | WO | 160 | 43,188 | 0.1 |
| Aspect | Fullerton, CA | WO | 323 | 133,529 | 0.4 |
| Beltway Portfolio | Various | JV | 1,628 | 118,914 | 0.4 |
| Broadstone Bowles Crossing | Littleton, CO | JV | 0 | 13,519 | 0.0 |
| Broadstone Waterfront - WO | Scottsdale, AZ | WO | 259 | 108,662 | 0.3 |
| Cordoba | Doral, FL | WO | 224 | 61,084 | 0.2 |
| Cordoba Phase II | Doral, FL | WO | 230 | 62,413 | 0.2 |
| Domain at City Centre | Houston, TX | WO | 370 | 96,677 | 0.3 |
| Elizabeth Square | Charlotte, NC | WO | 267 | 60,949 | 0.2 |
| Fairways at Raccoon Creek WO | Littleton, CO | WO | 360 | 94,845 | 0.3 |
| Fenway Triangle - SPF | Boston, MA | JV | 405 | 106,380 | 0.3 |
| Gaslight Commons | South Orange, NJ | WO | 200 | 79,086 | 0.2 |
| Grand Isle | Murrieta, CA | JV | 453 | 48,036 | 0.1 |

Ownership: WO indicates wholly owned investments and JV indicates joint venture investments. Totals may not sum due to rounding. These examples represent some of the investments of the Fund. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment by the Fund in the future. **See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

# SPF Residential Investments (cont'd)

## As of June 30, 2019

| Investment Name | Location | Ownership | # Units | NAV (USD 000s) | % of Fund NAV |
|---|---|---|---|---|---|
| Grey House | Houston, TX | WO | 279 | 79,505 | 0.2 |
| Ink Block | Boston, MA | JV | 315 | 124,089 | 0.4 |
| Jacaranda | Fullerton, CA | WO | 131 | 48,134 | 0.1 |
| Laguna Niguel Apartments - SPF | Laguna Niguel, CA | JV | 190 | 29,420 | 0.1 |
| Lakeside at LaVillita | Irving, TX | WO | 331 | 55,671 | 0.2 |
| Landings at LaVillita | Irving, TX | WO | 409 | 71,983 | 0.2 |
| Liberty Towers | Jersey City, NJ | WO | 648 | 404,176 | 1.2 |
| Memorial Park West | Houston, TX | JV | 315 | 23,252 | 0.1 |
| Midtown 5 | Miami, FL | JV | 400 | 68,637 | 0.2 |
| Midtown 6 | Miami, FL | JV | 447 | 77,751 | 0.2 |
| Midtown Green | Raleigh, NC | WO | 214 | 48,631 | 0.1 |
| Mosaic South End | Charlotte, NC | WO | 269 | 63,306 | 0.2 |
| Mountain Gate | Littleton, CO | WO | 496 | 129,570 | 0.4 |
| Mountain View | Mountain View, CA | JV | 632 | 46,045 | 0.1 |
| One City Place | White Plains, NY | WO | 316 | 155,050 | 0.5 |
| Outlook DTC | Denver, CO | WO | 242 | 70,733 | 0.2 |
| Palisade | San Diego, CA | JV | 300 | 89,421 | 0.3 |
| Parc Station | Hollywood, FL | WO | 336 | 91,472 | 0.3 |
| Park Lane Seaport Residential | Boston, MA | WO | 465 | 274,116 | 0.8 |
| Pasadena Apartments - SPF | Pasadena, CA | JV | 98 | 17,764 | 0.1 |
| Paseo at Winter Park | Winter Park, FL | JV | 204 | 17,617 | 0.1 |

Ownership: WO indicates wholly owned investments and JV indicates joint venture investments. Totals may not sum due to rounding. These examples represent some of the investments of the Fund. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment by the Fund in the future.

**See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

# SPF Residential Investments (cont'd)

## As of June 30, 2019

| Investment Name | Location | Ownership | # Units | NAV (USD 000s) | % of Fund NAV |
|---|---|---|---|---|---|
| Polo Lakes Apartments | Wellington, FL | WO | 366 | 83,449 | 0.3 |
| Promenade Rio Vista | San Diego, CA | JV | 970 | 297,921 | 0.9 |
| Rancho Santa Margarita - SPF | Rancho Santa Margarita, CA | JV | 166 | 18,166 | 0.1 |
| Seacliff - SPF | Huntington Beach, CA | JV | 271 | 39,830 | 0.1 |
| St. Johns Wood Apartments | Reston, VA | WO | 250 | 65,722 | 0.2 |
| Stack House | Seattle, WA | WO | 278 | 93,594 | 0.3 |
| Stevenson Ranch | Stevenson Ranch, CA | JV | 272 | 31,756 | 0.1 |
| Strata | San Francisco, CA | WO | 192 | 154,072 | 0.5 |
| Sunnyvale Town Center - Residential | Sunnyvale, CA | JV | 198 | 195,824 | 0.6 |
| Temecula Phase I & II Apartments - SPF | Temecula, CA | JV | 346 | 34,406 | 0.1 |
| Terra Vista | Rancho Cucamonga, CA | JV | 216 | 25,276 | 0.1 |
| The Cameron | Franklin, TN | WO | 328 | 92,266 | 0.3 |
| The Capitol | New York, NY | WO | 387 | 272,823 | 0.8 |
| The Circle at Hermann Park - Amalfi | Houston, TX | WO | 420 | 41,270 | 0.1 |
| The Circle at Hermann Park - Esplanade | Houston, TX | WO | 375 | 36,320 | 0.1 |
| The Devon Four25 | Raleigh, NC | WO | 261 | 68,324 | 0.2 |
| The District | Washington, DC | WO | 125 | 82,201 | 0.3 |
| The Hub | Brooklyn, NY | JV | 750 | 138,752 | 0.4 |
| The Laurel | Dallas, TX | JV | 159 | 65,588 | 0.2 |
| The Lofts CityCentre | Houston, TX | WO | 250 | 23,887 | 0.1 |
| The Lofts Portfolio | San Diego, CA | WO | 458 | 180,302 | 0.6 |

Ownership: WO indicates wholly owned investments and JV indicates joint venture investments. Totals may not sum due to rounding. These examples represent some of the investments of the Fund. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment by the Fund in the future.

**See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

# SPF Residential Investments (cont'd)

## As of June 30, 2019

| Investment Name | Location | Ownership | # Units | NAV (USD 000s) | % of Fund NAV |
|---|---|---|---|---|---|
| The Louisa | Portland, OR | WO | 242 | 58,595 | 0.2 |
| The Parker | Chicago, IL | JV | 227 | 114,546 | 0.4 |
| The Reserve at 4S Ranch | San Diego, CA | WO | 540 | 204,709 | 0.6 |
| The Wilcox | Seattle, WA | WO | 132 | 60,946 | 0.2 |
| Third and Valley WO | South Orange, NJ | WO | 215 | 81,573 | 0.2 |
| Trinity Bluff | Fort Worth, TX | WO | 304 | 49,272 | 0.2 |
| Trinity District Wholly-Owned | Fort Worth, TX | WO | 256 | 41,903 | 0.1 |
| Tupelo Alley | Portland, OR | WO | 188 | 57,968 | 0.2 |
| Valencia - SPF | Valencia, CA | JV | 226 | 34,005 | 0.1 |
| Van Ness Residential | Boston, MA | JV | 172 | 59,092 | 0.2 |
| Vantage | Jersey City, NJ | JV | 448 | 143,962 | 0.4 |
| Venue | San Francisco, CA | WO | 147 | 116,215 | 0.4 |
| Via Las Colinas | Irving, TX | WO | 784 | 146,531 | 0.4 |
| Viridian | Greenwood Village, CO | WO | 420 | 113,229 | 0.3 |
| Washington Place Phase I | Newton, MA | JV | 140 | 26,875 | 0.1 |
| **TOTAL Residential (78 PROJECTS)** | | | **25,746 units** | **6,866,749** | **21.0** |

Ownership: WO indicates wholly owned investments and JV indicates joint venture investments. Totals may not sum due to rounding. These examples represent some of the investments of the Fund. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment by the Fund in the future. **See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

# SPF Land Investments

## As of June 30, 2019

| Investment Name | Location | Ownership | Acres | NAV (USD 000s) | % of Fund NAV |
|---|---|---|---|---|---|
| Downtown Doral | Doral, FL | WO | 7 | 6,510 | 0.0 |
| Lincoln Yards | Chicago, IL | JV | 27 | 159,508 | 0.5 |
| Sunnyvale Town Center - Land | Sunnyvale, CA | JV | 14 | 45,507 | 0.1 |
| **TOTAL Land (3 PROJECTS)** | | | **48 acres** | **211,525** | **0.6** |

Ownership: WO indicates wholly owned investments and JV indicates joint venture investments. Totals may not sum due to rounding. These examples represent some of the investments of the Fund. However, you should not assume that these types of investments will be available to or, if available, will be selected for investment by the Fund in the future. **See important disclosures, including with respect to certain existing investments of SPF in which investors in FIVs 2-5 will not participate, and the impact to the FIVs of differing levels of expenses and taxes inherent in their investment structures, on the private placement risk disclosure page(s).**

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# Appendix – Biographies of key professionals

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# J.P. Morgan Asset Management – Real Estate Americas

**Kevin Faxon**, *Managing Director*, is Chairman of Real Estate Americas at J.P. Morgan Asset Management. He is responsible for strategic initiatives and oversight of the 250 person group that manages more than $65 billion of assets across a range of Core, Mid-risk and Opportunistic strategies on behalf of institutional, sovereign and high net worth investors. Kevin is a member of JPMAM Americas Executive Committee and sits on the J.P. Morgan Commercial Real Estate Council which coordinates the Real Estate activities of the broader Firm. An employee since 1988, Kevin was previously portfolio manager of the Special Situation Property and Income & Growth Funds. Prior to assuming these roles, Kevin was head of acquisitions for the western United States. Before joining the firm, he was employed by Landauer Associates, a national real estate consulting firm. Kevin holds a B.S. in real estate and finance from the University of Connecticut and an M.B.A. in finance from New York University. He is on the Board of Directors of PREA, serves on the board of The Real Estate Roundtable and is an Urban Land Institute Foundation Trustee and Governor.

**Mike Kelly**, Managing Director, is Head of Real Estate Americas at J.P. Morgan Asset Management and leads the 250 person group that manages more than $65 billion of assets across a range of Core, Mid-risk and Opportunistic strategies on behalf of institutional, sovereign and high net worth investors. Previously, Mike was Head of Portfolio Management, Real Estate Americas, and was responsible for oversight of the portfolio managers for U.S. real estate funds and separate accounts. Mike chairs the Real Estate Americas Management Committee and is a member of the USRE Oversight Committee. An employee since 2009, Mike also serves on the Board of Directors for two of Real Estate Americas' entity level investments. Before joining the firm, he was a director and head of Real Estate Conduit and Workouts for Citigroup Global Markets. Previously, Michael was a vice president and originator in the Large Loan CMBS Group and assisted with management of Goldman Sachs Commercial Mortgage Capital. Earlier in his career, he was a managing director and co-head of Commercial Mortgage Origination at New York Life Investment Management. He started in the industry in 1989. Mike earned a B.S. in business management from Springfield College and an M.S. in real estate from New York University and holds Series 3, 7 and 63 licenses.

**Douglas A. Schwartz,** *Managing Director*, is Chief Investment Officer, Real Estate Americas at J.P. Morgan Asset Management, responsible for all transactions and asset management on the platform. Doug is a voting member of the Investment Committee and sits on the America's Management Committee as well as the Risk and Oversight Committee. He is also a member of the Board of Directors of Carr Properties. Previously, Doug was portfolio manager of JPMCB Special Situation Property Fund, an open-end, value added real estate fund. Prior to this role, he was head of real estate acquisitions for the West Coast with responsibility for sourcing, underwriting and closing office, industrial, retail and multi-family transactions for all of J.P. Morgan's U.S. real estate funds. His 23 years in the industry have included roles in transactions, asset management, development management, research, risk management, and capital-raising. Prior to joining the firm in 2004, he held real estate investment roles with Lowe Enterprises, Bristol Group and Sedway & Associates. Doug earned his B.A. in mathematics from the University of Pennsylvania and an M.B.A. from the University of California, Los Angeles. Doug is a ULI IOPC chair.

**Ann Cole**, *Managing Director*, is Global Head of Real Estate Client Strategy for J.P. Morgan Asset Management and leads a global team of investment specialists focused on advising clients on real estate strategies and execution across regions, risk levels, equity, debt and defined contribution. Ann sits on the Real Estate Americas Management Committee. Previously, Ann was Co-Portfolio Manager for J.P. Morgan's flagship U.S. core real estate strategy, Strategic Property Fund. Since joining J.P. Morgan Asset Management in 1989, Ann has held various positions in our Real Estate Asset Management team including Sector Head of our office/industrial East and West Regions. Ann has extensive real estate experience with the acquisition, asset management, development and disposition of institutional quality real estate and was responsible for overseeing the development of Strategic Property Fund's 2000 Avenue of the Stars in Los Angeles. Ann also served as a Client Portfolio Manager on the Marketing and Client Strategy team, where she advised clients on real estate investment strategies. Ann has a B.B.A. in accounting from Pace University and passed the March 1987 CPA examination. Ann holds the Series 7 and 63 licenses.

# J.P. Morgan Asset Management – Real Estate Americas

**Kimberly A. Adams,** *Managing Director*, is the Senior Portfolio Manager for J.P. Morgan's flagship U.S. core real estate strategy, Strategic Property Fund. She is responsible for managing all aspects of the portfolio's investments and strategy. Kim joined the Strategic Property Fund portfolio management team in July 2012. She is a member of the Investment Committee and US RE Management Committee. Since joining J.P. Morgan Asset Management – Real Estate Americas in 2003, Kim has served in various investment roles including Sector Head for office/industrial asset management in the Central region, senior asset manager in the retail and East/South region, and as an acquisitions officer in the Midwest. Earlier in her career, Kim worked for Prudential Real Estate Investors and LaSalle Investment Management. Kim received a B.A. in economics from Northwestern University and an M.B.A. from the Kellogg Graduate School of Management. She serves as a council member for the Urban Land Institute, and a member of PREA.

**Sue Kolasa, CFA**, *Managing Director*, is a Portfolio Manager for Strategic Property Fund, J.P. Morgan Asset Management's flagship core real estate fund. She is involved in all aspects of managing the portfolio's investments and strategy. She is a member of the Real Estate Americas Management Committee. An employee since 2000, Sue brings a deep knowledge of portfolio construction due to her nine years leading portfolio analytics for open-end real estate funds. Sue was Head of Real Estate Americas' retirement business with responsibility for JPMorgan's private real estate strategies for defined contribution programs, portfolios she designed and oversaw since inception. Sue serves on the board of the IPD PREA U.S. Property Fund Index, a group that establishes and monitors a suite of open-end fund indices. Sue received a B.B.A. in accounting from the College of William and Mary and holds Series 7 and 63 licenses. She is a CFA charterholder.

**Steven Zaun**, *Managing Director*, is a Portfolio Manager for Strategic Property Fund, J.P. Morgan Asset Management's flagship core real estate fund. He is involved in all aspects of managing the portfolio's investments and strategy. Previously, Steve was Head of the West Coast Office/Industrial Asset Management team and responsible for all aspects of office and industrial Asset Management, including property management, leasing and development for J.P. Morgan Asset Management - Real Estate Americas. Steven joined the Asset Management team in 2000, initially based out of the New York office. In 2004, he relocated to Los Angeles to help establish the West Coast Asset Management presence. Since that time, Steven has worked on many of the platform's highest profile Office and Industrial assets in the West region. Steven obtained a B.A. in Finance from Boston College and is a CFA charterholder.

**Nancy E. Brown,** *Managing Director*, is the U.S. Real Estate Income and Growth Fund portfolio manager for Real Estate Americas at J.P. Morgan Asset Management. Prior to joining the firm in 2001, Nancy worked at The O'Connor Group where her primary responsibilities included acquisitions for the firm's various opportunity funds. Before that, she worked within the Real Estate Investment Banking Group of Bankers Trust Securities Corporation. Nancy has been in the industry since 1985. She received a B.A. from Brown University and an M.B.A. from the J.L. Kellogg Graduate School of Management of Northwestern University. She holds Series 3, 7, and 63 licenses.

**Benjamin G. Gifford,** *Managing Director,* is Chairman of Real Estate Americas Investment Committee at J.P. Morgan Asset Management – Real Estate Americas. Ben is responsible for governing the Investment Committee proceedings. An employee since 1998, Ben is the former CIO, Real Estate Americas, and, in that role, was responsible for the direct real estate investment activity of the commingled funds and all separate accounts. Prior to joining the firm, he was president of O'Connor Realty Advisors, where he was responsible for the separate account direct investment real estate advisory business. He was also employed at the Morgan Guaranty Trust Company, where he was responsible for real estate equity investments on behalf of its commingled trust fund and separate accounts. Prior to that, he was employed by the Teachers Insurance and Annuity Association (TIAA) as a mortgage officer. Ben holds a B.A. from the University of Pennsylvania and his professional affiliations include the Urban Land Institute, the International Council of Shopping Centers and the Pension Real Estate Association.

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# J.P. Morgan Asset Management – Real Estate Americas

**Dave Esrig, CFA**, *Managing Director*, is J.P. Morgan Asset Management's Director of Research and Data Science for Real Estate Americas. Dave is also a member of the Real Estate Americas Management Committee and voting member of the Infrastructure Investments Committee. An employee since 1997, Dave and his team forecast local economic and property performance used in real estate acquisitions and dispositions underwriting. He or a member of his team accounts for one of four unanimous votes required for all property acquisitions and dispositions. Additionally, the research team develops new investment strategies for existing as well as new funds. Dave designed, founded and launched JPMAM's industry-leading suite of defined contribution direct property funds. He also leads the Real Estate Americas' effort to generate investment insights from the firm's proprietary data. Dave holds a B.A. from the University of Virginia and an M.A. in economics from the University of Pennsylvania.

**Mark Bonapace**, *Managing Director*, is the head of Asset Management for the JPMorgan Real Estate Group, responsible for the management, leasing and ongoing development of the real estate assets. An employee since 1990, Mark has held several positions within the group. Prior to his role as head of Asset Management, Mark was the sector head for Office/Industrial East/South within the Real Estate Group. Mark has also been the Office/Industrial sector head for the Central region and was a Senior Asset Manager for our Retail portfolio. Mark previously worked at Deloitte & Touche for four years. He holds a B.S. in accounting from the University of Delaware and an M.B.A. in finance from New York University's Stern School of Business. Mark is also a Certified Public Accountant and an active member of the Urban Land Institute.

**James F. Kennedy**, *Managing Director*, is the head of the Development & Engineering Group, Global Real Estate, at J.P. Morgan Asset Management. An employee since 2004, he is responsible for engineering and environmental due diligence, development oversight and general engineering support. Jim is involved with the various real estate and infrastructure funds internationally, and provides leadership in the group's sustainability initiatives. Prior to joining J.P. Morgan Jim served in various roles across the development, construction and business consulting fields. His experience ranges across asset types, including office, industrial, retail, multi-family, hospitality and large-scale civil infrastructure. Jim received a B.B.A. in finance from the University of Massachusetts at Amherst and an M.S. in civil and environmental engineering from the Massachusetts Institute of Technology. He is a member of the American Society of Civil Engineers, National Association of Real Estate Investment Managers, Urban Land Institute and International Council of Shopping Centers. Jim is a USGBC-LEED Accredited Professional.

**Steven M. Greenspan**, *Managing Director*, is the Global Director of Product Development for J.P. Morgan Asset Management - Global Real Estate, Asian Infrastructure and Global Transport Groups. Steven plays an integral role in the design, marketing, launch, implementation and oversight of our global products and strategies. A J.P. Morgan employee since 1996, Steven has broad experience in structuring open- and closed-end funds, separate accounts and other investment vehicles designed to meet the complex commercial, legal, regulatory, and tax needs of JPMAM's global client base. He is a member of JPMAM - Alternatives Operating Committee and the investment committees and boards of various real estate, infrastructure and transport funds. He previously served as a vice president/assistant general counsel in JPMAM's Legal Department, and as a practicing attorney in the real estate and corporate departments at Stroock & Stroock & Lavan LLP. Steven holds a B.P.S. from the University at Buffalo and a J.D. from Brooklyn Law School.

**William C. Schultz**, *Managing Director*, is Chief Operating Officer of Real Estate Americas for J.P. Morgan Asset Management. An employee since 2002, he is responsible for development and execution of the business plan, strategic initiatives and operational management of the Americas real estate business. Bill is a member of the Real Estate Americas Management Committee. He is also a board member of the JPMorgan Alternative Property Fund and a past board member of the JPMorgan US Real Estate Income and Growth Fund. His prior responsibilities within Real Estate Americas include managing the platform's expansion into Europe and Asia and roles as the Global Head of Technology, India Services and Product Delivery. Prior to joining the firm, Bill was a business process engineering and technology consultant, providing automation solutions to Fortune 500 companies globally. He holds a B.A. in economics from Glassboro State College.

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# J.P. Morgan Asset Management – Real Estate Americas

**Alfred W. Dort**, *Managing Director*, is head of the Global Real Estate Financial Group at J.P. Morgan Asset Management. An employee since 1997, he manages a team of professionals that provide dedicated support to the real estate and transportation teams in New York, Los Angeles, London, Luxembourg, Mumbai, Hong Kong and Singapore. His responsibilities include all aspects of financial management, tax, reporting and analysis for all of the platforms open- and closed-end funds and separate accounts. He serves on the boards of directors of several real estate funds and is a non-voting member of the Real Estate Americas Investment Committee. Prior to joining the firm, Alfred spent several years with PricewaterhouseCoopers LLP, providing consulting and accounting services to real estate industry clients. He earned a B.S. in accountancy from Villanova University and is a Certified Public Accountant. He is currently a member of the American Institute of Certified Public Accountants and the New York State Society of Certified Public Accountants.

**Cassandra Clark**, *Managing Director*, heads the Real Estate Americas Debt Capital Markets Group at J.P. Morgan Asset Management. An employee of J.P. Morgan since 2002, she is responsible for debt procurement and mezzanine loan valuation for the domestic platform. During her time in Real Estate Americas, she has closed over USD12Bn of transactions. Prior to joining the group, Cassandra was a Vice President within J.P. Morgan's Commercial Bank focusing on Investor Real Estate loan origination for the bank's high new worth clients. Cassandra began her career as a credit analyst in the Commercial Bank's Asset Based Lending Group. Cassandra serves on the Boards of Alpha Sigma Nu, the honor society of Jesuit institutions of higher education, and Choices in Childbirth. Cassandra graduated magna cum laude with a B.A. in Economics and Psychology from the College of the Holy Cross.

**Ruchi Pathela**, *Executive Director*, is the Director of Valuations at J.P. Morgan Asset Management - Global Real Assets. Active in the real estate industry since 1998, Ruchi has experience in valuations, acquisitions, asset/portfolio management, underwriting, and private equity. Prior to joining J.P. Morgan in 2017, she was a Director at Altus Group where she oversaw the appraisal management client relationship on-site at J.P. Morgan for four years. She is a respected veteran in the industry with diverse experience, and has held positions at RREEF/Deutsche Bank Real Estate, Bear Stearns, and PricewaterhouseCoopers. Ruchi earned an M.S. in Real Estate Development from Columbia University and a B.S. in Architecture from The Georgia Institute of Technology. She carries the Counselor of Real Estate (CRE) and Fellow of the Royal Institution of Chartered Surveyors (FRICS) designations.

**Angeline Leong-Sit**, *Executive Director*, is a member of the Real Estate Americas client relations team at J.P. Morgan Asset Management. An employee since 2000, she is responsible for servicing real estate client portfolios with a focus on U.S. core plus and India strategies. Previously, Angeline was the product specialist on US and global real estate securities strategies. Prior to that, she worked in the client portfolio management team in the Institutional U.S. Large Cap Equity team, primarily focused on REIT and Active Equity strategies. Angeline holds a Bachelor of Commerce from the University of British Columbia. She is a Series 7 and 63 registered representative.

**Brian Nottage**, *Managing Director,* is Head of Portfolio Strategy and Separate Accounts for J.P. Morgan Asset Management's Real Estate Americas group. In this Portfolio Strategy role, he oversees fund strategy, positioning and analytics for both the comingled funds and separately managed accounts. He has with direct management responsibilities for the separate account portfolio management team, and he leads the co-investments program. He is also the lead portfolio manager for REA's Opportunity Zone Fund Series. Before joining the firm in 2005, he was a vice president and econometrician at GMAC Commercial Mortgage, where he helped develop market commercial mortgage risk products. Prior to that, Brian was a director at Moody's Economy.com, where he provided U.S. macro, industry and regional economic analysis. Brian holds a Ph.D. in economics from Florida State University and is a CFA charterholder.

# J.P. Morgan Asset Management – Real Estate Americas

**Lawrence Fuchs**, *Managing Director,* is the Head of Finance and Business Management, Global Alternatives, at J.P. Morgan Asset Management. An employee since 2000, he is responsible for driving strategy and operations around new business initiatives, governance, risk management, financial planning, and people initiatives. Lawrence is a member of the Global Alternatives Management Committee and serves on the investment committees and boards of directors of various real estate, infrastructure and maritime funds. Prior to joining the group, he was the director of operations for the Emerging Markets U.S. division of J.P. Morgan Securities, Inc. From 1998 to 2000, he was a member of the Emerging Markets Trading Association, providing insight for emerging markets operational risk and business practices. Lawrence registered as a General Securities Principal of J.P. Morgan Institutional Investments, Inc. He holds a B.B.A. in finance from Hofstra University.

**Pulkit Sharma**, *Managing Director,* is the head of the Investment Strategy and Solutions team within the Alternatives Solutions Group and leads Real Assets and Alternatives Portfolio Construction for J.P. Morgan's $130B+ Global Alternatives Business. Pulkit works with institutional investors such as global pension plans, sovereign wealth funds, and insurance companies to design, implement, and manage global real assets/alternatives investment solutions that are customized to meet their long-term investment objectives. His portfolio construction work spans geographies, the risk-return spectrum, and investment strategies such as global real estate, infrastructure, transport and other alternatives. Prior to joining J.P. Morgan, he worked in the Middle East and Asia on project management and real estate development for Laing O'Rourke. Pulkit is a member of the International Real Estate Affinity Council of the Pension Real Estate Association (PREA) and a member of the Global Exchange Council of the Urban Land Institute (ULI). Pulkit is a CFA charterholder, CAIA charterholder, LEED accredited professional, and holds FINRA Series 3, 7, and 63 licenses. He holds a B.E. in Civil Engineering from the Delhi College of Engineering and an M.S. in Real Estate Finance and Development from the Massachusetts Institute of Technology.

**Ravi Sharma**, *Managing Director,* is the Global Head of Client Relations within J.P. Morgan Asset Management – Alternatives. Ravi has over 19 years of experience in client and product management. Ravi and his team are responsible for managing and executing on all client service activities across institutional, sovereign and high net worth investors. Previously, he was the head of the Product Delivery Team in Global Real Assets, responsible for managing the build-out of all key processes and functions for all New Product Implementations. Prior to 2007, Ravi was with Deloitte & Touche and the Bank of New York Mellon. Ravi began his career at J.P. Morgan as an analyst in the Leadership Management Development Program. He holds a B.S. in finance and marketing from the State University of Albany.

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# Appendix – Important Risk and Disclaimers

# Strategic Property Fund Composite
# January 1, 2008 to December 31, 2017

## Annual returns, USD

| | | | | | | | | | As of December 31 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Income (%) | Appreciation (%) | Gross Return (%) | Net Return (%) | Benchmark Return (%) | Composite 3yr St Dev (%) | Benchmark 3yr St Dev (%) | Internal Dispersion (%) | Number of Accounts | Composite Assets ($ millions) | % of Real Estate Assets (%) | Total Firm Assets ($ billions) |
| 2017 | 4.20 | 2.89 | 7.20 | 6.14 | 7.62 | 1.30 | 0.88 | n/a | ≤ 5 | 41,595 | 38.69 | 1,165 |
| 2016 | 4.44 | 3.79 | 8.38 | 7.31 | 8.77 | 1.28 | 0.72 | n/a | ≤ 5 | 41,230 | 42.72 | 1,068 |
| 2015 | 4.87 | 9.93 | 15.24 | 14.10 | 15.01 | 1.36 | 0.46 | n/a | ≤ 5 | 39,655 | 44.20 | 834 |
| 2014 | 5.18 | 5.70 | 11.14 | 10.04 | 12.49 | 1.35 | 0.49 | n/a | ≤ 5 | 34,441 | 41.83 | 845 |
| 2013 | 5.25 | 10.16 | 15.90 | 14.76 | 13.94 | 1.44 | 0.75 | n/a | ≤ 5 | 27,665 | 38.28 | 775 |
| 2012 | 5.26 | 6.54 | 12.12 | 11.02 | 10.94 | 2.05 | 1.45 | n/a | ≤ 5 | 24,450 | 37.79 | 701 |
| 2011 | 5.47 | 9.98 | 15.96 | 14.82 | 15.99 | 9.18 | 7.47 | n/a | ≤ 5 | 21,322 | 35.60 | 657 |
| 2010 | 6.61 | 7.11 | 14.15 | 13.03 | 16.36 | 9.35 | 7.49 | n/a | ≤ 5 | 17,868 | 36.24 | 621 |
| 2009 | 6.13 | (30.92) | (26.55) | (27.30) | (29.76) | 9.46 | 7.39 | n/a | ≤ 5 | 14,821 | 33.54 | 617 |
| 2008 | 4.97 | (12.49) | (8.09) | (9.01) | (10.01) | 5.24 | 4.98 | n/a | ≤ 5 | 18,741 | 37.12 | 575 |

J.P. Morgan Investment Management Inc. claims compliance with the Global Investment Performance Standards (GIPS®) and has prepared and presented this report in compliance with the GIPS standards. J.P. Morgan Investment Management Inc. has been independently verified for the period from 2001-2017. The verification report is available upon request.

Verification assesses whether (1) the firm has complied with all the composite construction requirements of the GIPS standards on a firm-wide basis and (2) the firm's policies and procedures are designed to calculate and present performance in compliance with the GIPS standards. Verification does not ensure the accuracy of any specific composite presentation.

1. J.P. Morgan Investment Management Inc. (JPMIM or the Firm) consists of the assets of institutional clients invested in US managed products including 1) the fixed income and cash assets formerly part of Chase Asset Management and MDSass&Chase Partners, 2) the New York institutional investment division of JPMorgan Chase Bank, N.A., formerly Morgan Guaranty Trust Company of New York, and 3) the institutional investment assets of JPMorgan Investment Advisors, Inc. (JPMIA), formerly known as Banc One Investment Advisors Corporation (BOIA), the advisor to institutional assets directly managed by JPMIA or sub-advised by an affiliate institution, and 4) the institutional assets of Bear Stearns Asset Management Inc. The Firm also includes Separately Managed Accounts over which JPMIM has full and sole discretion. JPMIM is marketed under JPMorgan Asset Management.

2. The composite contains a single account which is the commingled fund that is directly invested according to JPMIM's Strategic Property Fund strategy. The strategy is an actively managed diversified, core, open-end commingled pension trust fund. It seeks to generate an income-driven rate of return and outperform the NCREIF Fund Index – Open End Diversified Core Equity (NFI-ODCE) through asset, geographic and sector selection and active asset management. The Fund invests in high-quality stabilized assets with dominant competitive characteristics in markets with attractive demographics throughout the United States. The composite was created in December 2000.

3. Equity futures are occasionally used in accordance with client-authorized account objectives and guidelines in order to equitize large cash contributions and to minimize market impact while purchasing individual equity securities.

4. Both gross and net returns reflect the reinvestment of income, deduction of transaction costs, and are net of withholding taxes where applicable and include the effect of leverage, which averaged 24.6% of asset value in the year 2017. All returns are expressed in U.S. dollars. Gross returns do not reflect the deduction of investment advisory fees or any other expenses that may be incurred in the management of the account. The sum of the income and appreciation returns will not equal the total gross return due to the effect of compounding.

The Net-of-fees returns are calculated by deducting 1/4 of the model management fee ("model fee") from the gross composite return on quarterly basis. The model fee is either the highest tier of schedule in effect for the period, or a higher value, whichever is required to ensure the model composite net of fee return is lower than or equal to the composite net of fee return calculated using actual fees. As of December 31, 2017, the standard annual fee schedule is as follows: For investors with Fund NAV below $100 million: 1.00% of the participant's pro-rata share of the net asset value of JPMCB Strategic Property Fund, except that the fee will only be 0.15% with respect to the market value of cash and cash equivalents in SPF in excess of a 5% reserve position for cash and cash equivalents. For investors that maintain Fund NAV of $100 million or more: 0.92% of the participant's pro-rata share of the net asset value of JPMCB Strategic Property Fund on the first $100 million of NAV, 0.85% per annum on the next $150 million of NAV, 0.80% per annum on the next $250 million of NAV, and 0.75% on amounts of NAV thereafter; except that the fee will only be 0.15% with respect to the market value of cash and cash equivalents in SPF in excess of a 5.0% reserve position for cash and cash equivalents. Actual advisory fees charged and actual account minimum size may vary by account due to various conditions described in Part IIA of Form ADV

5. The firm's list of composite descriptions and the policies for valuing portfolios, calculating performance and preparing compliant presentations are available upon request.

6. Effective July 1, 2013, the Fund has changed its benchmark from the NCREIF Property Index (NPI) to the NCREIF Fund Index – Open End Diversified Core Equity (NFI-ODCE). As a capitalization-weighted index of U.S. open-end core direct real estate funds with returns based on changes in the published market value of net assets of its constituents, the NFI-ODCE provides a more meaningful peer-to-peer comparison than the NPI, a market-value weighted index of unleveraged property returns for the investment-grade U.S. real estate market. Released in 2005, the NFI-ODCE was not available for use as a benchmark at the Fund's inception January 1, 1998. We have made the decision to switch the Fund's benchmark to the NFI-ODCE as the index is now more widely used in the industry as a gauge of performance of the overall institutional-quality U.S. real estate marketplace.

7. The three-year annualized standard deviation measures the variability of the composite and the benchmark returns over the preceding 36-month period.

8. The internal dispersion of annual returns is measured by the asset-weighted standard deviation of gross account returns included in the composite for the full year. For periods with 5 or fewer accounts included for the entire year, internal dispersion is not presented (n/a) as it is not considered meaningful.

9. Past performance is no guarantee of future results. As with any investment vehicle, there is always the potential for gains as well as the possibility of losses.

10. In January 2019, the 2014 Appreciation was changed from 7.70 to 5.70 to capture accurate figure.

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# Private Placement Risk Disclosures

The information attached hereto and included herein (and any related information, whether or not referenced therein; collectively, the "Information") has been provided to you at your request, is for informational purposes only and does not constitute an offer or solicitation with respect to the purchase or sale of any investment. The Information should not be assumed to be accurate or complete as of the date of receipt, is subject to change without notice and may have changed (possibly materially) following the date as of which such information was provided or the date of receipt of the Information. The Information is not intended to provide and should not be relied on for accounting or tax advice.

Prior to making an investment in the Strategic Property Fund (including each fund investor vehicle and their subsidiaries; collectively, the "Fund"), prospective investors should obtain a copy of the Confidential Private Placement Memorandum of the Fund (the "Memorandum"), the applicable subscription agreement or the participation agreement, any relevant constituent document and related documents in relation to a fund investor vehicle, which together contain important forms of agreements and other documents relating to the Fund and the offering of the units in the relevant fund investor vehicle in which they intend to invest. Prospective investors must conduct their own investigation and analysis, and make their own assessment, of the private placement independently and without reliance on JPMorgan Chase & Co., and its subsidiaries and affiliates ("JPMC") or the Fund. In addition, prospective investors are strongly urged to consult their own legal counsel and financial, accounting, regulatory and tax advisers regarding the implications for them of investing in the Fund and the legal requirements and tax consequences within the countries of their citizenship, residence, domicile and place of business with respect to the acquisition, holding or disposal of units and any foreign exchange restrictions that may be relevant thereto. No assurance, representation or warranty is made by any person that the Fund's investment objectives or strategies will be achieved or that JPMC's aims, assumptions, expectations and/or goals will be achieved. The Information may not be relied upon as a guarantee, promise, assurance or representation as to the future. Nothing contained in the Information constitutes investment advice. If there are any conflicts between the contents of the Information and the Memorandum, the information contained in the Memorandum shall prevail. Any investment in the Fund may be made in reliance on the Memorandum only.

Past performance is not a reliable indicator of current and future results. Returns will fluctuate and an investment upon redemption may be worth more or less than its original value. Investors should not assume that similar types of investment activity will be available, or if available, will be selected by the Fund. All of the performance and other figures presented in the Information are subject to adjustment.

Past performance of real estate funds are not indicative of the performance of the real estate market as a whole and the value of real property generally will be a matter of a valuer's opinion rather than fact. The value of a property may be significantly diminished in the event of a downturn in the real estate market. Real estate investments are subject to many factors including adverse changes in economic conditions, adverse local market conditions and risks associated with the acquisition, financing and ownership and operation and disposal or lack of liquidity of real property. Since the Fund anticipates a significant portion of its income will come, directly or indirectly, from rental income from real estate, the Fund's financial position thus will depend indirectly on the success of the businesses operated by the tenants of the Fund's properties. The Fund may impose limits on the number of redemptions and may provide for deferrals or suspension in particular circumstances for a given period of time.

***IMPORTANT PERFORMANCE DISCLOSURE:***
***Investors should note that the investment returns of the fund investor vehicles are likely to vary among one another as a result of the use by the fund investor vehicles of differing investment structures and tax strategies in relation to their investments. In certain circumstances, the variation in returns between the fund investor vehicles may be material.***

***One of the legacy investments owned by The Commingled Pension Trust Fund (Strategic Property) of JPMorgan Chase Bank, N.A. ("JPMCB SPF") (which forms a part of the Fund) (collectively, the "Legacy Investments") is not expected to be transferred to the Fund, in whole or in part, and will remain owned, in whole or in part, by JPMCB SPF because, among other reasons, such Legacy Investment is anticipated to be sold in 2019, such Legacy Investment would not satisfy applicable real estate investment trust requirements, or the transfer of such Legacy Investment requires the consent of a third-party, which has either not been obtained or the third-party has not waived its consent rights (the "Retained Legacy Investments"). In the event the Legacy Investment is not transferred to the Fund on or before June 30, 2019 such Legacy Investment will become a Retained Legacy Investment and is not expected to be transferred to the Fund. JPMC currently anticipates that the value of the Retained Legacy Investments will constitute less than 1% of SPF's net asset value as of December 31, 2018. As a result, the performance information regarding the Retained Legacy Investments included in the Information and the overall performance information regarding JPMCB SPF will not be applicable to you as an investor in the Fund through any vehicle other than JPMCB SPF due to the fact that the Retained Legacy Investments will not be transferred to the Fund. Consequently, prospective investors should not rely on this information when making a decision to invest in the Fund.***

***The net asset value per unit of each fund investor vehicle is expected to differ because each fund investor vehicle is likely to incur or otherwise be subject to different levels of expenses and taxes through its investment structure. The taxes and expenses of a fund investor vehicle may be greater than those of SPF, which, accordingly, may result in lower returns to investors of any such fund investor vehicle.***

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# Important Commingled Fund Investor Disclosures

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# Investment Risk Disclosures

Leverage. Certain of the Fund's investments may be leveraged, which may adversely affect income earned by the Fund or may result in a loss of principal. The use of leverage creates an opportunity for increased net income, but at the same time involves a high degree of financial risk and may increase the exposure of the Fund or its investments to factors such as rising interest rates, downturns in the economy or deterioration in the condition of the investment collateral. The Fund may be unable to secure attractive financing as market fluctuations may significantly decrease the availability and increase the cost of leverage. Principal and interest payments on any leverage will be payable regardless of whether the Fund has sufficient cash available. Senior lenders would be entitled to a preferred cash flow prior to the Fund's entitlement to payment on its Investment.

**Property Funds:** Past performance of property funds are not indicative of the performance of the property market as a whole and the value of real property will generally be a matter of a Valuer's opinion rather than fact. The value of a property may be significantly diminished in the event of a downturn in the property market. Property investments are subject to many factors including adverse changes in economic conditions, adverse local market conditions and risks associated with the acquisition, financing and ownership and operation and disposal of real property. Property funds may impose limits on the number of redemptions and may provide for deferrals or suspension in particular circumstances for a given period of time.

The target returns discussed herein have been established as of the date of this presentation. The target returns have been established by each investment adviser based on its assumptions and calculations using data available to it and available investment opportunities and is subject to the risks set forth herein and set forth more fully in the applicable Fund's Declaration of Trust. A more detailed explanation along with the data supporting the target returns is on file with the applicable investment adviser and is available for inspection upon request. The target returns are for illustration/discussion purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns similar to the target returns shown above. The target returns are the investment advisor's estimate based on the investment adviser's assumptions, as well as past and current market conditions, which are subject to change. Each investment adviser has the discretion to change the target returns for the Fund at any time. Because of the inherent limitations of the target returns, potential investors should not rely on them when making a decision on whether or not to invest in any Fund. The target returns cannot account for the impact that economic and market factors have on the implementation of an actual investment program. Unlike actual performance, the target returns do not reflect actual trading, liquidity constraints, fees, expenses, and other factors that could impact the future returns of a Fund. Any investment adviser's ability to achieve the target returns is subject to risk factors over which such investment adviser may have no or limited control. No representation is made that a Fund will achieve the target return or its investment objective. Actual returns could be higher or lower than the target returns. The data supporting the Target Return is on file with J.P. Morgan and is available for inspection upon request.

The deduction of an advisory fee reduces an investor's return. Actual account performance will vary depending on individual portfolio security selection and the applicable fee schedule. Fees are available upon request.

The following is an example of the effect of compounded advisory fees over a period of time on the value of a client's portfolio: A portfolio with a beginning value of USD100mm, gaining an annual return of 10% per annum would grow to USD259mm after 10 years, assuming no fees have been paid out. Conversely, a portfolio with a beginning value of USD100mm, gaining an annual return of 10% per annum, but paying a fee of 1% per annum, would only grow to USD235mm after 10 years. The annualized returns over the 10 year time period are 10.00% (gross of fees) and 8.91% (net of fees). If the fee in the above example was 0.25% per annum, the portfolio would grow to USD253mm after 10 years and return 9.73% net of fees. The fees were calculated on a monthly basis, which shows the maximum effect of compounding.

All case studies are shown for illustrative purposes only and should not be relied upon as advice or interpreted as a recommendation. They are based on current market conditions that constitute our judgment and are subject to change. Results shown are not meant to be representative of actual investment results. Past performance is not necessarily indicative of the likely future performance of an investment.

Any investments mentioned throughout the presentation are shown for illustrative purposes only and should not be interpreted as recommendations to buy or sell. A full list of firm recommendations for the past year is available upon request.

JPMorgan Chase & Co. and its affiliates do not provide tax advice. Accordingly, any discussion of U.S. tax matters contained herein (including any attachments) is not intended or written to be used, and cannot be used, in connection with the promotion, marketing or commendation by anyone unaffiliated with JPMorgan Chase & Co. of any of the matters addressed herein or for the purpose of avoiding U.S. tax-related penalties.

# Investment Risk Disclosures (cont.)

The following summarizes certain key risk factors. Please see the Fund's Confidential Private Placement Memorandum for a more detailed discussion of these and other risks.

General. An investment in the Fund involves significant risk. There can be no assurance that the Fund's return objectives will be realized or that there will be any return of capital. An investor could lose all of its investment.

Illiquidity and restrictions on transfer and withdrawal. Interests in a Fund Investor Vehicle are generally not transferable except with the consent of the relevant General Partner, Board of Directors or other body managing the applicable Fund Investor Vehicle, which consent may be withheld in their sole discretion. Investors may not withdraw capital from the Fund Investor Vehicle in which they have invested. Although Investors will have the ability on a quarterly basis to request the repurchase of some or all of their Interests, any such repurchases will only be made in the discretion of the relevant General Partner, Board of Directors or other body managing the applicable Fund Investor Vehicle in consultation with J.P. Morgan Investment Management, Inc., and there can be no assurance that either will exercise their discretion to repurchase Interests at any time. The Interests may not be resold, transferred or otherwise disposed of by Investors except in compliance with applicable securities laws and the transfer restrictions contained in the respective Charter Documents.

Risks associated with real estate investments. An investment in the Fund is subject to certain risks associated with the ownership of real estate and the real estate industry in general. These risks include, among others, possible declines in the value of real estate; risks related to general and local economic conditions; possible lack of availability of mortgage funds; overbuilding; extended vacancies of properties; increases in competition; property taxes and transaction, operating and foreclosure expenses; legal fees and expenses incurred to protect the Fund's investments; changes in zoning laws; costs resulting from the clean up of, and liability to third parties for damages resulting from, environmental problems; casualty or condemnation losses; uninsured damages from floods, earthquakes or other natural disasters; limitations on and variations in rents; and changes in interest rates. To the extent that assets underlying the investments are concentrated geographically, by property type or in certain other respects, the Fund may be subject to certain of the foregoing risks to a greater extent.

Dependence on Investment Adviser. Most of the investment decisions with respect to the Fund will be made by the Investment Adviser. The success of the Fund depends significantly on the Investment Adviser's ability to identify, select, manage and dispose of appropriate investments. There is no guarantee that suitable investments will be available or that investments will be successful.

Leverage. Certain of the Fund's investments may be leveraged, which may adversely affect income earned by the Fund or may result in a loss of principal. The use of leverage creates an opportunity for increased net income, but at the same time involves a high degree of financial risk and may increase the exposure of the Fund or its investments to factors such as rising interest rates, downturns in the economy or deterioration in the condition of the investment collateral. The Fund may be unable to secure attractive financing as market fluctuations may significantly decrease the availability and increase the cost of leverage. Principal and interest payments on any leverage will be payable regardless of whether the Fund has sufficient cash available. Senior lenders would be entitled to a preferred cash flow prior to the Fund's entitlement to payment on its Investment.

Valuation. Since the Fund's investments have limited or no liquidity, the actual value received upon liquidation may significantly differ from the interim valuations arrived at by the Fund.

# Investment Risk Disclosures (cont.)

Taxation. Returns in the Fund will be subject to U.S. federal, state and local tax regardless of the Fund Investor Vehicle. Non-U.S. Investors may also be subject to taxation in their home countries. The rate and amount of tax will vary depending on the mix and type of real estate investments and other investments made by the Fund. An Investor in one of the U.S. Partnerships will generally be subject to U.S. tax on income earned through such U.S. Partnership, even if distributions are not made by (or if such distributions are automatically reinvested in) that U.S. Partnership. Non-U.S. investors should be aware that the German KG and the Cayman Corporations intend to invest in U.S. real estate through U.S. subsidiary corporations. Such U.S. subsidiary corporations will pay U.S. federal and state tax on all income they derive, including upon their disposition of such real estate, thus reducing the return to such Non-U.S. Investors when compared with U.S. investors in the U.S. Partnerships. Tax-exempt U.S. investors investing in a U.S. Partnership should be aware of the potential for a U.S. Partnership to generate "unrelated business taxable income" (although the General Partner of Domestic LP has agreed, subject to the discussion in the Confidential Private Placement Memorandum, to use best efforts to minimize, to the extent reasonably possible and to the extent not inconsistent with Domestic LP's investment objectives, the realization of such income by Domestic LP). For a more detailed discussion of the tax consequences of an Investment in the Fund, Investors should review the Confidential Private Placement Memorandum. Investors should consult their tax advisers regarding such tax consequences as well as any taxes to which they may be subject in their own jurisdiction.

Other Tax Considerations. In addition to the U.S. federal tax considerations of investing in the Fund, Investors in the U.S. Partnerships should note that there may be tax filing requirements in the states and other jurisdictions where the Fund acquires real estate or otherwise earns income or gains, conducts activities or is deemed to be engaged in a trade or business. While Domestic LP generally makes its real estate investments through REIT Subsidiaries that are expected to eliminate the need for such tax return filings by Investors and the imposition of direct state and local taxes on Investors in Domestic LP, there can be no assurance that Investors in Domestic LP will not have to file any state and local tax returns or pay any state and local taxes. Conversely, Direct LP does not expect to make any investments through REIT Subsidiaries and Investors in Direct LP will generally be subject to direct state and local taxes as well as tax return filings with respect to U.S. real estate investments. As discussed in further detail in the Confidential Private Placement Memorandum, the Investment Adviser, with respect to Direct LP, will coordinate tax filings for certain Investors that are individuals and certain grantor trusts in the states and other jurisdictions where consolidated or composite tax filings are available. Corporate and other non-individual investors will be required to file their own tax returns in applicable states or other jurisdictions.

Target Return. The target return discussed herein has been established as of the date of this Booklet. The Target Return has been established by J.P. Morgan Investment Management Inc. ("JPMIM") based on its assumptions and calculations using data available to it and available investment opportunities and is subject to the risks set forth herein and set forth more fully in the Memorandum. A more detailed explanation along with the data supporting the target returns is on file with JPMIM and is available for inspection upon request. The target returns are for illustration/discussion purposes only and are subject to significant limitations. An investor should not expect to achieve actual returns similar to the target returns shown above. The target returns are JPMIM's estimate based on JPMIM's assumptions, as well as past and current market conditions, which are subject to change. JPMIM has the discretion to change the target returns for the Fund at any time. Because of the inherent limitations of the target returns, potential investors should not rely on them when making a decision on whether or not to invest in the Fund. The target returns cannot account for the impact that economic and market factors have on the implementation of an actual investment program. Unlike actual performance, the target returns do not reflect actual trading, liquidity constraints, fees, expenses, and other factors that could impact the future returns of the Fund. JPMIM's ability to achieve the target returns is subject to risk factors over which JPMIM may have no or limited control. Investors should review carefully the selected risk factors below as well as in the Memorandum. No representation is made that the Fund will achieve the target return or its investment objective. Actual returns could be higher or lower than the target returns. A more detailed explanation of how JPMIM calculated the target returns is available upon request.

**Property Funds**: Past performance of property funds are not indicative of the performance of the property market as a whole and the value of real property will generally be a matter of a Valuer's opinion rather than fact. The value of a property may be significantly diminished in the event of a downturn in the property market. Property investments are subject to many factors including adverse changes in economic conditions, adverse local market conditions and risks associated with the acquisition, financing and ownership and operation and disposal of real property. Property funds may impose limits on the number of redemptions and may provide for deferrals or suspension in particular circumstances for a given period of time.

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# J.P. Morgan Asset Management – Real Estate Americas

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# J.P. Morgan Asset Management – Real Estate Americas

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Callan

August 19, 2019

# Tucson Supplemental Retirement System

2nd Quarter 2019 Market Update

**Gordie Weightman, CFA**
Senior Vice President

**Paul Erlendson**
Senior Vice President

# U.S. Economy

## June 30, 2019

**The initial estimate of second quarter GDP growth came in at 2.1% (annualized)**

- This figure reflects softening relative to Q1 (3.1%) but exceeded consensus expectations.
- Growth from consumer spending was much stronger than anticipated, at 4.3%.

**Labor market remains healthy, but volatile**

- On average, over 170,000 jobs were added on a monthly basis in the second quarter. However, job growth was highly inconsistent; reaching 224,000 in April and June, with a low of 74,000 in May.
- Unemployment registered at 3.7% in June

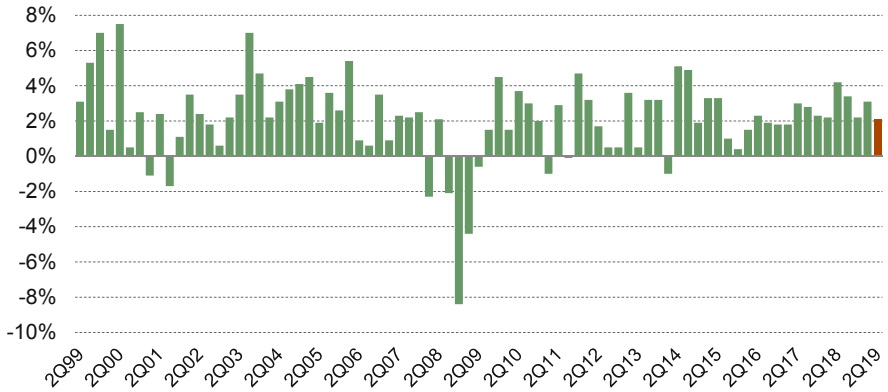
**Moderate inflation**

- As of June, the CPI rose 1.8% over the trailing 12 months, while core CPI grew 2.0% over the same period.

**The Fed lowered rates 25 bps at their July meeting**

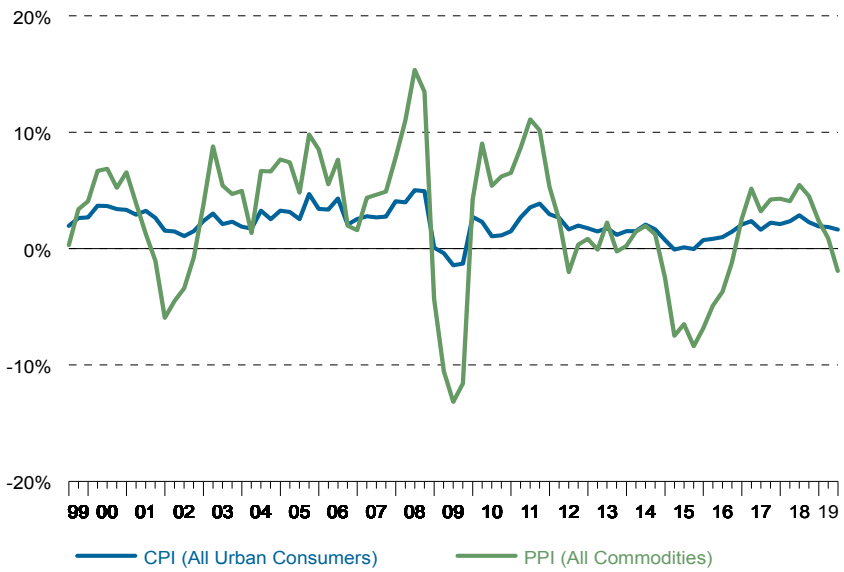
- The Federal Funds target range is now 2.00% to 2.25%
- The Fed also halted its balance sheet reduction, two months ahead of schedule.
- The Fed's comments were dovish but not as much as investors were hoping, and although they hinted at the possibility of additional cuts this year, there will likely be a good deal of uncertainty at the September meeting.

**Quarterly Real GDP Growth (20 Years)**




Source: Bureau of Economic Analysis

**Inflation Year-Over-Year**




Source: Bureau of Labor Statistics

# Asset Class Performance

## Periodic Table of Investment Returns for Periods Ended June 30, 2019

Best

| Last Quarter | Last 2 Quarters | Last Year | Last 3 Years | Last 5 Years | Last 10 Years | Last 20 Years |
|---|---|---|---|---|---|---|
| S&P:500 4.3% | Russell:Midcap Index **21.3%** | S&P:500 10.4% | S&P:500 14.2% | S&P:500 10.7% | Russell:Midcap Index **15.2%** | Russell:Midcap Index **9.0%** |
| Russell:Midcap Index **4.1%** | S&P:500 18.5% | Blmbg:Aggregate 7.9% | Russell:2000 Index 12.3% | Russell:Midcap Index **8.6%** | S&P:500 14.7% | Russell:2000 Index 7.8% |
| MSCI:EAFE 3.7% | Russell:2000 Index 17.0% | Russell:Midcap Index **7.8%** | Russell:Midcap Index **12.2%** | Russell:2000 Index 7.1% | Russell:2000 Index 13.4% | MSCI:EM Gross 7.6% |
| Blmbg:Aggregate 3.1% | MSCI:EAFE 14.0% | 3 Month T-Bill 2.3% | MSCI:EM Gross 11.1% | Blmbg:Aggregate 2.9% | MSCI:EAFE 6.9% | S&P:500 5.9% |
| Russell:2000 Index 2.1% | MSCI:EM Gross 10.8% | MSCI:EM Gross 1.6% | MSCI:EAFE 9.1% | MSCI:EM Gross 2.9% | MSCI:EM Gross 6.2% | Blmbg:Aggregate 4.9% |
| MSCI:EM Gross 0.7% | Blmbg:Aggregate 6.1% | MSCI:EAFE 1.1% | Blmbg:Aggregate 2.3% | MSCI:EAFE 2.2% | Blmbg:Aggregate 3.9% | MSCI:EAFE 4.0% |
| 3 Month T-Bill 0.6% | 3 Month T-Bill 1.2% | Russell:2000 Index (3.3%) | 3 Month T-Bill 1.4% | 3 Month T-Bill 0.9% | 3 Month T-Bill 0.5% | 3 Month T-Bill 1.9% |

Worst

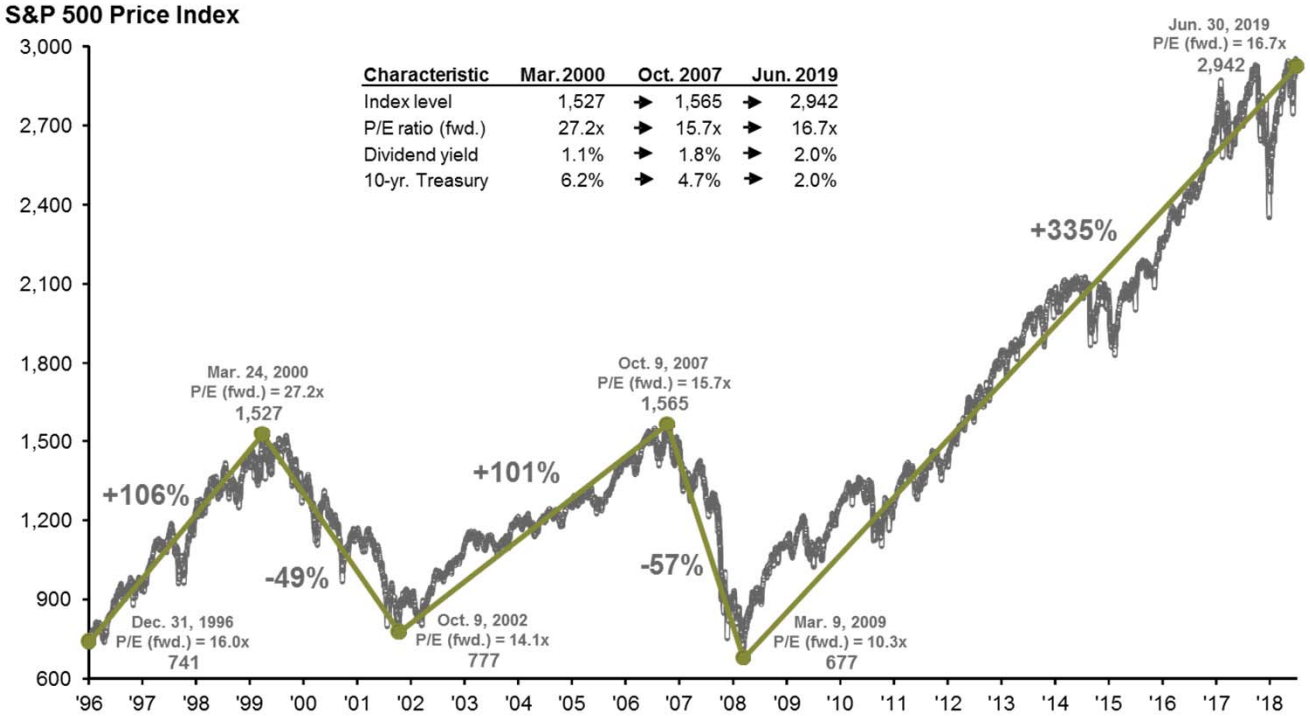
# Q2 Rebound Continues, Global Stock Markets Surge Through First Half of 2019

**New record for the S&P 500 reached in Q2 2019**

- 4.3% gain in Q2, on top of strongest first quarter (13.7%) since 2009

**Forward valuation rose back to 17.1 in Q2, above its 25-year average (16.2)**

- Still nowhere near the peak set in 2000




Source: Compustat, FactSet, Federal Reserve, Standard & Poor's, J.P. Morgan Asset Management.
Dividend yield is calculated as consensus estimates of dividends for the next 12 months, divided by most recent price, as provided by Compustat.
Forward price to earnings ratio is a bottom-up calculation based on the most recent S&P 500 Index price, divided by consensus estimates for earnings in the next 12 months (NTM), and is provided by FactSet Market Aggregates. Returns are cumulative and based on S&P 500 Index price movement only, and do not include the reinvestment of dividends. Past performance is not indicative of future returns.
*Guide to the Markets – U.S.* Data are as of June 30, 2019.

Source: J.P. Morgan Asset Management.

# U.S. Equity Market

## June 30, 2019

**The S&P 500 Index appreciated 4.3% in the second quarter**

- The index provided positive returns in April and June, but significantly negative returns in May.
- Financials was the strongest performing sector at +7.7% (Russell 3000), while Energy was the weakest returning -3.9%.
- Growth outperformed Value in the second quarter
  - R1000 Growth climbed 4.6% in the second quarter, while R1000 Value grew 3.8%.

**Large caps outperformed in the second quarter, followed by mid cap and finally, small caps**

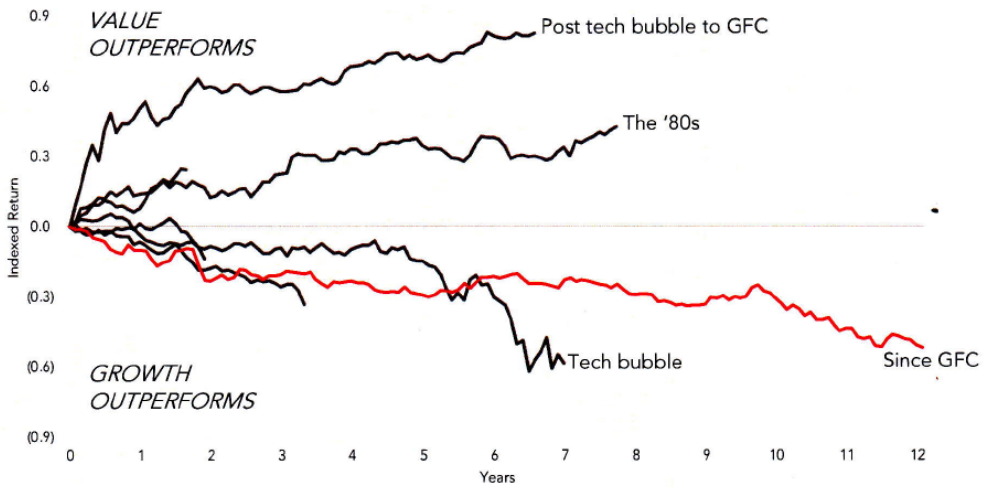
- Last quarter, the R1000 was up 4.3% vs. the R2000 which was up 2.1%.

| Large Cap Equity | Last Quarter | Last 2 Quarters | Last Year | Last 3 Years | Last 5 Years | Last 10 Years |
|---|---|---|---|---|---|---|
| Russell 1000 Index | 4.25 | 18.84 | 10.02 | 14.15 | 10.45 | 14.77 |
| Russell 1000 Growth | 4.64 | 21.49 | 11.56 | 18.07 | 13.39 | 16.28 |
| Russell 1000 Value | 3.84 | 16.24 | 8.46 | 10.19 | 7.46 | 13.19 |
| Mid Cap Equity | | | | | | |
| Russell Midcap Index | 4.13 | 21.35 | 7.83 | 12.16 | 8.63 | 15.16 |
| Russell Midcap Growth | 5.40 | 26.08 | 13.94 | 16.49 | 11.10 | 16.02 |
| Russell Midcap Value | 3.19 | 18.02 | 3.68 | 8.95 | 6.72 | 14.56 |
| Small Cap Equity | | | | | | |
| Russell 2000 Index | 2.10 | 16.98 | -3.31 | 12.30 | 7.06 | 13.45 |
| Russell 2000 Growth | 2.75 | 20.36 | -0.49 | 14.69 | 8.63 | 14.41 |
| Russell 2000 Value | 1.38 | 13.47 | -6.24 | 9.81 | 5.39 | 12.40 |

# Growth Outpaced Value for Quarter, Continues to Widen Return Gap

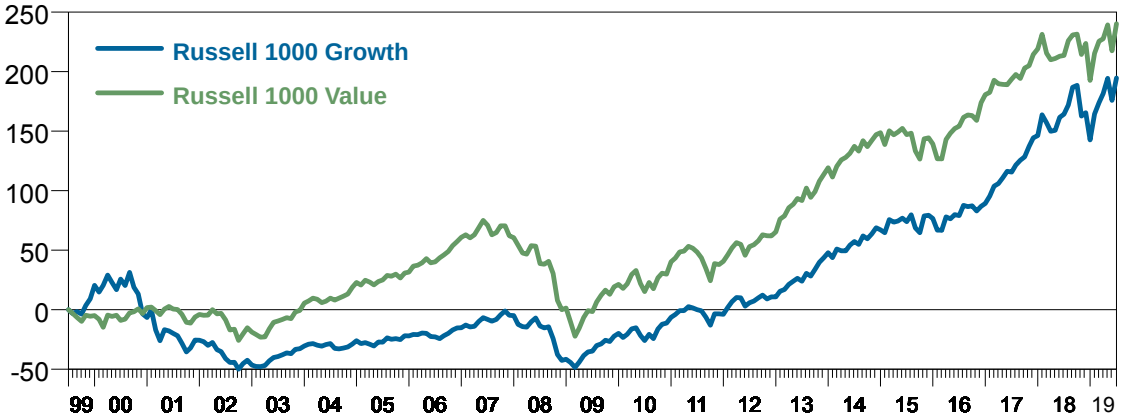
- Growth outperformed value across all market caps, extending duration of growth outperformance since the GFC.
- While growth has outperformed value in recent time periods, value beats growth over the trailing 20-year period.
- Why the divergence? Speculation that low interest rates (and by proxy, discount rates) make growth stocks more attractive at higher valuations compared to similar value stocks, which typically are trading at discount.
- Investors are more inclined to buy growth in a slow growth environment.

**Value/Growth Cycle Duration**
**1978 – 2019**




Index returns are based on the Russell 1000 Value Index and the Russell 1000 Growth Index.

**Cumulative Returns for Russell 1000 Style Indices: 20 Years**

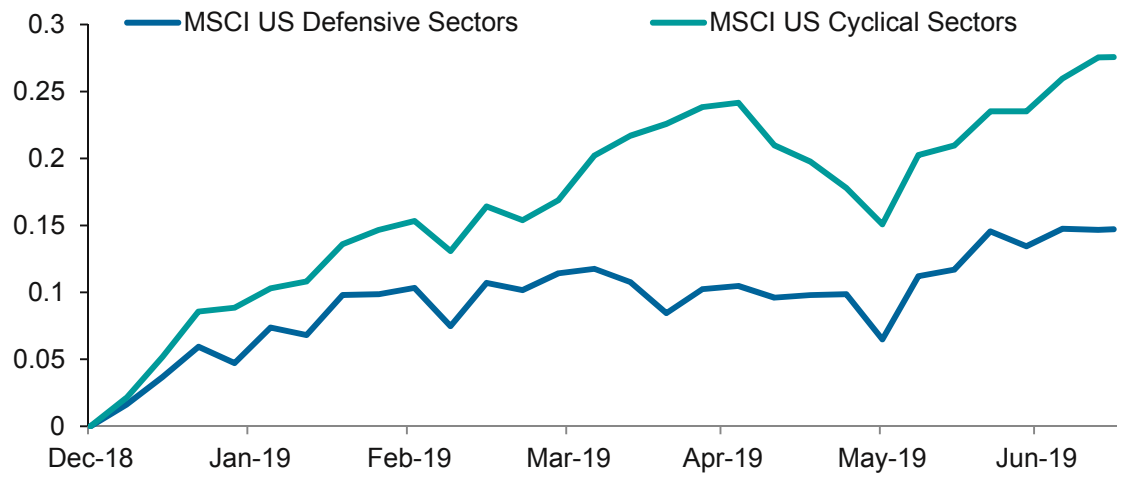



Source: Callan, AJO Partners

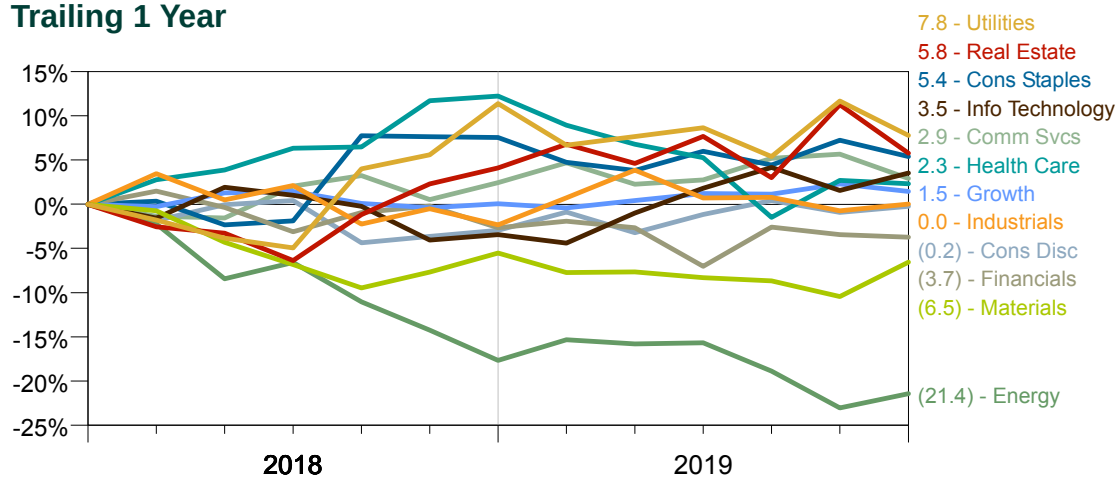
# Cyclicals Outpace Defensive Sectors

- In 2018, investor skepticism over the longevity of the bull market and economic cycle lifted defensive and lower-beta sectors.
- In the second quarter of 2019, risk appetite returned and cyclically exposed sectors outperformed more defensive assets.
- Over the trailing year, however, defensive sectors (Real Estate, Utilities, Staples) continue to outperform cyclicals (Industrials, Materials, Energy).

**Cyclical vs. Defensive Performance**




**Cumulative Relative Returns Sector vs. S&P 500**
**Trailing 1 Year**

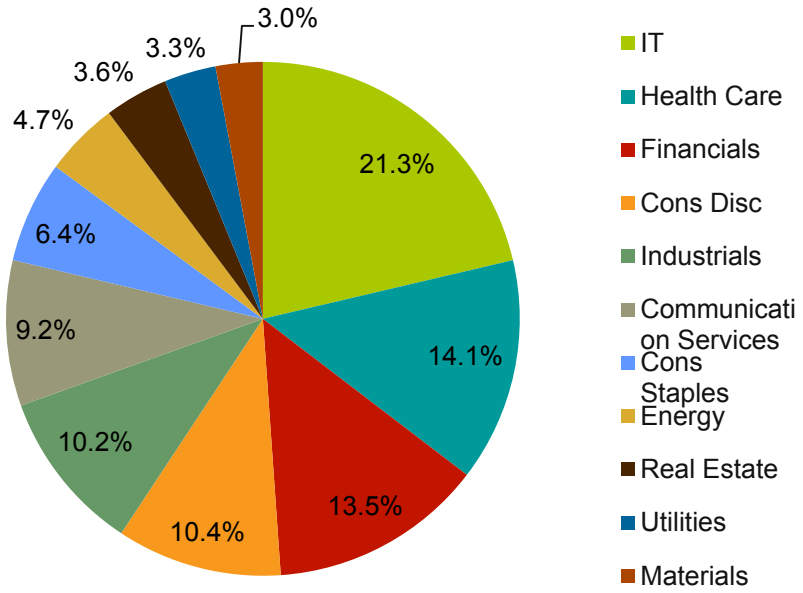



Sources: MSCI, Standard & Poor's

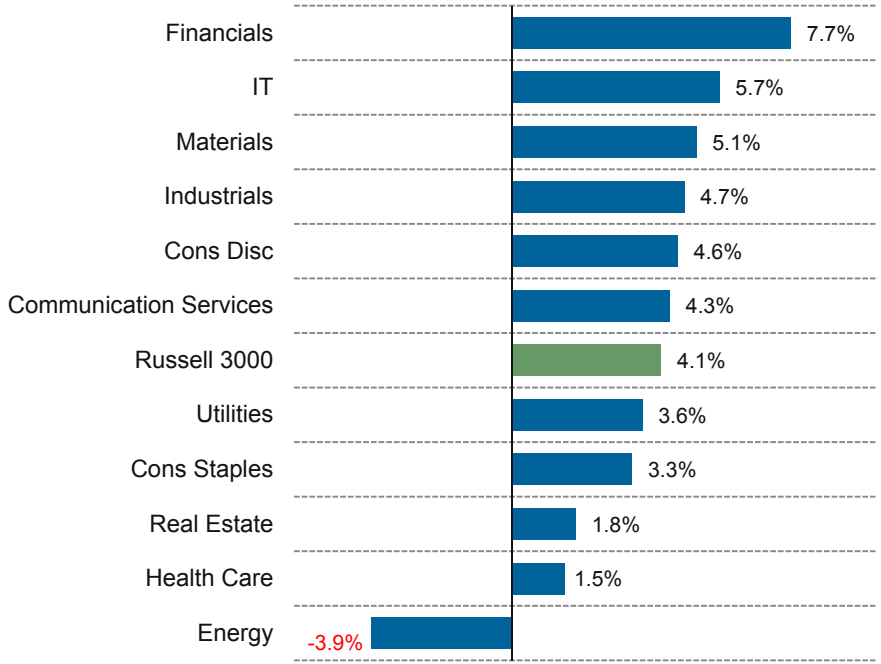
# U.S. Equity Returns

## June 30, 2019

**Economic Sector Exposure (Russell 3000)**




**Quarterly Returns (Russell 3000)**

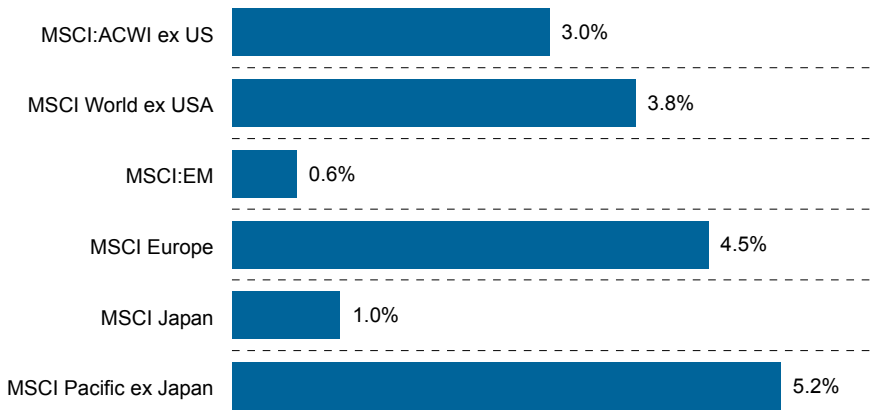



- The Russell 1000 Index rose 4.3% in the second quarter. Gains were driven by the Financial sector (+7.9%), followed by IT (+5.9%) and Materials (+5.6%).
- The Russell 2000 Index climbed 2.1% in the second quarter. Returns were driven by the Industrials sector (+8.5%), followed by Utilities (+5.3%) and Financials (+5.1%).

# International Equity Returns

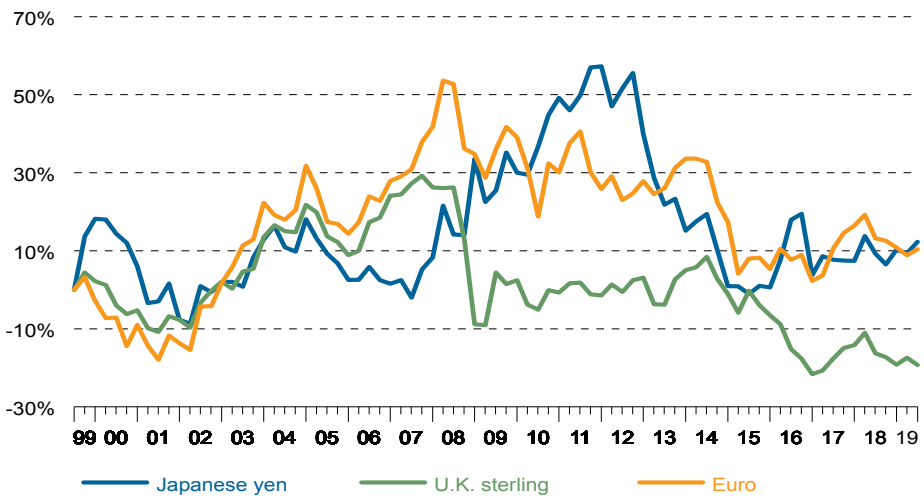
## June 30, 2019

### Regional Quarterly Performance (U.S. Dollar)



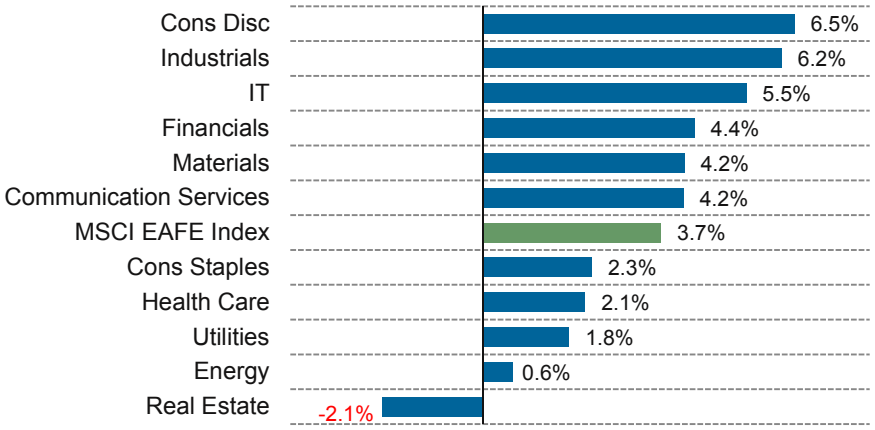

Source: MSCI

### Major Currencies' Cumulative Returns (vs. U.S. Dollar)




Source: MSCI

### MSCI EAFE Sector Returns

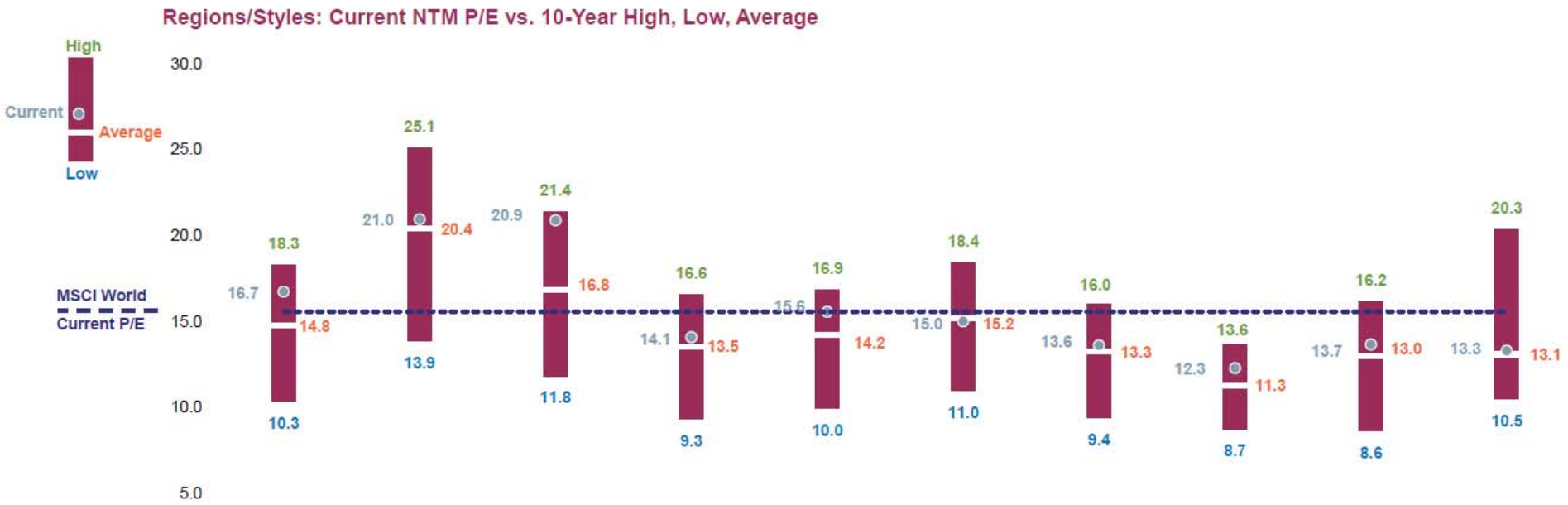



Source: MSCI

- International equity markets underperformed domestic equity in the second quarter (MSCI EAFE Index: +3.7%). Japan was again a laggard returning 1.0%.
- Consumer Discretionary and Industrials led performance from a sector perspective, while Real Estate provided negative returns.
- The euro (+1.4%) and the yen (+2.7%) rose against the dollar in the second quarter, while British pound fell 2.3%.

# Global Equity Valuations

July 31, 2019




| | S&P 500 | Russell 2000 | Russell 1000 Growth | Russell 1000 Value | MSCI World | MSCI World ex USA Small Cap | MSCI EAFE | MSCI EM | MSCI Europe | MSCI AC Asia Pac |
|---|---|---|---|---|---|---|---|---|---|---|
| **High Date** | 11/17 | 9/17 | 1/18 | 2/17 | 1/18 | 9/09 | 5/15 | 7/09 | 3/15 | 7/09 |
| **Low Date** | 9/11 | 9/11 | 9/11 | 9/11 | 9/11 | 9/11 | 9/11 | 9/11 | 9/11 | 9/11 |

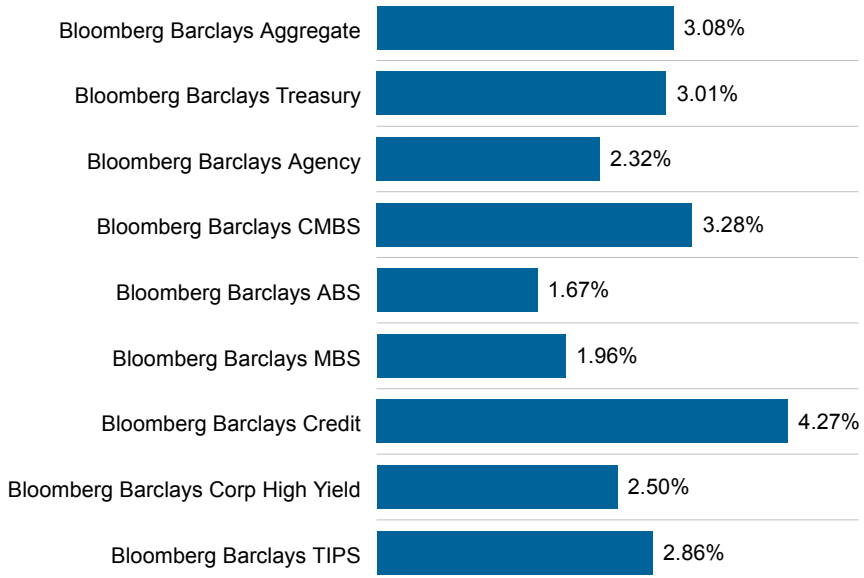
Source: Eaton Vance Monthly Market Monitor

FactSet as of 7/31/19. NTM P/E is market price per share divided by expected earnings per share over the next twelve months.

# Fixed Income

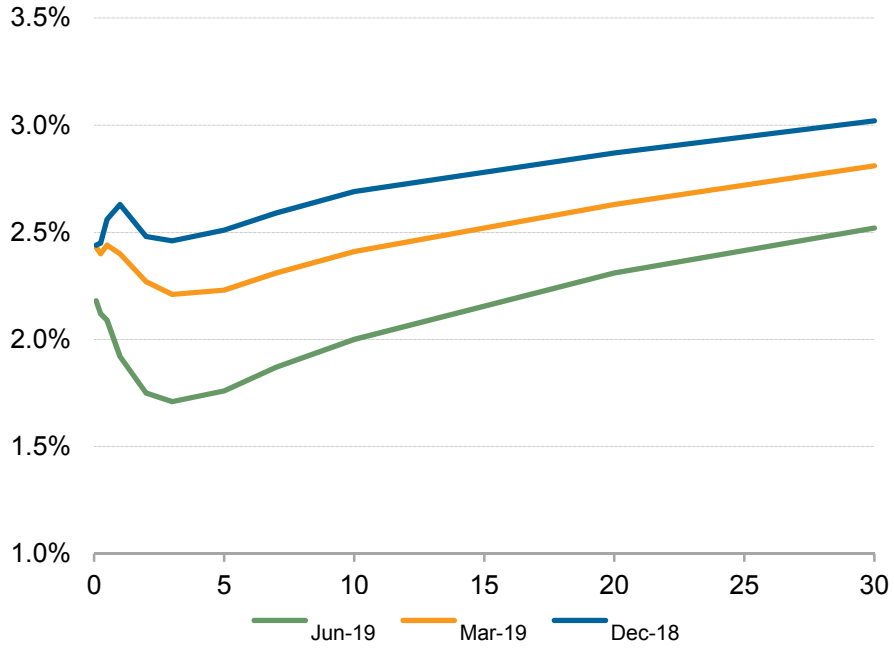
## June 30, 2019

**Total Returns**




Source: Bloomberg

**Treasury Yield Curve**

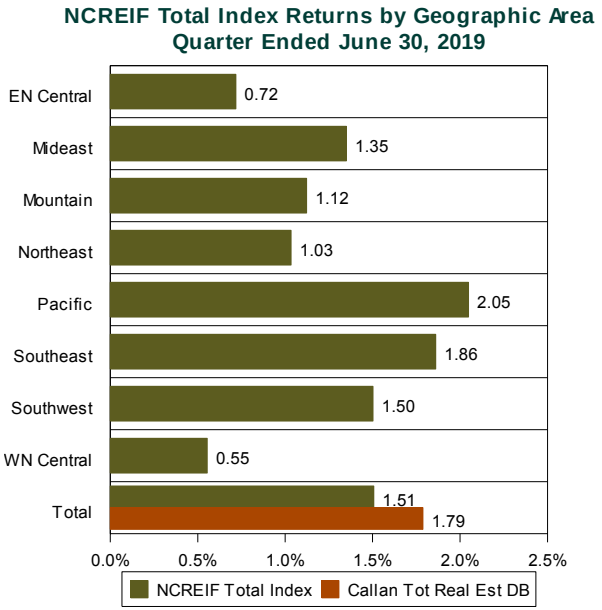


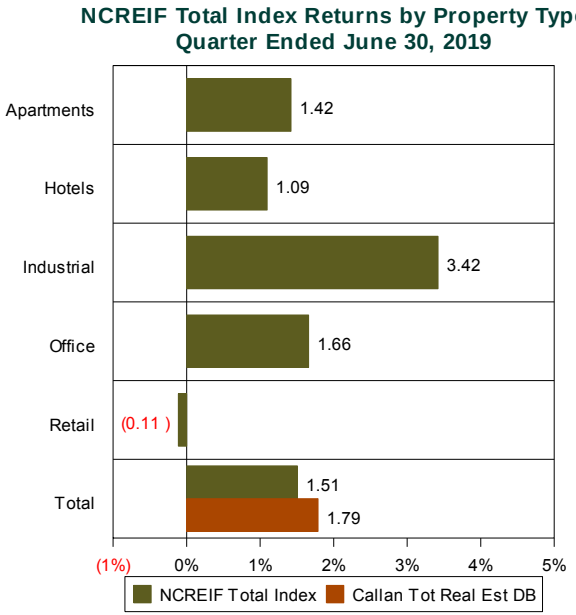

Source: U.S. Department of the Treasury

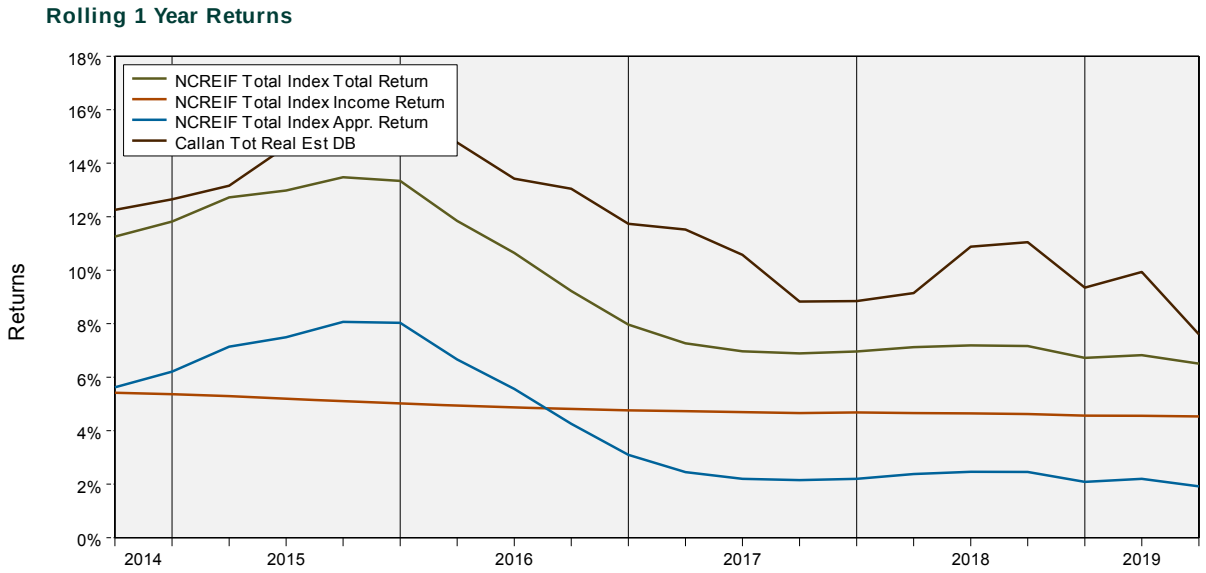
- As the Federal Reserve struck a more dovish tone, government bond yields fell across the maturity spectrum.
- The widely followed spread between the 2- and 10-year ended the month at 25 bps, up from 14 bps at the end of the first quarter.
- In this falling rate environment, the Bloomberg Aggregate Index gained 3.1%.
- Credit spreads tightened during the second quarter, and outperformed all other sectors returning 4.3% (Bloomberg Credit Index).

# Real Estate Overview

## June 30, 2019



Callan

# Appendix

# Trade Matters, but More to U.S. Trading Partners

## Exports, imports, and trade-to-GDP ratio in 2017

**Trade and trade policy dominate headlines in 2019, but impact of trade in the U.S. is far lower than in Europe and many other developed markets**

- Trade-to-GDP ratio is the sum of exports and imports as a % of GDP. Exports and imports include both goods and services.
- Trade has become a larger component of U.S. GDP over time.
  - U.S. exports have gradually risen from 7% in 1985 to 11.9% in 2017, while imports rose from 9% to 14.7%.
  - Trade activity now involves 26.6% of U.S. GDP.

**There is uncertainty in how the trade war will ultimately impact the U.S. and China**

- U.S. GDP is $20.4 trillion while China is $13.4 trillion.
- The U.S. buys significantly more from China than it sells.

| | Exports (% of GDP) | Imports (% of GDP) | Trade-to-GDP Ratio |
|---|---|---|---|
| Germany | 47.2% | 39.7% | 86.9% |
| Mexico | 37.9% | 39.7% | 77.6% |
| Canada | 30.9% | 33.2% | 64.1% |
| France | 30.9% | 32.0% | 62.9% |
| U.K. | 30.5% | 31.9% | 62.4% |
| Italy | 31.3% | 28.2% | 59.5% |
| Russia | 26.0% | 20.7% | 46.7% |
| China | 19.8% | 18.0% | 37.8% |
| Japan | 16.1% | 15.1% | 31.2% |
| U.S. | 11.9% | 14.7% | 26.6% |

Source: World Bank

# Inverted Yield Curve Points to Recession, a Normal Part of the Economic Cycle

## Built into the 10-year forecast

**Timing of recession following yield curve inversion is long and variable—6 to 18 months**

**Consensus expectation for U.S. recession in 2020; may avoid true recession with slowdown in GDP growth to 1%.**

**Typical economic impact:**

- Slowing job growth, layoffs
- Wages and income
- Consumer confidence
- Housing market
- Capital spending

**Thus far, only housing market and business investment are showing incipient signs of slowdown.**

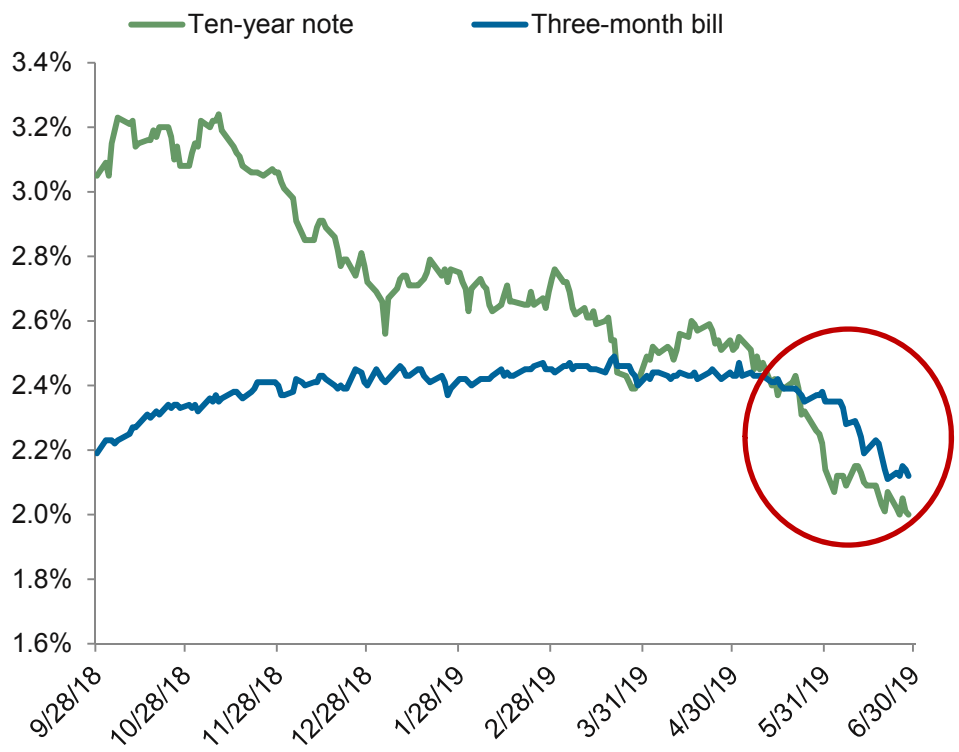
**Stock market reaction is usually sharp and early.**

- Recession fears spurred Q4 2018 market decline; snap back in Q1 and Q2 2019 a response to Fed policy shift, which ultimately signals fear of recession.

**Bond market will benefit from falling rates, but:**

- Sharp rise in government debt from 2018 tax cut; impact exacerbated by recession (hits tax receipts)
- Ballooning share of BBB corporate debt: increases risk of downgrade and upheaval in the credit markets

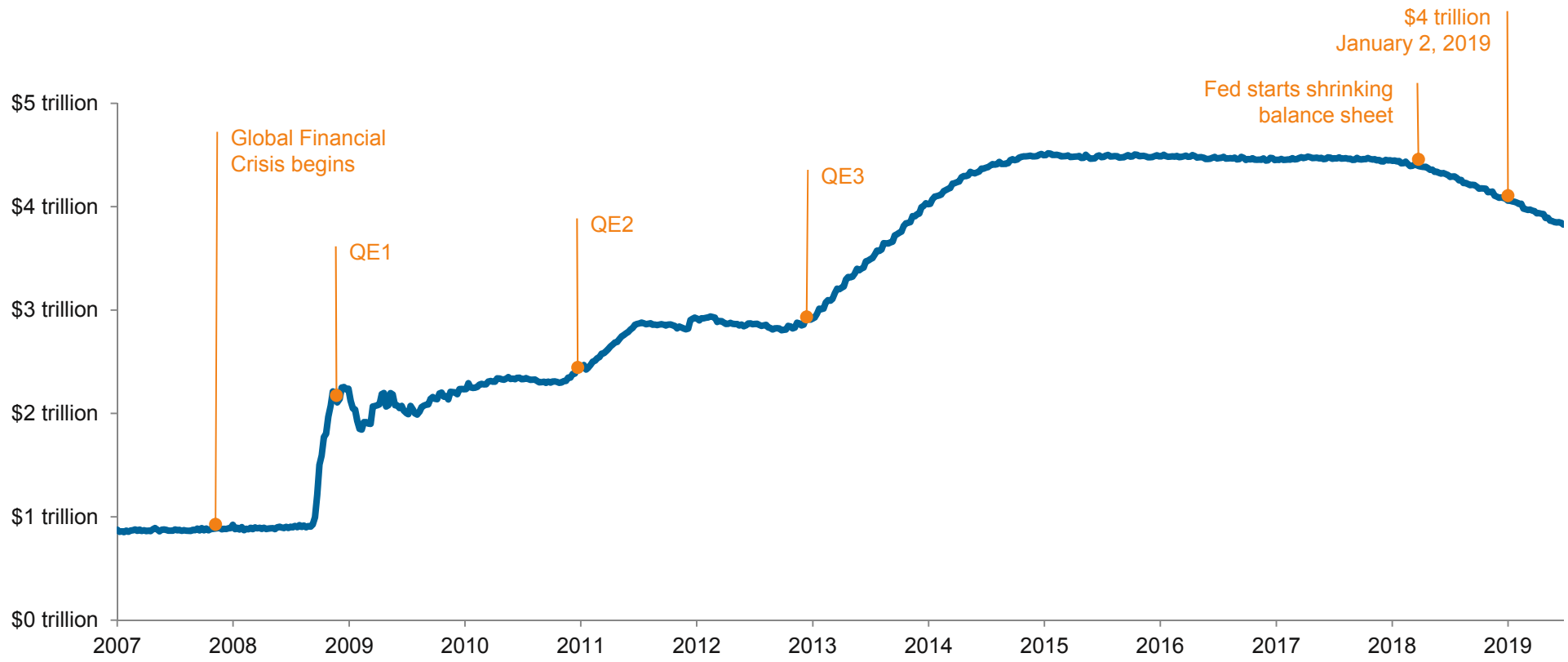
**Treasury Yield Curve Inverts**




Source: Bloomberg

# Federal Reserve Is Now Reducing Its Balance Sheet

## Effect is known as “Quantitative Tightening”




**Reversal of successive rounds of Quantitative Easing will take years to accomplish**

- Began with the taper in bond purchases, continues as bonds in the Fed portfolio mature and are not replaced
- Effective monetary tightening—lessens demand, potential upward pressure on yields
- U.S. is years ahead of euro zone monetary policy.

Source: Federal Reserve

Callan

June 30, 2019

# Tucson Supplemental Retirement System

## Investment Measurement Service Quarterly Review

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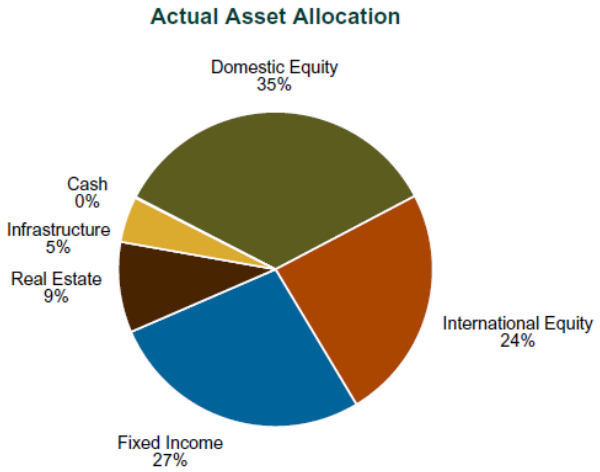
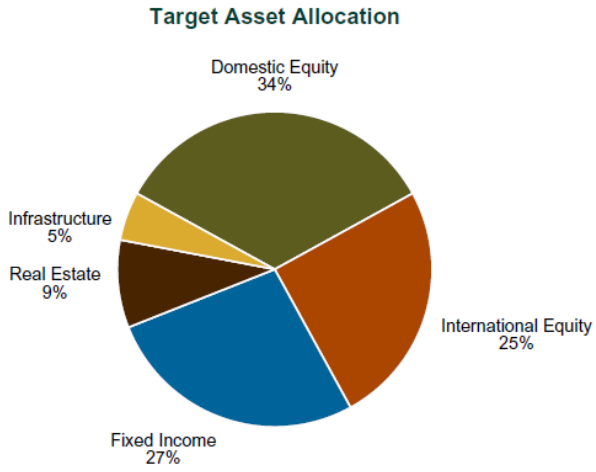
# Tucson Supplemental Retirement System

*Executive Summary for Period Ending June 30, 2019*

## Asset Allocation




## Total Fund Performance

### Returns for Periods Ended June 30, 2019

| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years |
|---|---|---|---|---|---|
| **Total Fund Gross** | 3.34% | 6.60% | 10.34% | 7.54% | 10.78% |
| **Total Fund Net** | 3.21% | 6.21% | 9.70% | 6.98% | 10.19% |
| **Total Fund Benchmark*** | 3.17% | 6.28% | 8.73% | 6.43% | 9.82% |

### Returns for Fiscal Years Ended June 30th

| | 2019 | 2018 | 2017 | 2016 | 2015 |
|---|---|---|---|---|---|
| **Total Fund Gross** | 6.60% | 9.81% | 14.77% | 2.33% | 4.63% |
| **Total Fund Net** | 6.21% | 8.77% | 14.26% | 1.89% | 4.17% |
| **Total Fund Benchmark*** | 6.28% | 7.96% | 12.04% | 1.82% | 4.34% |

* Current Quarter Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

## Recent Developments

- J.P. Morgan Asset Management CEO, Chris Willcox, will retire at the end of the year after 13 years with the firm. George Gatch, head of the asset management division's global funds group and institutional clients coverage, will succeed Willcox as CEO of asset management.

- AllianceBernstein announced that Chris Hogbin, COO of AB's Equities business, has been promoted to Co-Head of Equities alongside Sharon Fay. Hogbin's promotion is part of a succession plan for Fay. Chris will become sole Head of Equities when Sharon steps down from the role by mid-2020.

## Organizational Announcements

- Champlain completed a competitive bidding process to outsource their back-office functions and has selected SEI for trade reporting and settlement, portfolio accounting, performance measurement and fee calculation responsibilities. SEI has been the administrator for Champlain's mutual funds since 2004 so they have a current working relationship. The change is a result of a strategic review of Champlain's operational infrastructure and data management requirements.

## Active Manager Performance

| | Peer Group Ranking | | |
|---|---|---|---|
| Fund | Last Year | Last 3 Years | Last 5 Years |
| PIMCO Stocks Plus | 40 | 46 | 46 |
| T. Rowe Price Large Cap Growth | 68 | 7 | 12 |
| Champlain Mid Cap | 14 | 8 | 3 |
| FIAM Small Cap | 34 | 41 | 29 |
| Causeway International Opportunities** | 77 | 59 | 75 |
| Aberdeen EAFE Plus | 25 | 75 | 92 |
| American Century Int'l Small Cap | 77 | [30] | [42] |
| PIMCO Fixed Income | 1 | 1 | 2 |
| JP Morgan Strategic Property Fund | 96 | 94 | 93 |
| JP Morgan Income and Growth Fund | 96 | 84 | 82 |

- Aberdeen EAFE Plus outpaced the MSCI ACWI ex US by 19 basis points gross of fees in the second quarter and ranked in the 58th percentile among peers. From a geographic perspective, Japan had the largest negative attribution as a result of poor stock selection in the region. Israel and Canada also weighed on relative returns. The fund's investments in Asia Pacific ex-Japan outperformed the benchmark, supported by favorable security selection in Hong Kong and Korea as well as an underweight to China. From a sector lens, the manager's allocation decisions produced positive relative returns, while security selection detracted. Underweights to Energy and Consumer Discretionary contributed to positive attribution, as did an overweight to Industrials. Stock selection was mixed across sectors, but the largest relative detractors stemmed from the Consumer Staples and IT sectors.
- TSRS has been invested in Aberdeen for seven years and the portfolio has returned 4.72% annualized on a gross of fee basis versus 6.36% for the benchmark. Performance over the last year has been encouraging with Aberdeen returning 3.0% versus 1.3% for the benchmark. The EAFE Plus Commingled Fund has experienced a significant decline in assets under management over the past several years and Callan continues to monitor asset flows closely. The decline in assets is largely explained by difficult relative performance and the merger with Standard Life in 2017.

Gordon Weightman, CFA
Senior Vice President

Paul Erlendson
Senior Vice President

# Table of Contents
## June 30, 2019


**Market Overview**

**Capital Markets Review** 3

**Total Fund**

Actual Asset Allocation vs Target 20
Asset Allocation Across Investment Managers 21
Investment Manager Returns 22
Investment Manager Returns 26
Total Fund Attribution 30
Total Fund Performance 35

**Domestic Equity**

Domestic Equity 37
Alliance S&P 500 Index 39
PIMCO StocksPLUS 41
BlackRock Russell 1000 Value 43
T. Rowe Price Large Cap Growth 45
Champlain Mid Cap 47
Pyramis Small Cap 49

**International Equity**

International Equity 52
Causeway International Opportunities 54
Aberdeen EAFE Plus 56
American Century Non-US SC 58

**Fixed Income**

Fixed Income 61
BlackRock U.S. Debt Fund 63
PIMCO Fixed Income 65

**Real Estate**

Real Estate 68
JP Morgan Strategic Property Fund 70
JP Morgan Income and Growth Fund 72

**Infrastructure**

Infrastructure 75
Macquarie European Infrastructure 76
SteelRiver Infrastructure North America 77

**Callan Research/Education** 78

**Disclosures** 81

Market Overview
Capital Markets Review

Callan Institute

Second Quarter 2019

# Capital Market Review

## The Fed: 'A Mid-Cycle Adjustment to Policy'

ECONOMY

2 PAGE

The economic news for the U.S. during the second quarter was largely good, and better than the headlines would lead us to believe. Yet the Fed proceeded with a widely anticipated (and clearly signaled) interest rate cut in July, describing it as "a mid-cycle adjustment to policy."

## Big Focus on Fed, Possible Correction

INSTITUTIONAL INVESTORS

4 PAGE

Institutional investors, as measured by the Callan Total Fund Sponsor Database Group, gained 3.3% in the second quarter. That compares to the 4.0% increase generated by a benchmark composed of 60% S&P 500/40% Bloomberg Barclays US Aggregate.

## U.S. Stocks Hit Highs; Global Gains Muted

EQUITY

6 PAGE

U.S. equities neared record highs in the second quarter on expectations of easing from the Fed. Global equity markets were largely positive although investor sentiment was fairly muted as both U.S./China tariff fatigue and Brexit uncertainty continued.

## Rally for Treasuries Lifts Sovereign Bonds

FIXED INCOME

8 PAGE

The Federal Reserve's dovish statements and announced policy objective to "sustain the expansion" caused risk assets and U.S. Treasury yields to rally. Non-U.S. developed market sovereign bonds rose in tandem with the rally in Treasuries.

## Real Estate Gains; Real Assets Fall

REAL ESTATE/REAL ASSETS

10 PAGE

The NCREIF Property Index gained 1.5% during the second quarter. The NCREIF Open-End Diversified Core Equity Index rose 0.8%. U.S. REITs and global REITs both gained, but lagged broad equity indices. The Bloomberg Commodity Index fell 1.2%.

## Value Is in the Eye of the Beholder

PRIVATE EQUITY

12 PAGE

Fundraising, company purchase prices, and IPOs increased in the second quarter. But private M&A investment and exit measures were flat to markedly down. Private equity returns remained positive, despite the fourth quarter public equity sell-off.

## Continuing Rally Aids Most Strategies

HEDGE FUNDS/MACs

13 PAGE

Risk-on sentiment supported virtually all hedge fund strategies. The continuing rally also lifted long-biased MACs, but risk premia languished again. Hedge funds are well positioned defensively for a downturn. But without a sustained pick-up in volatility, they are likely to lag.

## Returns, Inflows Both Rebound for DC Index

DEFINED CONTRIBUTION

15 PAGE

The Callan DC Index™ rebounded in the first quarter, gaining 9.6%, and the Age 45 Target Date Fund did even better. After two quarters of negative flows, balances saw sizable growth. And TDFs retook their spot as the top destination for inflows.

## Broad Market Quarterly Returns

| U.S. Equity<br>Russell 3000 | Non-U.S. Equity<br>MSCI ACWI ex USA | U.S. Fixed Income<br>Bloomberg Barclays Agg | Non-U.S. Fixed Income<br>Bloomberg Barclays Gbl ex US |
|---|---|---|---|
| 4.1% | 3.0% | 3.1% | 3.4% |

Sources: Bloomberg Barclays, FTSE Russell, MSCI

# The Fed Speaks: 'A Mid-Cycle Adjustment to Policy'

**ECONOMY** | Jay Kloepfer

The U.S. economy continued its now-record expansion in the second quarter with a 2.1% gain in GDP, slower than the robust 3.1% in the first quarter but well ahead of expectations. Consumer spending rose 4.3% in the quarter, supported by solid gains in the job market and disposable income growth of 5% in each of the first two quarters of 2019. Offsetting the gains in consumption were hits to GDP from exports, non-residential business investment, residential investment, and a drawdown in inventories. The economic news for the U.S. during the quarter was largely good, and better than the headlines would lead us to believe. Yet the Fed proceeded with a widely anticipated (and clearly signaled) interest rate cut in July, lowering the Federal Funds rate target by 25 basis points.

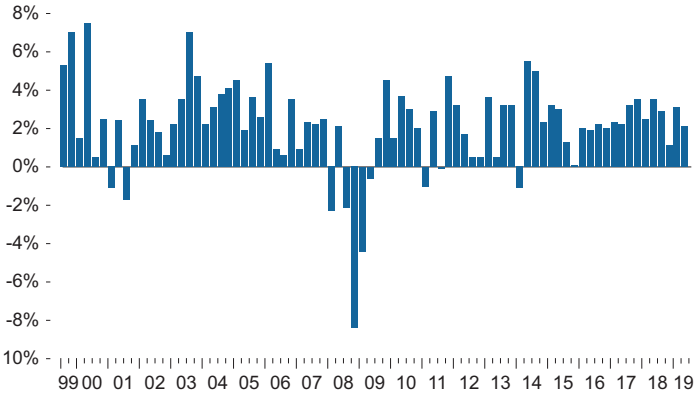
How did we get to a situation where the expansion continues but the Fed acts to cut rates? In classic Fed-speak, the announced reasoning is "a mid-cycle adjustment to policy." To be fair, while the job market and overall GDP data are coming in solid for the U.S., the global economy is clearly showing signs of slowing, and the uncertainty stemming from trade tensions is top of mind. Chairman Jerome Powell noted three reasons for the rate cut: (1) to insure against downside risks from slowing global growth and trade tensions; (2) to mitigate the effects those factors are already having on the U.S. outlook, even if they haven't shown up in the data; and (3) to enable a faster return to the Federal Reserve's symmetric 2% inflation target.

It is important to note that the Fed made clear this July rate cut is not likely to be the first in a series. After initial confusion, the markets simply interpreted this Fed comment as fewer rate cuts this year than were previously priced into bond yields.

Key to the Fed's perceived latitude to lower rates is the persistent surprise of low inflation. After breaking through the Fed's 2% target in 2018, inflation has once again subsided. Headline CPI rose 1.6% in June (year-over-year), dragged down by a 3.4% decline in energy costs. In fact, core CPI (less food and energy) rose 2.1% over the past 12 months, pushed up by the rising cost of shelter, apparel, and used vehicles. While annual wage gains have moved above 3% for the first time since the Global Financial Crisis (GFC), wage pressures have yet to show up in headline inflation. The impact of tariffs on consumer prices has not affected the broad CPI data, as the tariffs to date have been narrowly targeted.

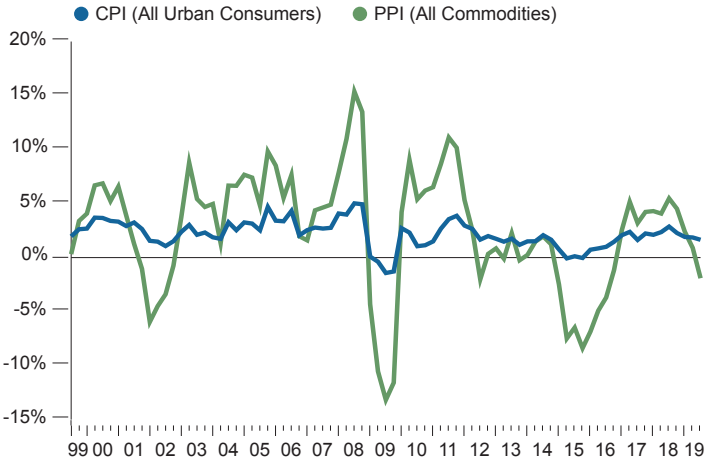
Foreshadowing the expected slowdown in the U.S. economy is the Purchasing Managers' Index (PMI), a forward-looking measure of business expectations for manufacturing demand and

**Quarterly Real GDP Growth** (20 Years)




Source: Bureau of Economic Analysis

**Inflation Year-Over-Year**




Source: Bureau of Labor Statistics

production. The mid-year 2019 reading of the PMI hit 50.6, very close to the line dividing expansion from contraction (50), and the lowest reading since 2009. Producers cite the twin worries of slowing global growth and trade tensions; the 5% drop in exports and the softening of business spending in the second quarter data certainly support these concerns. Other concerns about a material slowdown to GDP growth include the waning impact on domestic spending that has come from rising stock prices and fiscal stimulus since the GFC. Further concerns include the effects of potential new tariffs, and the slowdown in inventory accumulation. The U.S. economy is also approaching capacity constraints as the expansion reaches into record territory. Unemployment has hit a generational low of 3.6%; at some point firms' difficulties in finding new and replacement staff will weigh on overall workforce growth.

The nine interest rate hikes enacted by the Fed through 2018 raised the cost of borrowing for both businesses and consumers, and while the reversal of Fed policy since January halted the trajectory of rates, the impact of the increases since 2016 is still working its way through the economy. Higher mortgage rates slowed housing markets, pulling existing home sales down by more than 10% over the course of 2018. Rates for 30-year mortgages have fallen by more than 110 bps since November 2018, and home sales have bounced back since the start of the year, but the recovery has been uneven, concentrated in the South and the West. Investment in new homes, as measured by permits, began slipping in 2018 and is still down more than 10% (year over year) through June. New residential construction, restricted in many locations by supply and cost factors, has lagged the pace set in typical expansions since the GFC.

### The Long-Term View

| Index | 2019 2nd Qtr | Periods ended Dec. 31, 2018 Year | 5 Yrs | 10 Yrs | 25 Yrs |
|---|---|---|---|---|---|
| **U.S. Equity** | | | | | |
| Russell 3000 | 4.1 | -5.2 | 7.9 | 13.2 | 9.0 |
| S&P 500 | 4.3 | -4.4 | 8.5 | 13.1 | 9.1 |
| Russell 2000 | 2.1 | -11.0 | 4.4 | 12.0 | 8.3 |
| **Non-U.S. Equity** | | | | | |
| MSCI EAFE | 3.7 | -13.8 | 0.5 | 6.3 | 4.6 |
| MSCI ACWI ex USA | 3.0 | -14.2 | 0.7 | 6.6 | -- |
| MSCI Emerging Markets | 0.6 | -14.6 | 1.6 | 8.0 | -- |
| MSCI ACWI ex USA Small Cap | 1.2 | -18.2 | 2.0 | 10.0 | -- |
| **Fixed Income** | | | | | |
| Bloomberg Barclays Agg | 3.1 | 0.0 | 2.5 | 3.5 | 5.1 |
| 90-Day T-Bill | 0.6 | 1.9 | 0.6 | 0.4 | 2.5 |
| Bloomberg Barclays Long G/C | 6.6 | -4.7 | 5.4 | 5.9 | 6.8 |
| Bloomberg Barclays Gl Agg ex US | 3.4 | -2.1 | 0.0 | 1.7 | 4.4 |
| **Real Estate** | | | | | |
| NCREIF Property | 1.5 | 6.7 | 9.3 | 7.5 | 9.3 |
| FTSE Nareit Equity | 1.2 | -4.6 | 7.9 | 12.1 | 9.8 |
| **Alternatives** | | | | | |
| CS Hedge Fund | 2.3 | -3.2 | 1.7 | 5.1 | 7.3 |
| Cambridge PE* | 4.9 | 10.6 | 11.9 | 13.8 | 15.2 |
| Bloomberg Commodity | -1.2 | -11.2 | -8.8 | -3.8 | 2.0 |
| Gold Spot Price | 8.9 | -2.1 | 1.3 | 3.8 | 4.9 |
| **Inflation** – CPI-U | 0.8 | 1.9 | 1.5 | 1.8 | 2.2 |

*Data for most recent period lags by a quarter. Data as of March 31, 2019.
Sources: Bloomberg, Bloomberg Barclays, Bureau of Economic Analysis, Credit Suisse, FTSE Russell, MSCI, NCREIF, Standard & Poor's, Refinitiv/Cambridge

### Recent Quarterly Economic Indicators

| | 2Q19 | 1Q19 | 4Q18 | 3Q18 | 2Q18 | 1Q18 | 4Q17 | 3Q17 |
|---|---|---|---|---|---|---|---|---|
| Employment Cost–Total Compensation Growth | 2.7% | 2.8% | 2.9% | 2.8% | 2.8% | 2.7% | 2.6% | 2.5% |
| Nonfarm Business–Productivity Growth | 1.8%* | 3.4% | 1.3% | 1.9% | 2.9% | 0.7% | -0.3% | 2.3% |
| GDP Growth | 2.1% | 3.1% | 1.1% | 2.9% | 3.5% | 2.5% | 3.5% | 3.2% |
| Manufacturing Capacity Utilization | 75.7% | 76.4% | 77.0% | 76.9% | 76.4% | 76.1% | 75.8% | 74.9% |
| Consumer Sentiment Index (1966=100) | 98.4 | 94.5 | 98.2 | 98.1 | 98.3 | 98.9 | 98.4 | 95.1 |

Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, Federal Reserve, IHS Economics, Reuters/University of Michigan

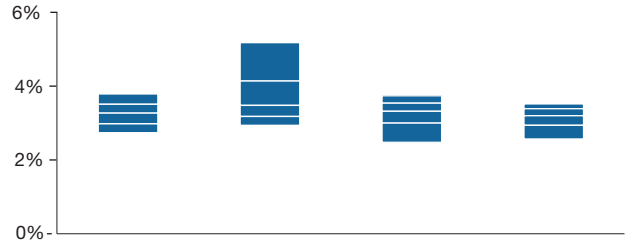
* Estimated figure provided by IHS Markit

# Big Focus on Possible Correction, Future Action by Fed

## INSTITUTIONAL INVESTORS

- Institutional investors, as measured by the **Callan Total Fund Sponsor Database Group,** gained 3.3% in the second quarter, with corporate plans faring best (+3.5%). Those results compare to the 4.0% gain of a quarterly rebalanced benchmark composed of 60% S&P 500/40% Bloomberg Barclays US Aggregate.
- Over the last 15 years, corporate plans (+6.9%) have fared the best, followed by nonprofits, public plans, and Taft-Hartley plans. Over that same period, the 60-40 index has seen a gain of 7.2%, annualized. Larger institutional investors have tended to do better than smaller ones over that time period, with the exception of Taft-Hartley plans; investors with more than $1 billion in assets gained 7.0% over the 15-year period, followed by 6.7% for medium investors ($100 million-$1 billion), and 6.6% for small plans (under $100 million).
- For institutional investors, strategic allocation decisions are focused on the anticipation of a market correction, volatility, and their desires to seek additional diversification opportunities. As a result, investors are re-evaluating the purpose and implementation of asset classes including real assets, hedge funds and liquid alternatives, fixed income, and equity.

### Quarterly Returns, Callan Database Groups




| | Public Database | Corporate Database | Nonprofit Database | Taft-Hartley Database |
|---|---|---|---|---|
| 10th Percentile | 3.8 | 5.2 | 3.7 | 3.5 |
| 25th Percentile | 3.5 | 4.1 | 3.5 | 3.4 |
| Median | 3.3 | 3.5 | 3.3 | 3.2 |
| 75th Percentile | 3.0 | 3.2 | 3.0 | 2.9 |
| 90th Percentile | 2.7 | 2.9 | 2.5 | 2.6 |

Source: Callan

- Increasingly, investors are focused on the disparity of performance between growth and value. As value continues to underperform, investors are wondering if "value is dead." They are also questioning whether there is any hope for active management. Will its promise to protect in a downturn be fulfilled?

### Callan Database Median and Index Returns* for Periods ended June 30, 2019

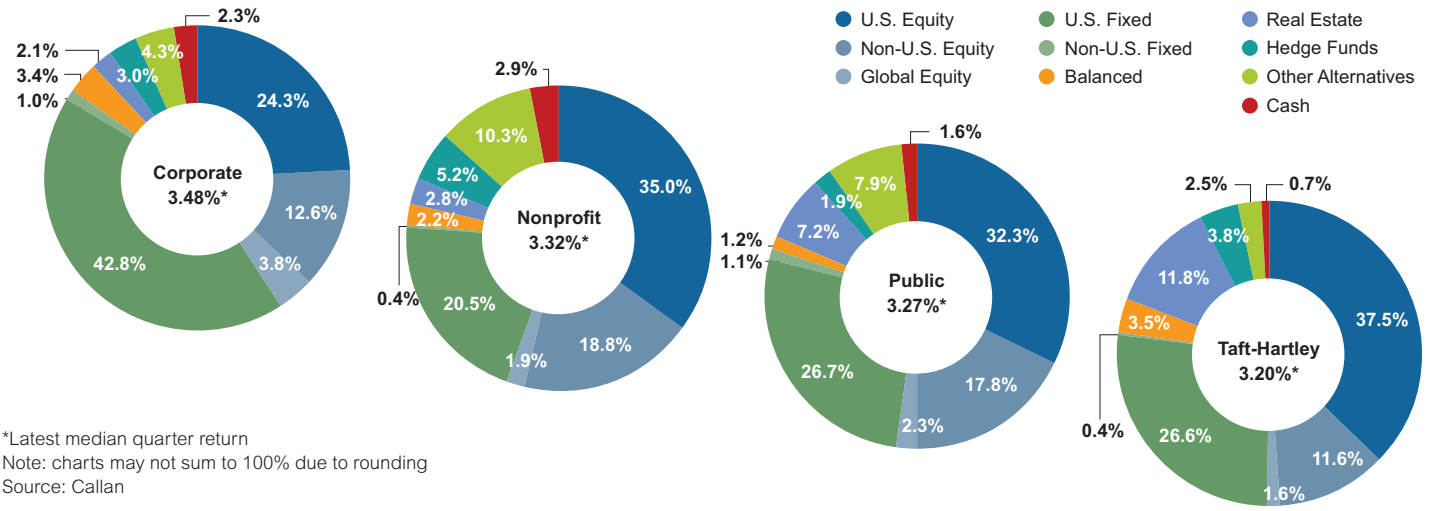
| Database Group | Quarter | Year | 3 Years | 5 Years | 10 Years | 15 Years |
|---|---|---|---|---|---|---|
| **Public Database** | **3.27** | **6.19** | **8.91** | **5.96** | **9.20** | **6.74** |
| **Corporate Database** | **3.48** | **7.26** | **8.21** | **5.96** | **9.24** | **6.85** |
| **Nonprofit Database** | **3.32** | **5.78** | **9.11** | **5.62** | **9.06** | **6.76** |
| **Taft-Hartley Database** | **3.20** | **6.34** | **9.03** | **6.54** | **9.42** | **6.67** |
| **All Institutional Investors** | **3.32** | **6.31** | **8.85** | **5.97** | **9.24** | **6.75** |
| **Large (>$1 billion)** | **3.24** | **6.35** | **9.03** | **6.17** | **9.39** | **7.04** |
| **Medium ($100mm - $1bn)** | **3.31** | **6.43** | **8.84** | **6.04** | **9.28** | **6.71** |
| **Small (<$100 million)** | **3.34** | **6.20** | **8.76** | **5.73** | **9.03** | **6.59** |

*Returns less than one year are not annualized.

Source: Callan. Callan's database includes the following groups: public defined benefit, corporate defined benefit, nonprofits, and Taft-Hartley plans. Approximately 10% to 15% of the database constituents are Callan's clients. All database group returns presented gross of fees. Past performance is no guarantee of future results. Reference to or inclusion in this report of any product, service, or entity should not be construed as a recommendation, approval, affiliation, or endorsement of such product, service, or entity by Callan.

- Plans continue to retain a strong tilt toward growth assets (at least 70% and as high as 90%). Many investors said they employ such a tilt to meet funding requirements. This has coincided with a refined definition of growth to include high yield, convertibles, low-volatility equity, hedge funds, MACs, and option-based strategies.
- Callan has consulted on a surge in asset-liability studies, with substantial changes to many policy portfolios. The focus is on de-risking (less equity) and risk mitigation (diversification and implementation), but dissatisfaction remains with hedge funds, risk premia, and absolute return products.
- In the current capital market environment, investors are focused on how long the expansion will continue. They are also examining how the reversal in Fed policy changes the landscape. Equity markets cheered, but doesn't accommodation imply leaner times ahead? And while LDI pays off when rates fall, lower rates can wreak havoc with liability-driven investing glidepaths.
- In discussions of asset class structures, investors are examining the role of fixed income in a total return portfolio: Is pursuit of return a goal?
- The relentless cost pressure is driving passive implementation in all asset classes, particularly equity.
- Public plans are focused on the return from private markets, but they face mounting pressure to control costs. One approach is the "bar-belled" pursuit of active in private markets and alternatives, and all passive in equity, more passive in fixed, and cheaper liquid alternatives with "passive" exposures to betas and factors.
- Liquidity needs are top of mind for public plans looking to increase private investments in pursuit of a growth engine aside from public equity.
- Corporate plans moving down de-risking glidepaths continue to reconsider their equity structures, moving to passive to control costs and attain broad beta exposure in the declining growth allocation.

**Average Asset Allocation, Callan Database Groups**




*Latest median quarter return
Note: charts may not sum to 100% due to rounding
Source: Callan

# Equity

## U.S. Equities

Markets continued to march upward, and U.S. equities neared record highs. Growth outpaced value, as the dovish stance of the Fed was a headwind for valuation-sensitive stocks. Small cap stocks lagged large caps, possibly from economic weakness.

**Large Cap** ► *S&P 500: +4.3% | Russell 1000: +4.2%*

- U.S. equity showed strong gains as market participants anticipated another round of monetary easing from the Fed.
- Financials (+8.0%) was the best-performing sector; Energy (-2.8%) was the only sector to experience negative returns over the quarter.
- Trade rhetoric weighed on U.S. stocks in May followed by a June rebound.
- Given the increase in risk appetite, cyclicals outperformed while defensive sectors such as Utilities underperformed.

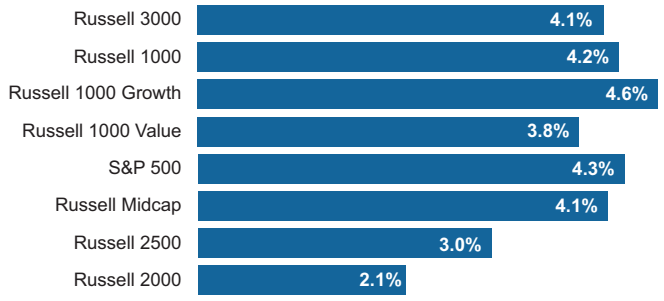
**Small Cap** ► *Russell 2000: +2.1%*

- Market conditions (e.g., more dovish Fed, strong U.S. dollar, trade tensions) should have benefited small cap companies, but did not.
- A slowing economy may explain weakness for small caps. Large caps tend to have stronger balance sheets and are more capable of weathering downturns.

**Growth vs. Value** ► *Russell 1000 Growth: +4.6% | Russell 1000 Value: +3.8%*

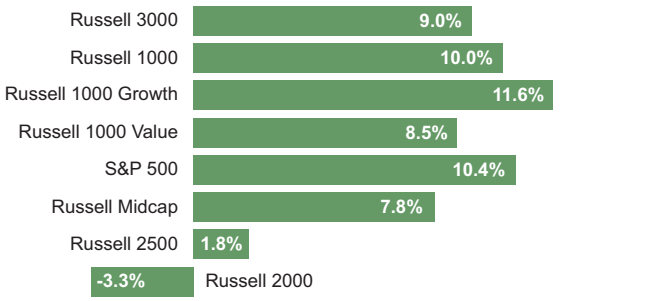
- Value factors (P/B, P/E trailing, yield) were mixed; growth factors (EPS growth, sales growth) were positive.

### U.S. Equity: Quarterly Returns



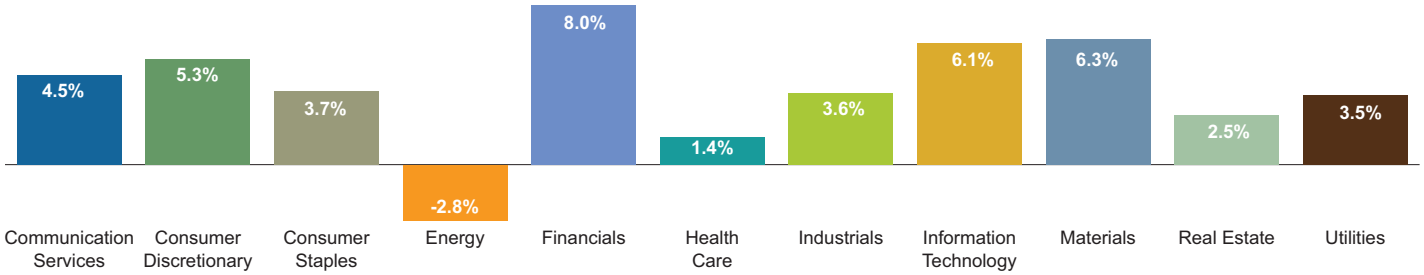

Sources: FTSE Russell and Standard & Poor's

### U.S. Equity: One-Year Returns




Sources: FTSE Russell and Standard & Poor's

### Quarterly Performance of Industry Sectors




Source: Standard & Poor's

## Non-U.S./Global Equities

Global equity markets were largely positive in the second quarter although investor sentiment was fairly muted as both U.S./China tariff fatigue and Brexit uncertainty continued. Some non-U.S. markets benefited from a weakening U.S. dollar relative to local currencies. Global equities were boosted by dovish central bank commentary that led to lower interest rates around the globe.

**Developed** ► *MSCI EAFE: +3.7% | MSCI ACWI ex USA: +3.0% | MSCI Europe: +4.5% | MSCI Japan: +1.0%*

- Developed markets rallied as central banks around the world expressed more accommodative paths with interest rates and quantitative easing.
- U.K. equities finished the quarter slightly up (+0.9%) as Brexit uncertainty continues. Prime Minister Theresa May announced her resignation during the quarter.
- Relative to other non-U.S. developed markets, Europe had a strong quarter fueled by robust returns from Germany, France, and Switzerland (30% combined weight), which benefited from declining bond yields.
- EAFE sector performance was positive across the board with the exception of real estate. Cyclicals drove the majority of returns as these are highly correlated with U.S. cyclicals, which benefited from declining interest rates.
- Factor performance in non-U.S. developed markets favored growth over value, large caps over small caps, and cyclicals over defensives.

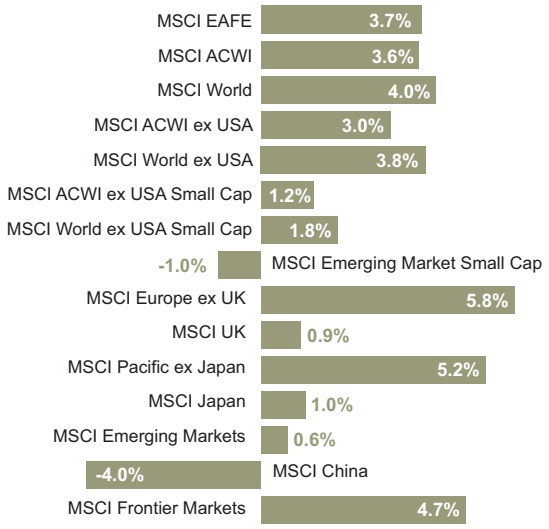
**Emerging Markets** ► *MSCI Emerging Markets Index: +0.6%*

- Emerging market returns were lackluster although, regionally, returns were bar-belled as many Asian countries were held back by trade concerns while EM ex-Asia tended to perform well. Russia (+16.9%) performed strongly with the help of the ruble appreciating by 4.2% relative to the U.S. dollar. Brazil (+7.2%) was also a top contributor due to the initial success of keeping pension reforms on track. China (-4.0%) faltered on tariff concerns.
- Argentina (+31.7%) was the top country performer, aided by the announcement of its inclusion in the **MSCI Emerging Markets Index** at the end of May (eight stocks in total).
- The **MSCI EM Value Index** outperformed the **MSCI EM Growth Index** as many growth-oriented sector and country returns were impacted by trade disputes.

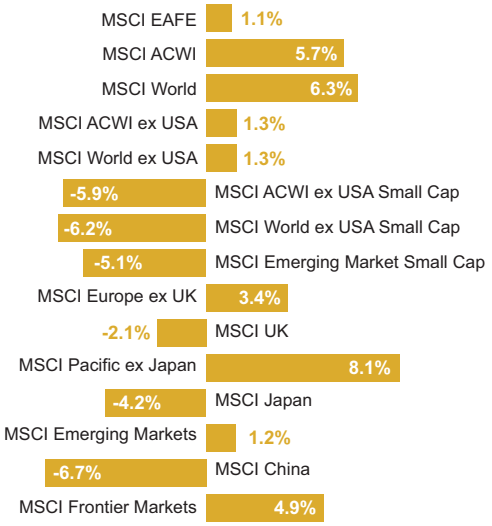
**Non-U.S. Small Cap** ► *MSCI World ex USA Small Cap: +1.8% | MSCI EM Small Cap: +1.0%*

- Non-U.S. small caps lagged large caps as investors preferred lower earnings risk and higher earnings momentum. Emerging market small caps lagged large caps as investors searched for a combination of lower volatility and higher growth that was absent in smaller companies as tariff uncertainty persisted.

**Non-U.S. Equity: Quarterly Returns** (U.S. Dollar)




**Non-U.S. Equity: One-Year Returns** (U.S. Dollar)




Source: MSCI

# Fixed Income

## U.S. Fixed Income

U.S. economic data continued to be mixed as a strong labor market and rising personal income offset waning business confidence and declining industrial production. The Federal Reserve's dovish statements and announced policy objective to "sustain the expansion" caused risk assets and U.S. Treasury yields to rally. Uncertainty surrounding trade policy and muted inflation data provided the Fed with additional cover for its rationale to potentially cut rates later this year.

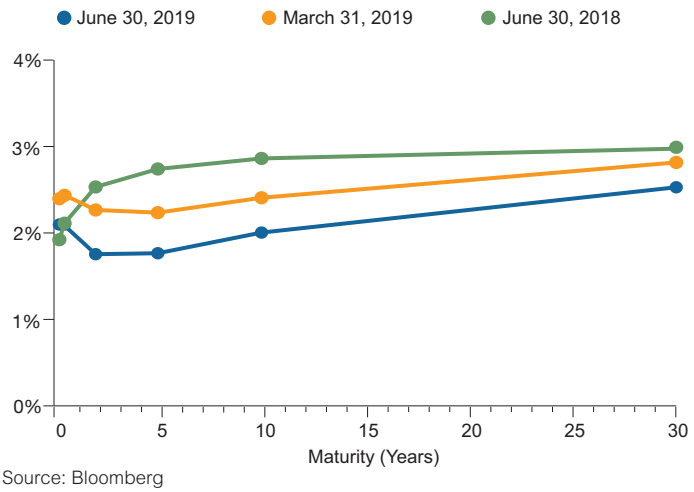
**Core Fixed Income** ► *Bloomberg Barclays US Agg: +3.1%*

- U.S. Treasuries gained 3.0% as the U.S. Treasury yield curve shifted lower across maturities, most dramatically at the 2-year key rate, as traders priced in expectations for the Fed to pre-emptively ease in order to boost domestic economic growth.
- The overall shape of the yield curve did not materially change during the quarter. The yield differential between the 10-year and 2-year key rates remained positive and widened 11 basis points during the quarter to close at 25 bps. However, the front-end of the curve remained inverted, with the 5-year offering roughly the same yield as the 2-year key rate.
- Nominal Treasuries outperformed TIPS as inflation expectations fell; the 10-year breakeven spread was only 1.69% as of quarter-end versus 1.88% at the end of the first quarter.

**Investment-Grade Corporates** ► *Bloomberg Barclays Corporate (Inv. Grade): +4.5%*

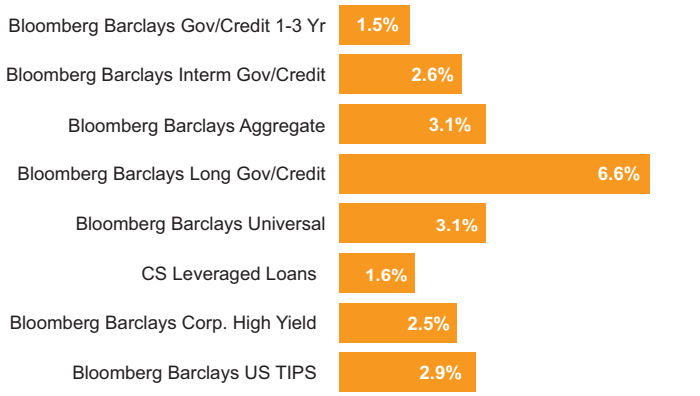
- Credit spreads rallied on the back of dovish Fed policy.
- Gross new corporate supply this quarter was $290.5 billion, which was 14% lower than a year ago. Year-to-date supply was 18% lower than in the first half of 2018. New issuance favored the 6-12 year maturities relative to last year.
- AAA-rated corporates (+5.0%) were the best performers in absolute return terms. BBB-rated lagged AAA by 18 bps, but posted a positive excess return over the index (+1.4%).

### U.S. Treasury Yield Curves



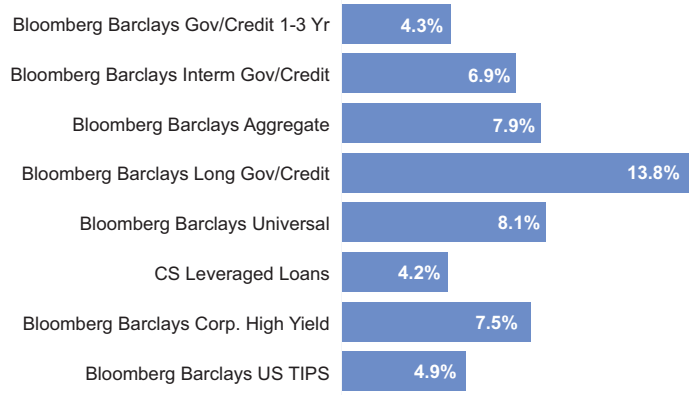

Source: Bloomberg

### U.S. Fixed Income: Quarterly Returns




Sources: Bloomberg Barclays and Credit Suisse

### U.S. Fixed Income: One-Year Returns




Sources: Bloomberg Barclays and Credit Suisse

**High Yield** ► *Bloomberg Barclays Corporate HY: +2.5%*

- High yield corporates posted positive results for the quarter, but lagged investment grade corporates on both absolute and excess returns. High yield gained 9.9% for the first half of 2019.
- Interest rate-sensitive BB-rated issues posted the highest return (+3.1%) while CCC-rated issues rose 0.3%.

**Leveraged Loans** ► *CS Leveraged Loans: +1.6%*

- Bank loans participated in the risk-on rally, but lagged both longer duration IG and HY corporates as interest rates declined.
- Retail outflows remain unabated as the Fed's dovish tone dampened enthusiasm for floating rate assets. New CLO issuance running ahead of expectations has also put technical pressure on the sector as investors absorbed the new float.
- Bank loans have less sensitivity to interest rates, but may have a similar spread duration profile to that of high yield bonds.

## Non-U.S. Fixed Income

**Global Fixed Income** ► *Bloomberg Barclays Global Aggregate: +3.3%*

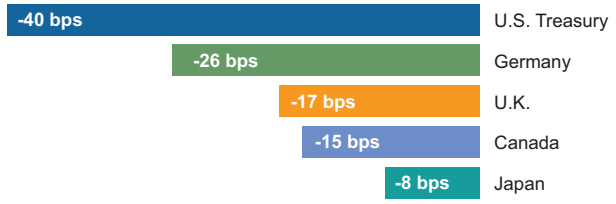
- Other developed market sovereign bonds rose in tandem with the rally in Treasuries and have pushed European sovereigns further into negative yields. The U.S. dollar depreciated modestly versus the euro and yen, but gained versus the U.K. pound.

**Emerging Market Debt ($US)** ► *JPM EMBI Global Diversified: +4.1%* | **(Local currency)** ► *JPM GBI-EM Global Diversified: +5.6%*

- Most emerging market currencies appreciated against the U.S. dollar.
- Top performers included Russia (+10.4%) and Turkey (+10.1%), while Argentina was the worst performer (-5.0%), and one of the few countries to post a negative result this quarter.

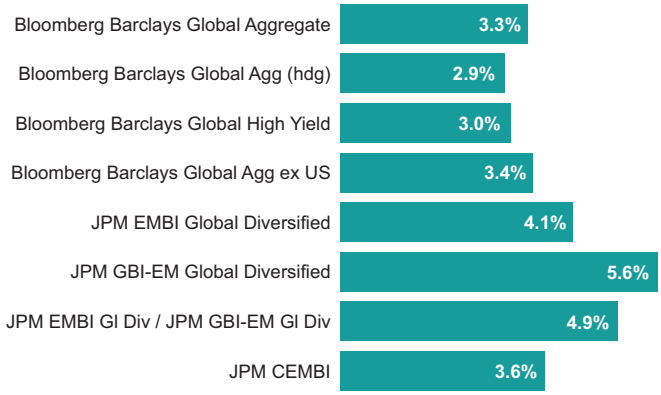
### Change in 10-Year Global Government Bond Yields

1Q19 to 2Q19



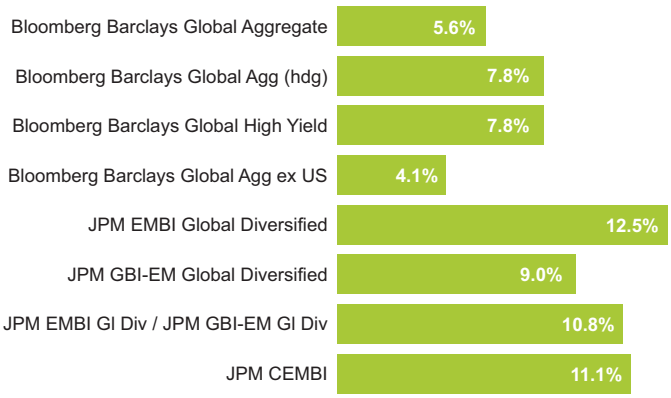

Source: Bloomberg Barclays

### Non-U.S. Fixed Income: Quarterly Returns




Sources: Bloomberg Barclays and JPMorgan Chase

### Non-U.S. Fixed Income: One-Year Returns




Sources: Bloomberg Barclays and JPMorgan Chase

# Real Estate Gains; Real Assets Mostly Fall

**REAL ESTATE/REAL ASSETS** | Munir Iman and Kristin Bradbury

### Income Produces Bulk of Returns

- U.S. core real estate returns continue to be driven by income, with limited appreciation this late in the cycle.
- The **NCREIF Property Index (NPI),** a measure of U.S. institutional real estate assets, gained 1.5% during the second quarter. The income return was 1.1%, while appreciation contributed 0.4%.
- Industrial led property sector performance with a return of 3.4%. Retail finished last, falling 0.1%.
- Regionally, the West led with a 1.9% return, while the Midwest was the worst performer at 0.7%.
- The **NCREIF Open-End Diversified Core Equity Index** (value-weighted, net of fees), representing equity ownership positions in U.S. core real estate, generated a 0.8% total return during the second quarter, with income providing 0.8% and appreciation 0.0%.
- Defensive posturing is becoming more prevalent.

### U.S. Real Estate Fundamentals Remain Healthy

- Steady returns continued, driven by above inflation-level rent growth in many metro areas.
- Within the NPI, the vacancy rate for U.S. offices was 9.8% in the second quarter, the lowest in over 12 years.
- Net operating income has been growing annually and is expected to be the primary return driver.

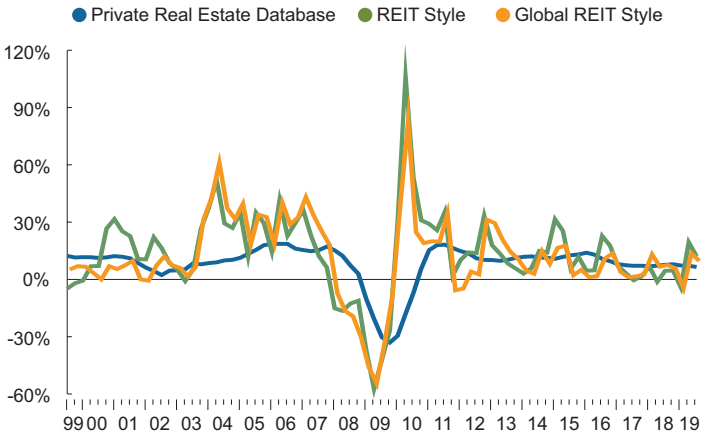
### Pricing remains expensive in the U.S.

- Transaction volumes increased and remain robust.
- Cap rates fell slightly; market remains near full valuations

### REITs underperformed global equities

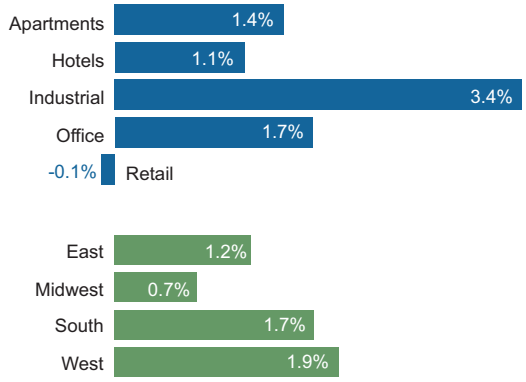
- U.S. REITs advanced 1.2% in the second quarter, underperforming the S&P 500 Index, which rose 4.3%.
- Global REITs fell 0.1% in the second quarter compared to a 3.4% gain for global equities (MSCI ACWI IMI).
- Both U.S. and non-U.S. REITs are trading at NAV.
- Large cap REITs, especially those with lower debt levels, modestly underperformed.

### Rolling One-Year Returns




Source: Callan

### Sector Quarterly Returns by Property Type and Region




Source: NCREIF

## Non-U.S. Real Estate

### Asia

- The growth of the middle class in Asia is steady and the demand for institutional quality real estate is commensurate.
- The number of open-end core funds focused on the Asia Pacific market has increased over recent years and includes both sector-diversified and sector-specific (e.g., logistics) funds, supporting the development of the institutional real estate market in the region. In the first half of the year, India had the first successful IPO for a REIT, which substantiates the institutionalization of the asset class in that country.

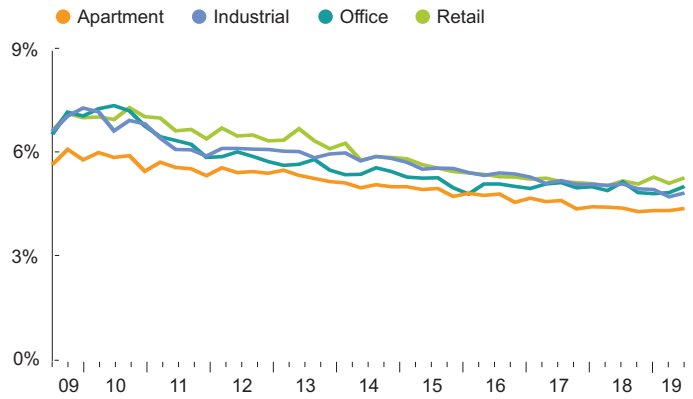
### Europe

- Political uncertainty continues to weigh on overall growth throughout Europe, but real estate fundamentals remain strong in key gateway markets given the continued lack of new supply. Cap rates for prime real estate remain low, as real estate continues to be an attractive asset class as a result of low interest rates throughout the region.
- Institutional interest and investment in multifamily properties keeps expanding, as housing prices continue to grow faster than incomes in major markets across Europe, and demand is supported by continued urbanization and migration to major cities in Europe.

### Real Assets

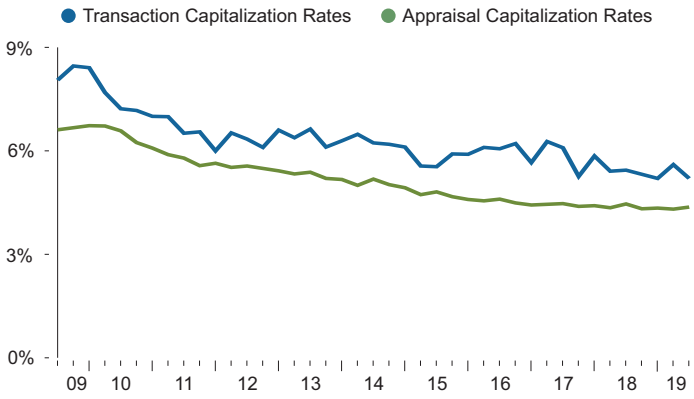
- The **Bloomberg Commodity Index** fell 1.2% in the quarter.
- Both the Precious Metals and Agriculture commodity sectors were positive performers, driven by strong individual returns for gold as well as corn, wheat, and coffee.
- Meanwhile, the Livestock, Energy, and Industrial Metals commodity sectors all posted negative quarterly results.
- Oil pulled back but was roughly flat for the quarter, ending at $58/barrel (West Texas intermediate).
- Natural gas within the **Bloomberg Energy Sub-Index** declined a precipitous 16.2%.
- MLPs (**Alerian MLP Index:** +0.1%) were flat.

### NCREIF Capitalization Rates by Property Type




Source: NCREIF. Capitalization rates (net operating income / current market value (or sale price)) are appraisal-based.

### NCREIF Transaction and Appraisal Capitalization Rates




Source: NCREIF
Note: Transaction capitalization rate is equal weighted.

### Callan Database Median and Index Returns* for Periods ended June 30, 2019

| Private Real Assets | Quarter | Year to Date | Year | 3 Years | 5 Years | 10 Years | 15 Years |
|---|---|---|---|---|---|---|---|
| **Real Estate ODCE Style** | **1.55** | **3.12** | **6.53** | **7.15** | **9.51** | **9.07** | **6.79** |
| NFI-ODCE (value wt net) | 0.77 | 1.98 | 5.46 | 6.61 | 8.76 | 8.87 | 7.01 |
| NCREIF Property | 1.51 | 3.34 | 6.51 | 6.89 | 8.83 | 9.25 | 8.70 |
| NCREIF Farmland | 0.70 | 1.40 | 5.63 | 6.24 | 7.98 | 11.05 | 14.22 |
| NCREIF Timberland | 0.11 | 0.22 | 2.23 | 3.05 | 4.47 | 3.90 | 7.04 |
| **Public Real Estate** | | | | | | | |
| **Global Real Estate Style** | **1.20** | **16.17** | **9.66** | **6.17** | **6.54** | **12.22** | **8.56** |
| FTSE EPRA Nareit Developed | -0.07 | 14.51 | 7.68 | 4.46 | 4.85 | 10.57 | -- |
| **Global ex-U.S. Real Estate Style** | **0.35** | **13.95** | **7.84** | **8.97** | **5.45** | **9.97** | **8.10** |
| FTSE EPRA Nareit Dev ex US | -0.58 | 12.89 | 6.09 | 6.79 | 3.47 | 8.26 | -- |
| **U.S. REIT Style** | **2.06** | **19.28** | **12.11** | **5.17** | **8.60** | **16.15** | **9.90** |
| EPRA Nareit Equity REITs | 1.24 | 17.78 | 11.21 | 4.20 | 7.92 | 15.46 | 9.05 |

*Returns less than one year are not annualized.
Sources: Callan, FTSE Russell, NCREIF

# Value Is in the Eye of the Beholder

**PRIVATE EQUITY** | Gary Robertson

Fundraising, company purchase prices, and IPOs increased in the second quarter. However, private M&A investment and exit measures were flat to markedly down. Average buyout company prices and leverage levels hit a record in 2019, tempering transaction activity. Private equity returns remained positive, despite the fourth quarter public equity sell-off.

– **Fundraising** ► Based on preliminary data, final closes for private equity partnerships in the second quarter totaled $143 billion of commitments in 203 partnerships. (Unless otherwise noted, all data in this commentary come from PitchBook.) The dollar volumes rose 8% and the number of funds rose 25% from the first quarter. For the first half, 2019 is running $99 billion or 21% behind a year ago. We expect that the second half of 2019 will be larger than the first half, as some large fundraises are slated to start in the fourth quarter, and sought-after general partners are closing new funds quickly.

– **Buyouts** ► New buyout transactions continued declining in the quarter. Funds closed 1,424 investments with $97 billion in disclosed deal value, representing a 12% decline in count and a 9% dip in dollar value from the first quarter. Average buyout prices leaped to 11.2x EBITDA in 2019 versus 10.6x in 2018, providing a headwind for investment volume.

– **VC Investments** ► New rounds of financing in venture capital companies totaled 4,656, with $55 billion of announced value. The number of investments was down 15% but announced value rose 10%. Venture prices generally rose during the quarter, particularly for larger later-stage investments.

– **Exits** ► There were 336 private M&A exits of private equity-backed companies, with disclosed values totaling $80 billion. The private sale count fell 28% but the announced dollar volume rose 4%. There were 35 private equity-backed IPOs in the second quarter raising an aggregate $15 billion, up 250% and 650%, respectively, from the first quarter.

– Venture-backed M&A exits totaled 290 transactions with disclosed value of $20 billion. The number of sales declined 14% from the first quarter, and announced value fell 62%. There were 54 VC-backed IPOs in the second quarter with a combined float of $54 billion; the count jumped 116% and the issuance ballooned 340% as unicorns such as Uber, Slack, and Pinterest made their public debuts.

**Funds Closed January 1 to June 30, 2019**

| Strategy | No. of Funds | Amt ($mm) | Share |
|---|---|---|---|
| Venture Capital | 159 | 30,984 | 11% |
| Growth Equity | 95 | 142,750 | 52% |
| Buyouts | 37 | 26,682 | 10% |
| Mezzanine Debt | 25 | 41,150 | 15% |
| Distressed | 6 | 9,840 | 4% |
| Energy | 6 | 12,266 | 4% |
| Secondary and Other | 23 | 8,690 | 3% |
| Fund-of-funds | 14 | 4,371 | 2% |
| **Totals** | **365** | **276,733** | **100%** |

Source: PitchBook (Figures may not total due to rounding.)

**Private Equity Performance Database (%) (Pooled Horizon IRRs through March 31, 2019*)**

| Strategy | 3 Months | Year | 3 Years | 5 Years | 10 Years | 15 Years | 20 Years |
|---|---|---|---|---|---|---|---|
| All Venture | 5.71 | 19.54 | 13.70 | 14.32 | 14.38 | 11.37 | 15.71 |
| Growth Equity | 6.14 | 16.87 | 16.41 | 13.05 | 15.05 | 13.23 | 13.76 |
| All Buyouts | 4.52 | 10.65 | 15.56 | 12.25 | 15.63 | 13.78 | 12.23 |
| Mezzanine | 2.25 | 7.56 | 11.67 | 10.30 | 11.09 | 10.47 | 8.83 |
| Distressed | 2.28 | 4.65 | 9.89 | 6.31 | 16.26 | 9.70 | 10.24 |
| **All Private Equity** | **4.13** | **4.60** | **10.73** | **7.71** | **13.11** | **10.60** | **10.66** |
| S&P 500 | 4.86 | 12.66 | 14.66 | 12.08 | 15.15 | 12.79 | 12.55 |

Note: Private equity returns are net of fees. Sources: Refinitiv/Cambridge and Standard & Poor's
*Most recent data available at time of publication

Note: Transaction count and dollar volume figures across all private equity measures are preliminary figures and are subject to update in subsequent versions of *Capital Market Review* and other Callan publications.

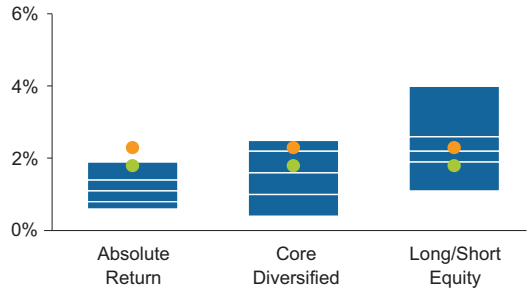
# Continuing Rally Boosts Most Strategies

**HEDGE FUNDS/MACs** | Jim McKee

### Top-Down Jumps Ahead; Bottom-Up Plods Forward

- Risk-on sentiment in equities and rates supported virtually all hedge fund strategies.
- *Global Macro* (+4.6%) and *Managed Futures* (+4.7%) led, supported by continuing trends/bets in the rates markets.
- Most relative value strategies slogged forward; *Equity Market Neutral* (-0.3%) slipped, indicating challenges with stock-specific risk factors.
- *Long/Short Equity* (+1.3%) lagged equities; *Event-Driven Multi-Strategy* (+2.9%) performed better with soft catalyst-driven stocks continuing to rebound from the fourth quarter sell-off.
- *Risk Arb* (+0.7%) and *Distressed* (+1.5%) edged ahead with their process-driven or hard-catalyst trades.
- Hedge fund portfolios with more exposure to macro or long-biased strategies beat absolute return, particularly those trading equity fundamentals without beta exposure.
- The median manager in the **Callan Hedge Fund-of-Funds Database Group,** net of fees, gained 1.9% in the second quarter. Within that broad grouping, the *Long/Short Equity FOF Style Group* (+2.2%) saw the biggest increase, followed by *Core Diversified* (+1.6%) and *Absolute Return* (+1.1%).

### Hedge Fund-of-Funds Style Group Returns




| | Absolute Return | Core Diversified | Long/Short Equity |
|---|---|---|---|
| 10th Percentile | 1.9 | 2.5 | 4.0 |
| 25th Percentile | 1.4 | 2.2 | 2.6 |
| Median | 1.1 | 1.6 | 2.2 |
| 75th Percentile | 0.8 | 1.0 | 1.9 |
| 90th Percentile | 0.6 | 0.4 | 1.1 |
| CS Hedge Fund ● | 2.3 | 2.3 | 2.3 |
| 90-Day T-Bill +5% ● | 1.8 | 1.8 | 1.8 |

Sources: Callan, Credit Suisse, and Federal Reserve

### Callan Database Median and Index Returns* for Periods ended June 30, 2019

| Hedge Fund Universe | Quarter | Year | 3 Years | 5 Years | 10 Years | 15 Years |
|---|---|---|---|---|---|---|
| **Callan Fund-of-Funds Database** | **1.85** | **5.06** | **2.69** | **5.14** | **4.59** | **4.59** |
| **Callan Absolute Return FOF Style** | **1.13** | **4.42** | **2.84** | **5.00** | **4.00** | **4.00** |
| **Callan Core Diversified FOF Style** | **1.56** | **4.52** | **2.16** | **4.95** | **4.61** | **4.61** |
| **Callan Long/Short Equity FOF Style** | **2.17** | **6.76** | **3.46** | **5.52** | **5.47** | **5.47** |
| Credit Suisse Hedge Fund | 2.35 | 4.34 | 2.36 | 5.03 | 5.01 | 5.01 |
| CS Convertible Arbitrage | 1.25 | 3.99 | 2.18 | 5.68 | 3.81 | 3.81 |
| CS Distressed | 1.52 | 5.23 | 1.22 | 5.82 | 5.63 | 5.63 |
| CS Emerging Markets | 1.41 | 6.19 | 4.08 | 5.73 | 6.57 | 6.57 |
| CS Equity Market Neutral | -0.25 | 1.39 | 0.31 | 1.73 | -0.26 | -0.26 |
| CS Event-Driven Multi | 2.86 | 4.82 | -0.09 | 4.19 | 5.20 | 5.20 |
| CS Fixed Income Arb | 1.21 | 5.19 | 3.36 | 6.55 | 3.78 | 3.78 |
| CS Global Macro | 4.55 | 4.81 | 3.01 | 5.23 | 6.26 | 6.26 |
| CS Long/Short Equity | 1.25 | 5.46 | 3.39 | 5.66 | 5.80 | 5.80 |
| CS Managed Futures | 4.73 | -1.65 | 2.50 | 1.57 | 3.23 | 3.23 |
| CS Multi-Strategy | 2.11 | 4.87 | 4.45 | 6.93 | 5.95 | 5.95 |
| CS Risk Arbitrage | 0.70 | 3.89 | 2.04 | 3.03 | 3.74 | 3.74 |
| HFRI Asset Wtd Composite | 2.12 | 5.15 | 3.00 | 5.15 | -- | -- |
| 90-Day T-Bill + 5% | 1.84 | 6.38 | 5.87 | 5.49 | 6.38 | 6.38 |

*Gross of fees. Sources: Bloomberg Barclays, Callan, Credit Suisse, Hedge Fund Research, Societe Generale, and Standard & Poor's

## Continuing Rally Lifts Long-Biased MACs; Risk Premia Languished Again

- **HFR Risk Parity Index** targeting 12% volatility gained 4.9%, propelled by rising stock and bond markets, amplified by portfolio leverage.
- Across these risk premia represented by HFR's Risk Premia indexes, *Rates Momentum* (+18.6%) benefited from global yields continuing their slide. Negative effects from other risk premia, especially in equities and commodities, dragged down overall performance.
- The **Callan Multi-Asset Class (MAC) Database Group** increased 2.3% in the quarter. Within that group, the *Risk Parity MAC Style Group* rose 4.6%, followed by *Long Biased* (+2.6%) and *Absolute Return* (+1.8%). *Risk Premia* fell 1.3%.

## Volatility Settles Down Again with Risk-On Sentiment

- Markets are discounting continued growth with lower expected rates priced into valuations.
- If hard economic data does not confirm the market's buoyant sentiment, hedge funds are well positioned defensively for a downturn.
- Without a sustained pick-up in volatility, hedge funds are likely to lag.

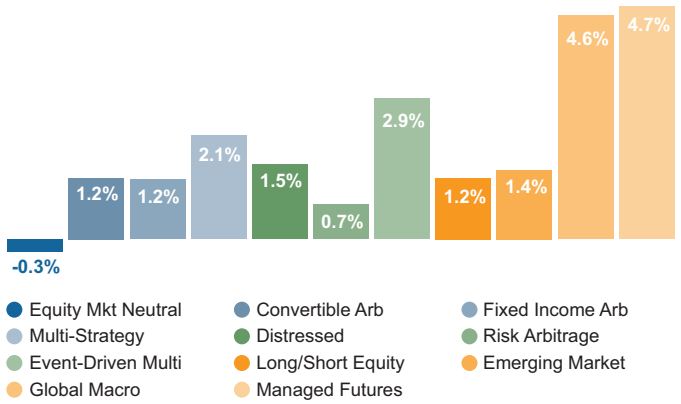
## Flat Yield Curve Continues to Level Playing Field

- While both long and short rates settled to lower levels, today's positive short-term rates are still providing support to hedge funds on cash holdings and short interest rebates.
- If the Fed lowers rates aggressively from here due to weakening economic growth, fixed income and diversifying strategies of "hedged" funds will likely benefit at the expense of equities suffering from lowered earnings expectations.

## Economic Divergence Creates More Opportunity

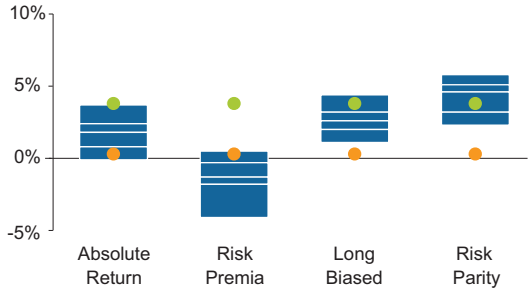
- Global macro tensions can lead to more fundamental and technical imbalances for hedge funds to trade.

### Credit Suisse Hedge Fund Strategy Returns




Source: Credit Suisse

### MAC Style Group Returns




| | Absolute Return | Risk Premia | Long Biased | Risk Parity |
|---|---|---|---|---|
| 10th Percentile | 3.7 | 0.5 | 4.4 | 5.8 |
| 25th Percentile | 2.4 | -0.3 | 3.2 | 5.1 |
| Median | 1.8 | -1.3 | 2.6 | 4.6 |
| 75th Percentile | 0.8 | -1.8 | 2.0 | 3.2 |
| 90th Percentile | -0.1 | -4.1 | 1.1 | 2.3 |
| Eurekahedge MFRP (5%v) | 0.3 | 0.3 | 0.3 | 0.3 |
| 60% S&P 500/ 40% BB Barclays Agg | 3.8 | 3.8 | 3.8 | 3.8 |

Sources: Bloomberg Barclays, Callan, Euredahedge, Standard & Poor's

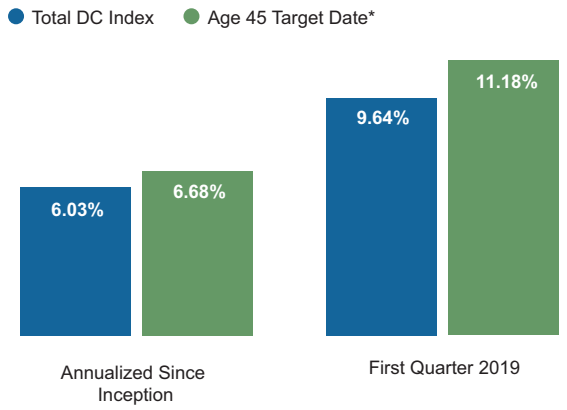
# Returns, Inflows Both Rebound for DC Index

**DEFINED CONTRIBUTION** | Patrick Wisdom

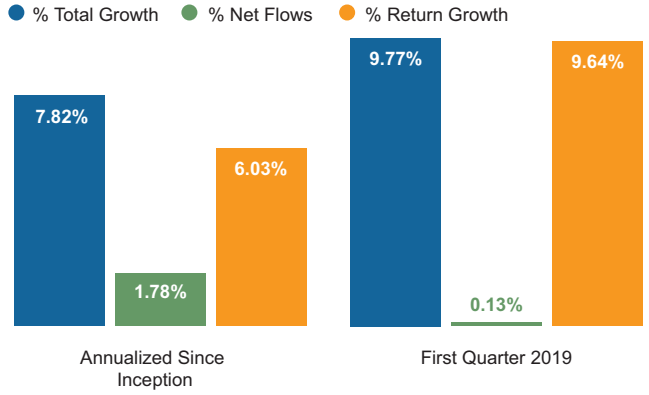
- After a rough finish to 2018, the Callan DC Index™ rebounded in the first quarter of 2019, gaining 9.6%. The Age 45 Target Date Fund posted even stronger results, gaining 11.2%, largely attributable to the Age 45 TDF's higher equity allocation (78% vs. 69%).
- After two quarters of negative flows, strong investment results and cash flows led to sizeable growth in balances in the first quarter, a reversal from two consecutive quarters of negative flows. The 9.8% total gain in market value for the quarter marked the highest since the first quarter of 2012 (9.9%).
- After an aberration in the fourth quarter, target date funds saw the largest inflows in the first quarter. Moreover, stable value experienced relatively large outflows after having the largest inflows the previous quarter. Despite strong equity gains in the first quarter, both U.S. and non-U.S. equity saw large outflows. At the same time, U.S. fixed and money market funds experienced relatively large inflows, perhaps indicating a shift toward safer securities within the core lineup.
- First quarter turnover (i.e., net transfer activity levels within DC plans) increased slightly to 0.48% from the previous quarter's 0.41%.
- After equities rebounded in the first quarter, the share of equity rose to 69.5% from 68.8% the previous quarter.
- Target date funds ended the quarter with 30% of assets, down from 33% the previous quarter. Among asset classes that increased, U.S. large cap (25%) and U.S./global balanced (7%) were up roughly 1 percentage point.
- Stable value's prevalence within DC plans rose for the sixth consecutive quarter and is now at 76%. Additionally, more plans are now offering emerging market equity (18%) as an option compared to the previous quarter.

*The Callan DC Index is an equally weighted index tracking the cash flows and performance of nearly 90 plans, representing more than one million DC participants and over $150 billion in assets. The Index is updated quarterly and is available on Callan's website, as is the quarterly DC Observer newsletter.*

### Investment Performance




### Growth Sources




### Net Cash Flow Analysis (First Quarter 2019)

(Top Two and Bottom Two Asset Gatherers)

| Asset Class | Flows as % of Total Net Flows |
|---|---|
| Target Date Funds | 73.22% |
| U.S. Fixed Income | 21.27% |
| U.S./Global Balanced | -16.65% |
| U.S. Large Cap | -24.86% |
| **Total Turnover**** | **0.48%** |

Data provided here is the most recent available at time of publication.

Source: Callan DC Index

Note: DC Index inception date is January 2006.

* The Age 45 Fund transitioned from the average 2035 TDF to the 2040 TDF in June 2018.

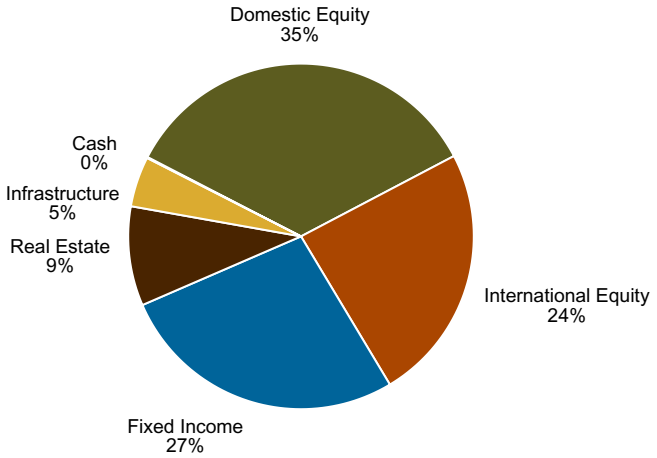
** Total Index "turnover" measures the percentage of total invested assets (transfers only, excluding contributions and withdrawals) that moved between asset classes.

Total Fund

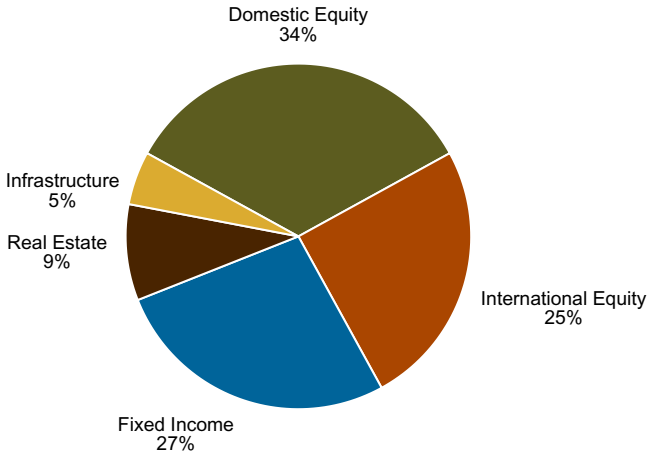
## Actual vs Target Asset Allocation
## As of June 30, 2019

The top left chart shows the Fund's asset allocation as of June 30, 2019. The top right chart shows the Fund's target asset allocation as outlined in the investment policy statement. The bottom chart ranks the fund's asset allocation and the target allocation versus the Callan Public Fund Sponsor Database.

### Actual Asset Allocation

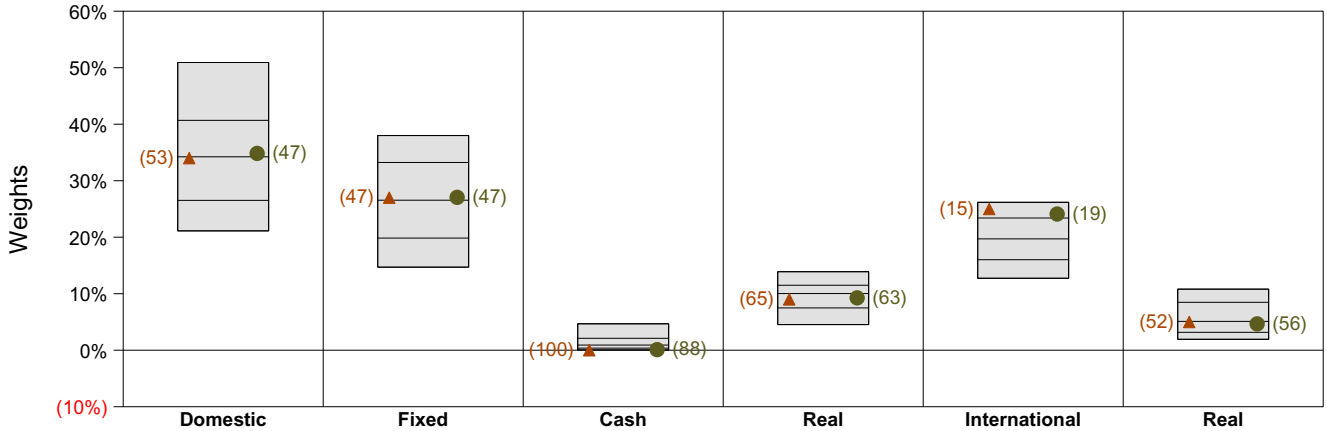



### Target Asset Allocation




| Asset Class | $000s Actual | Weight Actual | Target | Percent Difference | $000s Difference |
|---|---|---|---|---|---|
| Domestic Equity | 291,391 | 34.8% | 34.0% | 0.8% | 6,934 |
| International Equity | 201,638 | 24.1% | 25.0% | (0.9%) | (7,521) |
| Fixed Income | 226,316 | 27.1% | 27.0% | 0.1% | 424 |
| Real Estate | 77,499 | 9.3% | 9.0% | 0.3% | 2,201 |
| Infrastructure | 38,964 | 4.7% | 5.0% | (0.3%) | (2,868) |
| Cash | 830 | 0.1% | 0.0% | 0.1% | 830 |
| Total | 836,638 | 100.0% | 100.0% | | |

### Asset Class Weights vs Callan Public Fund Sponsor Database




| | Domestic Equity | Fixed Income | Cash | Real Estate | International Equity | Real Assets |
|---|---|---|---|---|---|---|
| 10th Percentile | 50.92 | 37.99 | 4.68 | 13.90 | 26.17 | 10.81 |
| 25th Percentile | 40.68 | 33.23 | 2.11 | 11.50 | 23.40 | 8.48 |
| Median | 34.23 | 26.55 | 0.91 | 10.03 | 19.71 | 5.10 |
| 75th Percentile | 26.52 | 19.85 | 0.37 | 7.48 | 16.02 | 3.17 |
| 90th Percentile | 21.12 | 14.70 | 0.05 | 4.54 | 12.73 | 1.93 |
| **Fund** ● | 34.83 | 27.05 | 0.10 | 9.26 | 24.10 | 4.66 |
| Target ▲ | 34.00 | 27.00 | 0.00 | 9.00 | 25.00 | 5.00 |
| % Group Invested | 98.56% | 97.12% | 78.42% | 76.98% | 96.40% | 24.46% |

* Current Quarter Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

## Investment Manager Asset Allocation

The table below contrasts the distribution of assets across the Fund's investment managers as of June 30, 2019, with the distribution as of March 31, 2019. The change in asset distribution is broken down into the dollar change due to Net New Investment and the dollar change due to Investment Return.

### Asset Distribution Across Investment Managers

| | June 30, 2019 | | | | March 31, 2019 | |
|---|---|---|---|---|---|---|
| | Market Value | Weight | Net New Inv. | Inv. Return | Market Value | Weight |
| **Domestic Equity** | **$291,390,567** | **34.83%** | **$(4,017,753)** | **$11,037,788** | **$284,370,532** | **34.86%** |
| **Large Cap Equity** | **$222,144,979** | **26.55%** | **$(3,016,079)** | **$8,410,848** | **$216,750,211** | **26.57%** |
| Alliance S&P Index | 67,345,430 | 8.05% | (2,002,777) | 2,837,724 | 66,510,483 | 8.15% |
| PIMCO StocksPLUS | 34,150,105 | 4.08% | 0 | 1,490,392 | 32,659,714 | 4.00% |
| BlackRock Russell 1000 Value | 60,419,879 | 7.22% | (11,403) | 2,239,366 | 58,191,915 | 7.13% |
| T. Rowe Price Large Cap Growth | 60,229,565 | 7.20% | (1,001,900) | 1,843,366 | 59,388,098 | 7.28% |
| **Small/Mid Cap Equity** | **$69,245,588** | **8.28%** | **$(1,001,673)** | **$2,626,940** | **$67,620,321** | **8.29%** |
| Champlain Mid Cap | 34,290,459 | 4.10% | (1,000,523) | 1,119,138 | 34,171,844 | 4.19% |
| Pyramis Small Cap | 34,955,130 | 4.18% | (1,150) | 1,507,803 | 33,448,477 | 4.10% |
| **International Equity** | **$201,638,481** | **24.10%** | **$(137,901)** | **$5,073,486** | **$196,702,897** | **24.11%** |
| Causeway International Opportunities (3) | 78,532,446 | 9.39% | 0 | 1,024,408 | 77,508,038 | 9.50% |
| Aberdeen EAFE Plus | 83,449,553 | 9.97% | (137,901) | 2,569,905 | 81,017,550 | 9.93% |
| American Century Non-US SC [1] | 39,656,482 | 4.74% | 0 | 1,479,172 | 38,177,310 | 4.68% |
| **Fixed Income** | **$226,316,271** | **27.05%** | **$(28,986)** | **$7,403,677** | **$218,941,579** | **26.84%** |
| BlackRock U.S. Debt Fund | 111,703,222 | 13.35% | (28,986) | 3,352,587 | 108,379,621 | 13.29% |
| PIMCO Fixed Income | 114,613,049 | 13.70% | 0 | 4,051,090 | 110,561,958 | 13.55% |
| **Real Estate** | **$77,498,617** | **9.26%** | **$(308,351)** | **$(797,965)** | **$78,604,933** | **9.64%** |
| JP Morgan Strategic Property Fund | 51,853,651 | 6.20% | 0 | (978,737) | 52,832,388 | 6.48% |
| JP Morgan Income and Growth Fund | 25,644,966 | 3.07% | (308,351) | 180,772 | 25,772,545 | 3.16% |
| **Infrastructure** | **$38,963,665** | **4.66%** | **$(901,671)** | **$4,381,210** | **$35,484,126** | **4.35%** |
| Macquarie European Infrastructure | 12,707,974 | 1.52% | (901,671) | 4,381,210 | 9,228,435 | 1.13% |
| SteelRiver Infrastructure | 26,255,691 | 3.14% | 0 | 0 | 26,255,691 | 3.22% |
| **Cash Composite** | **$830,226** | **0.10%** | **$(778,614)** | **$8,473** | **$1,600,366** | **0.20%** |
| Cash | 830,226 | 0.10% | (778,614) | 8,473 | 1,600,366 | 0.20% |
| **Total Plan** | **$836,637,828** | **100.0%** | **$(6,173,276)** | **$27,106,670** | **$815,704,435** | **100.0%** |

[1] American Century was funded May 2016.

## Investment Manager Returns

The table below details the rates of return for the Fund's investment managers over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

**Returns for Periods Ended June 30, 2019**

| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years |
|---|---|---|---|---|---|
| **Gross of Fees** | | | | | |
| **Domestic Equity** | **3.88%** | **9.87%** | **15.93%** | **11.45%** | **15.66%** |
| Total Domestic Equity Target (1) | 4.01% | 8.50% | 13.80% | 10.07% | 14.68% |
| **Large Cap Equity** | **3.88%** | **9.94%** | **15.73%** | **11.20%** | **15.20%** |
| S&P 500 Index | 4.30% | 10.42% | 14.19% | 10.71% | 14.70% |
| Alliance S&P Index | 4.28% | 10.39% | 14.14% | 10.68% | 14.66% |
| PIMCO StocksPLUS | 4.56% | 10.64% | 14.57% | 10.68% | 16.77% |
| S&P 500 Index | 4.30% | 10.42% | 14.19% | 10.71% | 14.70% |
| BlackRock Russell 1000 Value Index | 3.85% | 8.61% | 10.30% | 7.55% | 13.29% |
| Russell 1000 Value Index | 3.84% | 8.46% | 10.19% | 7.46% | 13.19% |
| T. Rowe Price Large Cap Growth | 3.09% | 10.46% | 23.63% | 15.63% | 18.40% |
| Russell 1000 Growth Index | 4.64% | 11.56% | 18.07% | 13.39% | 16.28% |
| **Small/Mid Cap Equity U.S. Equity** | **3.89%** | **9.76%** | **16.57%** | **12.32%** | **17.20%** |
| Russell 2500 Index | 2.96% | 1.77% | 12.34% | 7.66% | 14.44% |
| Champlain Mid Cap | 3.26% | 16.06% | 19.11% | 14.29% | 17.25% |
| Russell MidCap Index | 4.13% | 7.83% | 12.16% | 8.63% | 15.16% |
| Pyramis Small Cap | 4.51% | 2.94% | 13.72% | 10.10% | 16.76% |
| Russell 2000 Index | 2.10% | (3.31%) | 12.30% | 7.06% | 13.45% |
| **International Equity** | **2.63%** | **(1.87%)** | **8.78%** | **1.90%** | **6.92%** |
| MSCI ACWI x US (Net) | 2.98% | 1.29% | 9.39% | 2.16% | 6.54% |
| Causeway International Opportunities (3) | 1.32% | (2.57%) | 8.85% | 2.15% | 8.82% |
| Causeway Linked Index (3) | 2.98% | 1.29% | 9.39% | 2.57% | 7.07% |
| Aberdeen EAFE Plus | 3.17% | 3.04% | 8.01% | 0.90% | 7.44% |
| MSCI ACWI x US (Net) | 2.98% | 1.29% | 9.39% | 2.16% | 6.54% |
| American Century Non-US SC (4) | 4.12% | (9.14%) | 10.98% | - | - |
| MSCI ACWI ex US Small Cap | 1.21% | (5.94%) | 7.76% | 2.77% | 8.48% |
| **Fixed Income** | **3.38%** | **9.29%** | **4.70%** | **4.24%** | **5.57%** |
| Blmbg Aggregate Index | 3.08% | 7.87% | 2.31% | 2.95% | 3.90% |
| BlackRock U.S. Debt Fund | 3.09% | 7.97% | 2.41% | 3.06% | 4.02% |
| Blmbg Aggregate Index | 3.08% | 7.87% | 2.31% | 2.95% | 3.90% |
| PIMCO Fixed Income | 3.66% | 10.57% | 6.50% | 5.19% | 6.79% |
| Custom Index (2) | 3.42% | 9.53% | 4.01% | 3.99% | 5.54% |

(1) The Total Domestic Equity target is currently composed of 78% S&P 500 and 22% Russell 2500 Index.
(2) The custom index is currently composed of 25% Barclays Mortgage, 25% Barclays Credit, 25% Barclays High Yield, and 25% JP Morgan EMBI Global. Prior to 2/1/2012, the custom index was composed of 70% Barclays Mortgage, 15% Barclays Credit, and 15% Barclays High Yield.
(3) Causeway International Value transitioned to International Opportunities in May 2016; as such, the index has been changed accordingly from EAFE to ACWI ex-US (Net Div).
(4) American Century Non-US SC was funded during second quarter 2016.

## Investment Manager Returns

The table below details the rates of return for the Fund's investment managers over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

**Returns for Periods Ended June 30, 2019**

| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years |
|---|---|---|---|---|---|
| **Gross of Fees** | | | | | |
| **Real Estate** | **(1.02%)** | **2.47%** | **6.06%** | **8.53%** | **9.11%** |
| NFI-ODCE Value Weight Gr | 1.00% | 6.41% | 7.57% | 9.76% | 9.88% |
| JP Morgan Strategic Property Fund | (1.85%) | 1.65% | 5.76% | 8.30% | 9.31% |
| NFI-ODCE Value Weight Gr | 1.00% | 6.41% | 7.57% | 9.76% | 9.88% |
| JP Morgan Income and Growth Fund | 0.70% | 4.19% | 6.66% | 9.18% | 11.59% |
| NFI-ODCE Value Weight Gr | 1.00% | 6.41% | 7.57% | 9.76% | 9.88% |
| **Infrastructure** | **12.66%** | **23.76%** | **18.38%** | **12.68%** | **11.00%** |
| CPI + 4% | 1.76% | 5.44% | 6.01% | 5.25% | 5.70% |
| Macquarie European Infrastructure | 52.43% | 57.37% | 44.55% | 23.86% | 15.86% |
| SteelRiver Infrastructure | 0.00% | 12.29% | 5.29% | 7.81% | 9.44% |
| CPI + 4% | 1.76% | 5.44% | 6.01% | 5.25% | 5.70% |
| **Cash Composite** | **0.57%** | **2.11%** | **1.33%** | **0.82%** | **0.49%** |
| **Total Fund** | **3.34%** | **6.60%** | **10.34%** | **7.54%** | **10.78%** |
| Total Fund Benchmark* | 3.17% | 6.28% | 8.73% | 6.43% | 9.82% |

* Current Quarter Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

## Investment Manager Returns

The table below details the rates of return for the Fund's investment managers over various time periods ended June 30. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

| | FY 2019 | FY 2018 | FY 2017 | FY 2016 | FY 2015 |
|---|---|---|---|---|---|
| **Gross of Fees** | | | | | |
| **Domestic Equity** | **9.87%** | **16.87%** | **21.35%** | **1.24%** | **9.01%** |
| Total Domestic Equity Target (1) | 8.50% | 14.79% | 18.34% | 2.28% | 7.15% |
| **Large Cap Equity** | **9.94%** | **16.40%** | **21.12%** | **1.60%** | **7.96%** |
| S&P 500 Index | 10.42% | 14.37% | 17.90% | 3.99% | 7.42% |
| Alliance S&P Index | 10.39% | 14.33% | 17.80% | 3.97% | 7.43% |
| PIMCO StocksPLUS | 10.64% | 14.13% | 19.11% | 2.68% | 7.57% |
| S&P 500 Index | 10.42% | 14.37% | 17.90% | 3.99% | 7.42% |
| BlackRock Russell 1000 Value Index | 8.61% | 6.88% | 15.61% | 2.75% | 4.34% |
| Russell 1000 Value Index | 8.46% | 6.77% | 15.53% | 2.86% | 4.13% |
| T. Rowe Price Large Cap Growth | 10.46% | 29.95% | 31.65% | (2.64%) | 12.35% |
| Russell 1000 Growth Index | 11.56% | 22.51% | 20.42% | 3.02% | 10.56% |
| **Small/Mid Cap Equity U.S. Equity** | **9.76%** | **18.33%** | **21.97%** | **0.17%** | **12.68%** |
| Russell 2500 Index | 1.77% | 16.24% | 19.84% | (3.67%) | 5.92% |
| Champlain Mid Cap | 16.06% | 18.85% | 22.50% | 4.64% | 10.27% |
| Russell MidCap Index | 7.83% | 12.33% | 16.48% | 0.56% | 6.63% |
| Pyramis Small Cap | 2.94% | 17.78% | 21.31% | (4.41%) | 15.07% |
| Russell 2000 Index | (3.31%) | 17.57% | 24.60% | (6.73%) | 6.49% |
| **International Equity** | **(1.87%)** | **8.64%** | **20.73%** | **(9.40%)** | **(5.79%)** |
| MSCI ACWI x US (Net) | 1.29% | 7.28% | 20.45% | (10.24%) | (5.26%) |
| Causeway International Opportunities (3) | (2.57%) | 7.29% | 23.39% | (11.66%) | (2.38%) |
| Causeway Linked Index (3) | 1.29% | 7.28% | 20.45% | (9.42%) | (4.22%) |
| Aberdeen EAFE Plus | 3.04% | 3.38% | 18.30% | (7.60%) | (10.16%) |
| MSCI ACWI x US (Net) | 1.29% | 7.28% | 20.45% | (10.24%) | (5.26%) |
| American Century Non-US SC | (9.14%) | 23.86% | 21.46% | - | - |
| MSCI ACWI ex US Small Cap | (5.94%) | 10.57% | 20.32% | (5.46%) | (3.07%) |
| **Fixed Income** | **9.29%** | **0.43%** | **4.58%** | **6.39%** | **0.78%** |
| Blmbg Aggregate Index | 7.87% | (0.40%) | (0.31%) | 6.00% | 1.86% |
| BlackRock U.S. Debt Fund | 7.97% | (0.31%) | (0.21%) | 6.13% | 1.99% |
| Blmbg Aggregate Index | 7.87% | (0.40%) | (0.31%) | 6.00% | 1.86% |
| PIMCO Fixed Income | 10.57% | 1.16% | 7.99% | 6.55% | 0.05% |
| Custom Index (2) | 9.53% | (1.05%) | 3.83% | 7.28% | 0.75% |

(1) The Total Domestic Equity target is currently composed of 78% S&P 500 and 22% Russell 2500 Index.
(2) The custom index is currently composed of 25% Barclays Mortgage, 25% Barclays Credit, 25% Barclays High Yield, and 25% JP Morgan EMBI Global. Prior to 2/1/2012, the custom index was composed of 70% Barclays Mortgage, 15% Barclays Credit, and 15% Barclays High Yield.
(3) Causeway International Value transitioned to International Opportunities in May 2016; as such, the index has been changed accordingly from EAFE to ACWI ex-US (Net Div).

## Investment Manager Returns

The table below details the rates of return for the Fund's investment managers over various time periods ended June 30. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

| | FY 2019 | FY 2018 | FY 2017 | FY 2016 | FY 2015 |
|---|---|---|---|---|---|
| **Gross of Fees** | | | | | |
| **Real Estate** | **2.47%** | **7.72%** | **8.07%** | **10.80%** | **13.92%** |
| NFI-ODCE Value Weight Gr | 6.41% | 8.44% | 7.87% | 11.82% | 14.43% |
| JP Morgan Strategic Property Fund | 1.65% | 7.80% | 7.94% | 11.10% | 13.37% |
| NFI-ODCE Value Weight Gr | 6.41% | 8.44% | 7.87% | 11.82% | 14.43% |
| JP Morgan Income and Growth Fund | 4.19% | 7.54% | 8.27% | 10.06% | 16.19% |
| NFI-ODCE Value Weight Gr | 6.41% | 8.44% | 7.87% | 11.82% | 14.43% |
| **Infrastructure** | **23.76%** | **18.95%** | **12.69%** | **12.61%** | **(2.75%)** |
| CPI + 4% | 5.44% | 7.09% | 5.50% | 4.64% | 3.62% |
| Macquarie European Infrastructure | 57.37% | 59.87% | 20.04% | 6.82% | (9.64%) |
| SteelRiver Infrastructure | 12.29% | (2.94%) | 7.09% | 17.75% | 5.97% |
| CPI + 4% | 5.44% | 7.09% | 5.50% | 4.64% | 3.62% |
| **Cash Composite** | **2.11%** | **1.22%** | **0.68%** | **0.12%** | **0.00%** |
| **Total Fund** | **6.60%** | **9.81%** | **14.77%** | **2.33%** | **4.63%** |
| Total Fund Benchmark* | 6.28% | 7.96% | 12.04% | 1.82% | 4.34% |

* Current Quarter Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

## Investment Manager Returns

The table below details the rates of return for the Fund's investment managers over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

**Returns for Periods Ended June 30, 2019**

| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years |
|---|---|---|---|---|---|
| **Net of Fees** | | | | | |
| **Domestic Equity** | **3.88%** | **9.69%** | **15.64%** | **11.16%** | **15.28%** |
| Total Domestic Equity Target (1) | 4.01% | 8.50% | 13.80% | 10.07% | 14.68% |
| **Large Cap Equity** | **3.88%** | **9.84%** | **15.58%** | **11.05%** | **14.98%** |
| S&P 500 Index | 4.30% | 10.42% | 14.19% | 10.71% | 14.70% |
| Alliance S&P Index | 4.28% | 10.37% | 14.10% | 10.64% | 14.62% |
| PIMCO StocksPLUS | 4.56% | 10.64% | 14.57% | 10.68% | 16.66% |
| S&P 500 Index | 4.30% | 10.42% | 14.19% | 10.71% | 14.70% |
| BlackRock Russell 1000 Value Index | 3.83% | 8.57% | 10.26% | 7.51% | 13.27% |
| Russell 1000 Value Index | 3.84% | 8.46% | 10.19% | 7.46% | 13.19% |
| T. Rowe Price Large Cap Growth | 3.09% | 10.16% | 23.15% | 15.16% | 17.87% |
| Russell 1000 Growth Index | 4.64% | 11.56% | 18.07% | 13.39% | 16.28% |
| **Small/Mid Cap Equity U.S. Equity** | **3.89%** | **9.31%** | **15.80%** | **11.52%** | **16.33%** |
| Russell 2500 Index | 2.96% | 1.77% | 12.34% | 7.66% | 14.44% |
| Champlain Mid Cap | 3.26% | 15.57% | 18.24% | 13.40% | 16.31% |
| Russell MidCap Index | 4.13% | 7.83% | 12.16% | 8.63% | 15.16% |
| Pyramis Small Cap | 4.51% | 2.54% | 13.04% | 9.39% | 15.95% |
| Russell 2000 Index | 2.10% | (3.31%) | 12.30% | 7.06% | 13.45% |
| **International Equity** | **2.58%** | **(2.15%)** | **8.35%** | **1.37%** | **6.24%** |
| MSCI ACWI x US (Net) | 2.98% | 1.29% | 9.39% | 2.16% | 6.54% |
| Causeway International Opportunities (3) | 1.32% | (2.75%) | 8.49% | 1.68% | 8.21% |
| Causeway Linked Index (3) | 2.98% | 1.29% | 9.39% | 2.57% | 7.07% |
| Aberdeen EAFE Plus | 3.17% | 2.70% | 7.41% | 0.25% | 6.67% |
| MSCI ACWI x US (Net) | 2.98% | 1.29% | 9.39% | 2.16% | 6.54% |
| American Century Non-US SC | 3.87% | (10.00%) | 9.91% | - | - |
| MSCI ACWI ex US Small Cap | 1.21% | (5.94%) | 7.76% | 2.77% | 8.48% |
| **Fixed Income** | **3.38%** | **9.14%** | **4.46%** | **3.96%** | **5.28%** |
| Blmbg Aggregate Index | 3.08% | 7.87% | 2.31% | 2.95% | 3.90% |
| BlackRock U.S. Debt Fund | 3.08% | 7.96% | 2.37% | 3.01% | 3.99% |
| Blmbg Aggregate Index | 3.08% | 7.87% | 2.31% | 2.95% | 3.90% |
| PIMCO Fixed Income | 3.66% | 10.30% | 6.07% | 4.73% | 6.34% |
| Custom Index (2) | 3.42% | 9.53% | 4.01% | 3.99% | 5.54% |

(1) The Total Domestic Equity target is currently composed of 78% S&P 500 and 22% Russell 2500 Index.
(2) The custom index is currently composed of 25% Barclays Mortgage, 25% Barclays Credit, 25% Barclays High Yield, and 25% JP Morgan EMBI Global. Prior to 2/1/2012, the custom index was composed of 70% Barclays Mortgage, 15% Barclays Credit, and 15% Barclays High Yield.
(3) Causeway International Value transitioned to International Opportunities in May 2016; as such, the index has been changed accordingly from EAFE to ACWI ex-US (Net Div).

## Investment Manager Returns

The table below details the rates of return for the Fund's investment managers over various time periods ended June 30, 2019. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

**Returns for Periods Ended June 30, 2019**

| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years |
|---|---|---|---|---|---|
| **Net of Fees** | | | | | |
| **Real Estate** | **(1.10%)** | **1.78%** | **5.12%** | **7.50%** | **7.96%** |
| NFI-ODCE Equal Weight Net | 1.12% | 5.99% | 6.97% | 9.12% | 8.80% |
| JP Morgan Strategic Property Fund | (1.85%) | 1.15% | 4.87% | 7.33% | 8.29% |
| NFI-ODCE Equal Weight Net | 1.12% | 5.99% | 6.97% | 9.12% | 8.80% |
| JP Morgan Income and Growth Fund | 0.44% | 3.11% | 5.62% | 8.00% | 10.10% |
| NFI-ODCE Equal Weight Net | 1.12% | 5.99% | 6.97% | 9.12% | 8.80% |
| **Infrastructure** | **9.98%** | **19.74%** | **12.96%** | **9.26%** | **8.37%** |
| CPI + 4% | 1.76% | 5.44% | 6.01% | 5.25% | 5.70% |
| Macquarie European Infrastructure | 38.52% | 40.10% | 28.24% | 15.04% | 10.78% |
| SteelRiver Infrastructure | 0.00% | 11.77% | 4.88% | 7.18% | 8.08% |
| CPI + 4% | 1.76% | 5.44% | 6.01% | 5.25% | 5.70% |
| **Cash Composite** | **0.57%** | **2.11%** | **1.33%** | **0.82%** | **0.49%** |
| **Total Fund** | **3.21%** | **6.21%** | **9.70%** | **6.98%** | **10.19%** |
| Total Fund Benchmark* | 3.17% | 6.28% | 8.73% | 6.43% | 9.82% |

* Current Quarter Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

## Investment Manager Returns

The table below details the rates of return for the Fund's investment managers over various time periods ended June 30. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

| | FY 2019 | FY 2018 | FY 2017 | FY 2016 | FY 2015 |
|---|---|---|---|---|---|
| **Net of Fees** | | | | | |
| **Domestic Equity** | **9.69%** | **16.55%** | **20.96%** | **0.94%** | **8.72%** |
| Total Domestic Equity Target (1) | 8.50% | 14.79% | 18.34% | 2.28% | 7.15% |
| **Large Cap Equity** | **9.84%** | **16.25%** | **20.92%** | **1.44%** | **7.83%** |
| S&P 500 Index | 10.42% | 14.37% | 17.90% | 3.99% | 7.42% |
| Alliance S&P Index | 10.37% | 14.29% | 17.76% | 3.93% | 7.40% |
| PIMCO StocksPLUS | 10.64% | 14.13% | 19.11% | 2.68% | 7.57% |
| S&P 500 Index | 10.42% | 14.37% | 17.90% | 3.99% | 7.42% |
| BlackRock Russell 1000 Value Index | 8.57% | 6.82% | 15.59% | 2.71% | 4.30% |
| Russell 1000 Value Index | 8.46% | 6.77% | 15.53% | 2.86% | 4.13% |
| T. Rowe Price Large Cap Growth | 10.16% | 29.47% | 30.97% | (3.13%) | 11.93% |
| Russell 1000 Growth Index | 11.56% | 22.51% | 20.42% | 3.02% | 10.56% |
| **Small/Mid Cap Equity U.S. Equity** | **9.31%** | **17.44%** | **20.95%** | **(0.61%)** | **11.80%** |
| Russell 2500 Index | 1.77% | 16.24% | 19.84% | (3.67%) | 5.92% |
| Champlain Mid Cap | 15.57% | 17.80% | 21.43% | 3.76% | 9.33% |
| Russell MidCap Index | 7.83% | 12.33% | 16.48% | 0.56% | 6.63% |
| Pyramis Small Cap | 2.54% | 17.06% | 20.34% | (5.10%) | 14.24% |
| Russell 2000 Index | (3.31%) | 17.57% | 24.60% | (6.73%) | 6.49% |
| **International Equity** | **(2.15%)** | **8.12%** | **20.24%** | **(10.04%)** | **(6.46%)** |
| MSCI ACWI x US (Net) | 1.29% | 7.28% | 20.45% | (10.24%) | (5.26%) |
| Causeway International Opportunities (3) | (2.75%) | 6.84% | 22.89% | (12.24%) | (3.01%) |
| Causeway Linked Index (3) | 1.29% | 7.28% | 20.45% | (9.42%) | (4.22%) |
| Aberdeen EAFE Plus | 2.70% | 2.61% | 17.60% | (8.32%) | (10.90%) |
| MSCI ACWI x US (Net) | 1.29% | 7.28% | 20.45% | (10.24%) | (5.26%) |
| American Century Non-US SC | (10.00%) | 22.61% | 20.31% | - | - |
| MSCI ACWI ex US Small Cap | (5.94%) | 10.57% | 20.32% | (5.46%) | (3.07%) |
| **Fixed Income** | **9.14%** | **0.14%** | **4.27%** | **6.05%** | **0.45%** |
| Blmbg Aggregate Index | 7.87% | (0.40%) | (0.31%) | 6.00% | 1.86% |
| BlackRock U.S. Debt Fund | 7.96% | (0.38%) | (0.25%) | 6.07% | 1.94% |
| Blmbg Aggregate Index | 7.87% | (0.40%) | (0.31%) | 6.00% | 1.86% |
| PIMCO Fixed Income | 10.30% | 0.65% | 7.49% | 6.04% | (0.43%) |
| Custom Index (2) | 9.53% | (1.05%) | 3.83% | 7.28% | 0.75% |

(1) The Total Domestic Equity target is currently composed of 78% S&P 500 and 22% Russell 2500 Index.
(2) The custom index is currently composed of 25% Barclays Mortgage, 25% Barclays Credit, 25% Barclays High Yield, and 25% JP Morgan EMBI Global. Prior to 2/1/2012, the custom index was composed of 70% Barclays Mortgage, 15% Barclays Credit, and 15% Barclays High Yield.
(3) Causeway International Value transitioned to International Opportunities in May 2016; as such, the index has been changed accordingly from EAFE to ACWI ex-US (Net Div).

## Investment Manager Returns

The table below details the rates of return for the Fund's investment managers over various time periods ended June 30. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

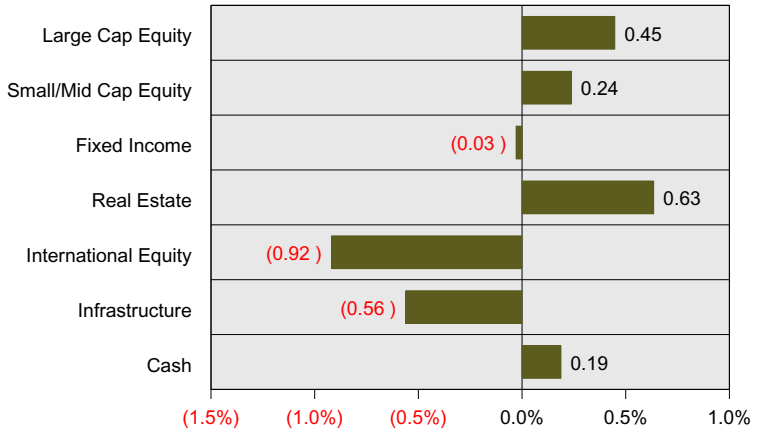
| | FY 2019 | FY 2018 | FY 2017 | FY 2016 | FY 2015 |
|---|---|---|---|---|---|
| **Net of Fees** | | | | | |
| **Real Estate** | **1.78%** | **6.59%** | **7.07%** | **9.64%** | **12.74%** |
| NFI-ODCE Equal Weight Net | 5.99% | 7.68% | 7.23% | 11.24% | 13.64% |
| JP Morgan Strategic Property Fund | 1.15% | 6.68% | 6.88% | 10.02% | 12.28% |
| NFI-ODCE Equal Weight Net | 5.99% | 7.68% | 7.23% | 11.24% | 13.64% |
| JP Morgan Income and Growth Fund | 3.11% | 6.43% | 7.37% | 8.69% | 14.74% |
| NFI-ODCE Equal Weight Net | 5.99% | 7.68% | 7.23% | 11.24% | 13.64% |
| **Infrastructure** | **19.74%** | **8.04%** | **11.42%** | **12.30%** | **(3.82%)** |
| CPI + 4% | 5.44% | 7.09% | 5.50% | 4.64% | 3.62% |
| Macquarie European Infrastructure | 40.10% | 27.95% | 17.65% | 6.82% | (10.56%) |
| SteelRiver Infrastructure | 11.77% | (3.21%) | 6.64% | 17.13% | 4.67% |
| CPI + 4% | 5.44% | 7.09% | 5.50% | 4.64% | 3.62% |
| **Cash Composite** | **2.11%** | **1.22%** | **0.68%** | **0.12%** | **(0.00%)** |
| **Total Fund** | **6.21%** | **8.77%** | **14.26%** | **1.89%** | **4.17%** |
| Total Fund Benchmark* | 6.28% | 7.96% | 12.04% | 1.82% | 4.34% |

* Current Quarter Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

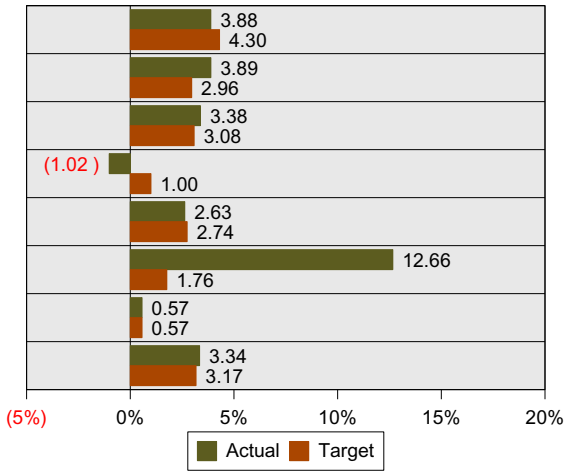
## Quarterly Style Attribution - June 30, 2019

The following analysis approaches Total Fund Attribution from the perspective of relative return. Relative return attribution separates and quantifies the sources of total fund excess return relative to its target. This excess return is separated into two relative attribution effects: Style Allocation Effect and Manager Selection Effect. The Style Allocation Effect represents the excess return due to the actual total fund style allocation differing from the target style allocation. Manager Selection Effect represents the total fund impact of the individual managers excess returns relative to their benchmarks.

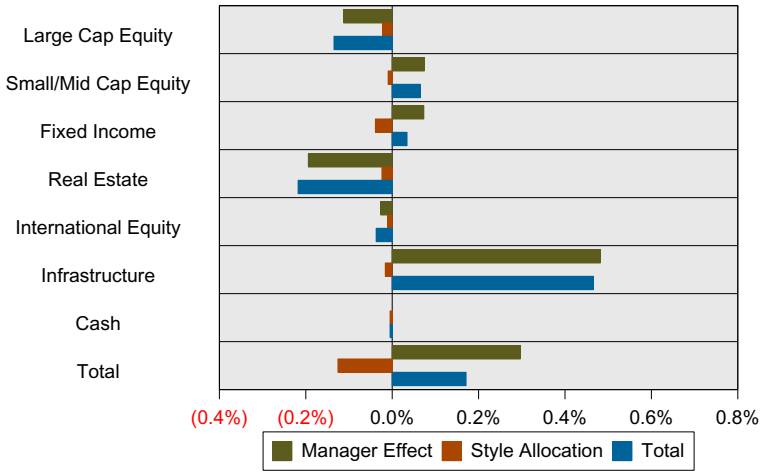
### Style Class Under or Overweighting




### Actual vs Target Returns




### Relative Attribution by Style Class




### Relative Attribution Effects for Quarter ended June 30, 2019

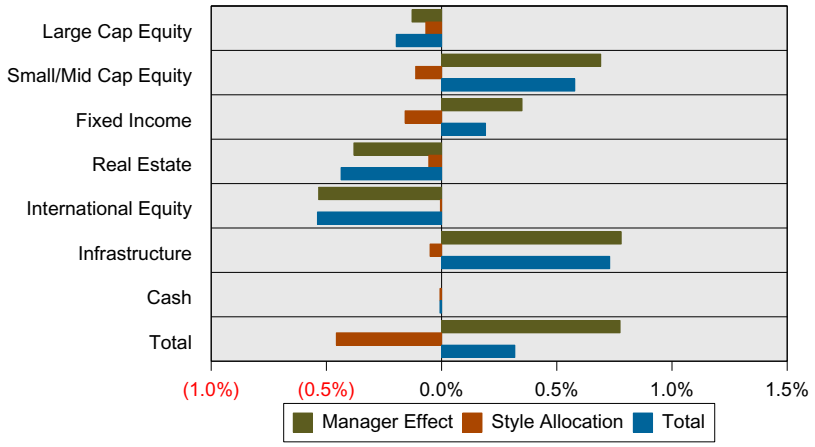
| Style Class | Effective Actual Weight | Effective Target Weight | Actual Return | Target Return | Manager Effect | Style Allocation | Total Relative Return |
|---|---|---|---|---|---|---|---|
| Large Cap Equity | 26% | 26% | 3.88% | 4.30% | (0.11%) | (0.02%) | (0.13%) |
| Small/Mid Cap Equity | 8% | 8% | 3.89% | 2.96% | 0.07% | (0.01%) | 0.07% |
| Fixed Income | 27% | 27% | 3.38% | 3.08% | 0.07% | (0.04%) | 0.03% |
| Real Estate | 10% | 9% | (1.02%) | 1.00% | (0.19%) | (0.02%) | (0.22%) |
| International Equity | 24% | 25% | 2.63% | 2.74% | (0.03%) | (0.01%) | (0.04%) |
| Infrastructure | 4% | 5% | 12.66% | 1.76% | 0.48% | (0.02%) | 0.47% |
| Cash | 0% | 0% | 0.57% | 0.57% | 0.00% | (0.00%) | (0.00%) |
| **Total** | | | **3.34%** = | **3.17%** + | **0.30%** + | **(0.13%)** | **0.17%** |

* Current Quarter Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

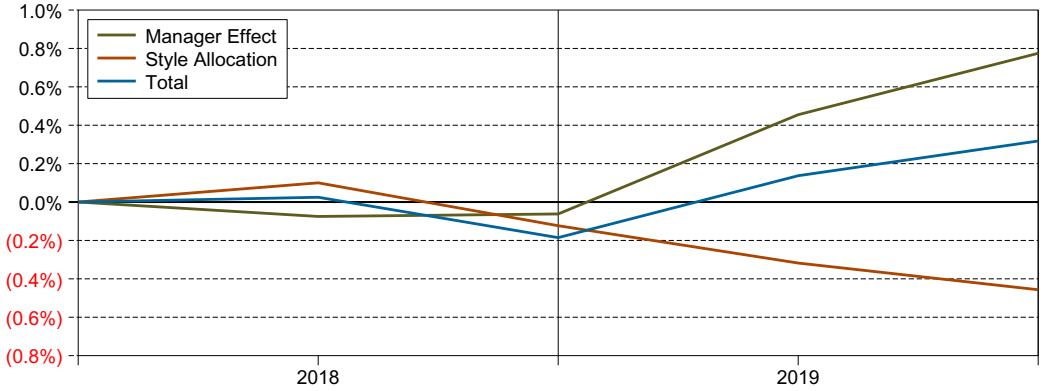
## Cumulative Style Relative Attribution - June 30, 2019

The charts below accumulate the Total Fund Attribution Analysis (shown earlier) over multiple periods to examine the cumulative sources of excess total fund performance relative to target. These cumulative results quantify the longer-term sources of total fund excess return relative to target by style class. These relative attribution effects separate the cumulative sources of total fund excess return into Style Allocation Effect and Manager Selection Effect.

### One Year Relative Attribution Effects




### Cumulative Relative Attribution Effects




### One Year Relative Attribution Effects

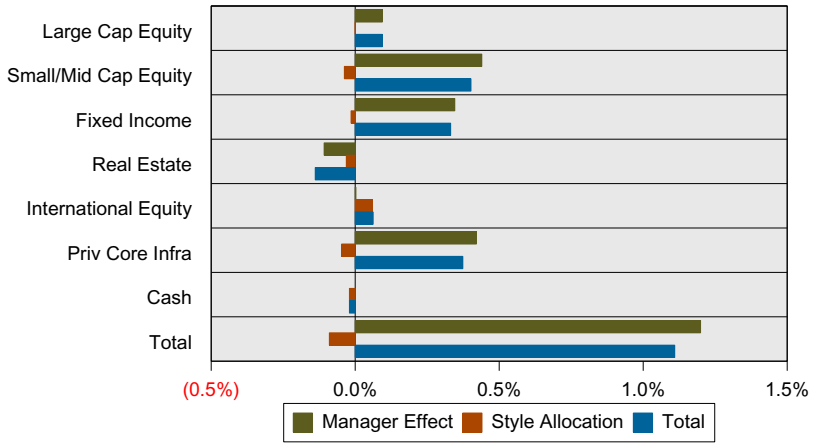
| Style Class | Effective Actual Weight | Effective Target Weight | Actual Return | | Target Return | | Manager Effect | | Style Allocation | Total Relative Return |
|---|---|---|---|---|---|---|---|---|---|---|
| Large Cap Equity | 27% | 26% | 9.94% | | 10.42% | | (0.13%) | | (0.07%) | (0.20%) |
| Small/Mid Cap Equity | 9% | 8% | 9.76% | | 1.77% | | 0.69% | | (0.11%) | 0.58% |
| Fixed Income | 26% | 27% | 9.29% | | 7.87% | | 0.35% | | (0.16%) | 0.19% |
| Real Estate | 10% | 9% | 2.47% | | 6.41% | | (0.38%) | | (0.06%) | (0.44%) |
| International Equity | 24% | 25% | (1.87%) | | 0.26% | | (0.53%) | | (0.01%) | (0.54%) |
| Infrastructure | 4% | 5% | 23.76% | | 5.44% | | 0.78% | | (0.05%) | 0.73% |
| Cash | 0% | 0% | 2.11% | | 2.11% | | 0.00% | | (0.01%) | (0.01%) |
| **Total** | | | **6.60%** | **=** | **6.28%** | **+** | **0.77%** | **+** | **(0.46%)** | **0.32%** |

* Current Quarter Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

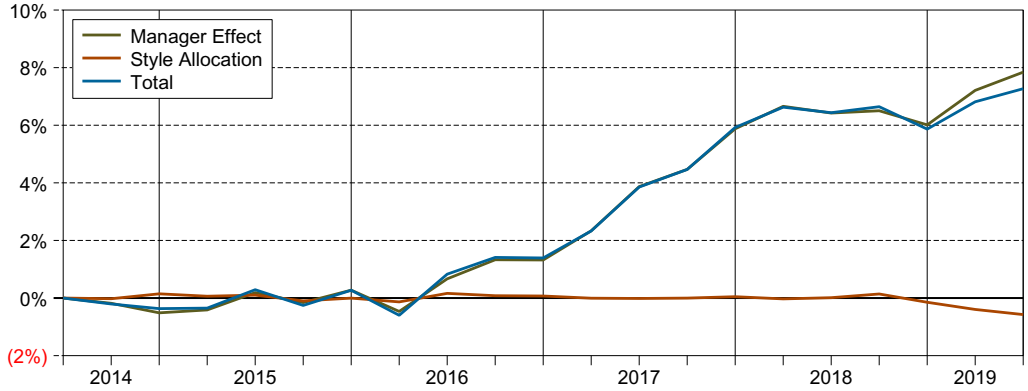
## Cumulative Style Relative Attribution - June 30, 2019

The charts below accumulate the Total Fund Attribution Analysis (shown earlier) over multiple periods to examine the cumulative sources of excess total fund performance relative to target. These cumulative results quantify the longer-term sources of total fund excess return relative to target by style class. These relative attribution effects separate the cumulative sources of total fund excess return into Style Allocation Effect and Manager Selection Effect.

### Five Year Annualized Relative Attribution Effects




### Cumulative Relative Attribution Effects




### Five Year Annualized Relative Attribution Effects

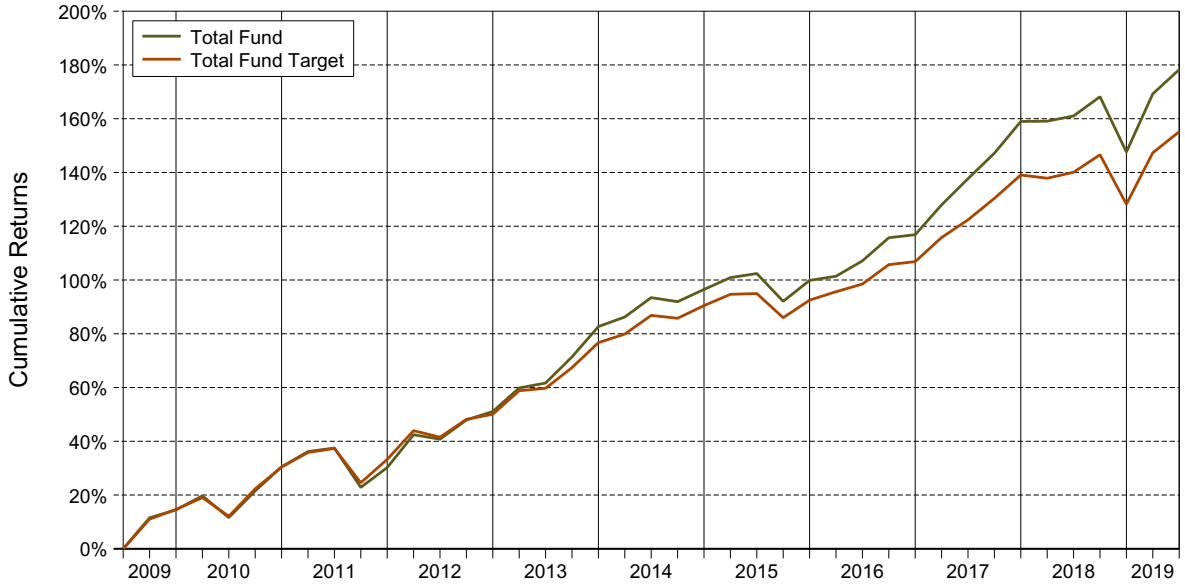
| Style Class | Effective Actual Weight | Effective Target Weight | Actual Return | | Target Return | | Manager Effect | | Style Allocation | Total Relative Return |
|---|---|---|---|---|---|---|---|---|---|---|
| Large Cap Equity | 31% | 30% | 11.20% | | 10.71% | | 0.09% | | 0.00% | 0.09% |
| Small/Mid Cap Equity | 9% | 9% | 12.32% | | 7.66% | | 0.44% | | (0.04%) | 0.40% |
| Fixed Income | 25% | 27% | 4.24% | | 2.95% | | 0.35% | | (0.01%) | 0.33% |
| Real Estate | 9% | 9% | 8.53% | | 9.76% | | (0.11%) | | (0.03%) | (0.14%) |
| International Equity | 20% | 21% | 1.90% | | 2.03% | | 0.00% | | 0.06% | 0.06% |
| Priv Core Infra | 5% | 5% | 12.68% | | 5.25% | | 0.42% | | (0.05%) | 0.37% |
| Cash | 0% | 0% | 0.82% | | 0.82% | | 0.00% | | (0.02%) | (0.02%) |
| **Total** | | | **7.54%** | **=** | **6.43%** | **+** | **1.20%** | **+** | **(0.09%)** | **1.11%** |

* Current Quarter Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

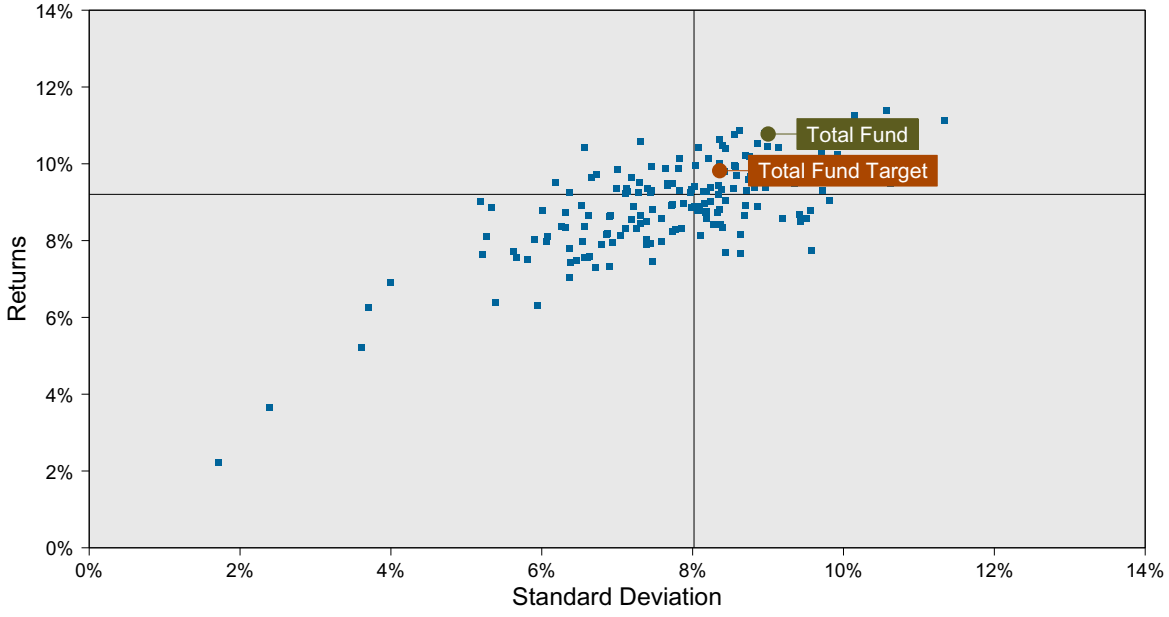
## Cumulative Performance Relative to Target

The first chart below illustrates the cumulative performance of the Total Fund relative to the cumulative performance of the Fund's Target Asset Mix. The Target Mix is assumed to be rebalanced each quarter with no transaction costs. The second chart below shows the return and the risk of the Total Fund and the Target Mix, contrasted with the returns and risks of the funds in the Callan Public Fund Sponsor Database.

### Cumulative Returns Actual vs Target




### Ten Year Annualized Risk vs Return



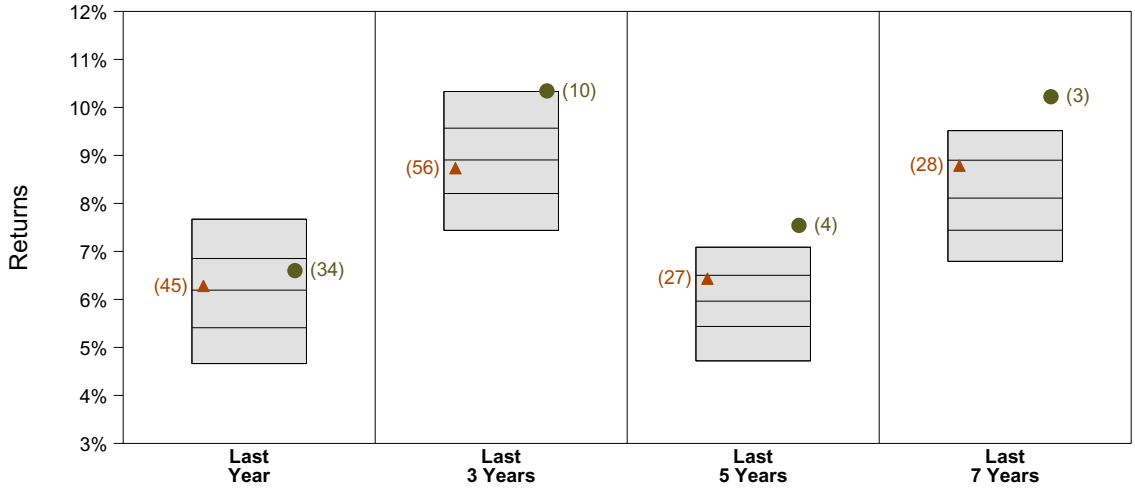

Squares represent membership of the Callan Public Fund Sponsor Database

* Current Quarter Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

## Total Fund Ranking

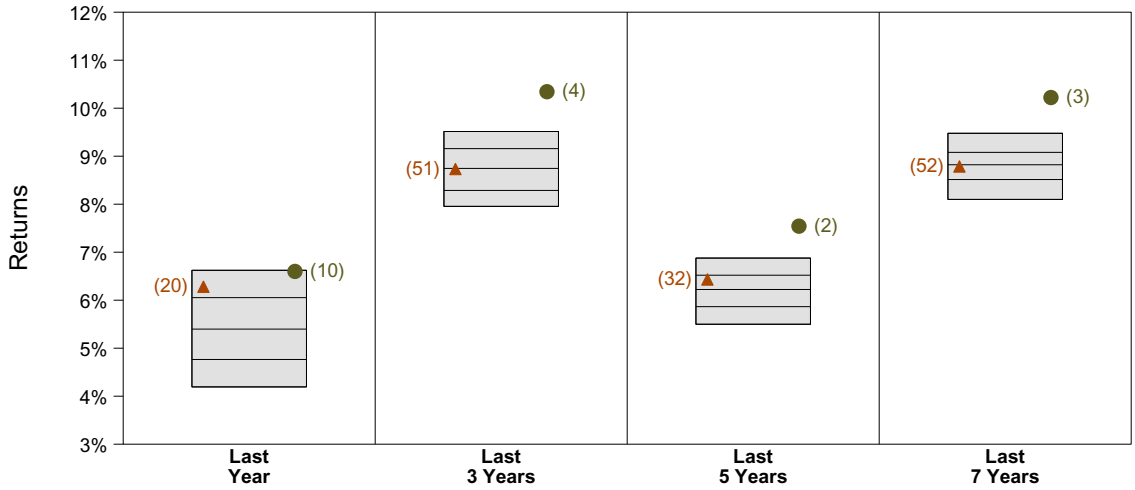
The first two charts show the ranking of the Total Fund's performance relative to that of the Callan Public Fund Sponsor Database for periods ended June 30, 2019. The first chart is a standard unadjusted ranking. In the second chart each fund in the database is adjusted to have the same historical asset allocation as that of the Total Fund.

### Callan Public Fund Sponsor Database




| | Last Year | Last 3 Years | Last 5 Years | Last 7 Years |
|---|---|---|---|---|
| 10th Percentile | 7.67 | 10.33 | 7.09 | 9.52 |
| 25th Percentile | 6.85 | 9.57 | 6.50 | 8.90 |
| Median | 6.19 | 8.91 | 5.96 | 8.11 |
| 75th Percentile | 5.41 | 8.21 | 5.44 | 7.44 |
| 90th Percentile | 4.66 | 7.44 | 4.72 | 6.79 |
| **Total Fund** ● | 6.60 | 10.34 | 7.54 | 10.22 |
| Policy Target ▲ | 6.28 | 8.73 | 6.43 | 8.79 |

### Asset Allocation Adjusted Ranking




| | Last Year | Last 3 Years | Last 5 Years | Last 7 Years |
|---|---|---|---|---|
| 10th Percentile | 6.62 | 9.51 | 6.88 | 9.48 |
| 25th Percentile | 6.05 | 9.16 | 6.52 | 9.08 |
| Median | 5.40 | 8.75 | 6.22 | 8.82 |
| 75th Percentile | 4.76 | 8.29 | 5.87 | 8.51 |
| 90th Percentile | 4.19 | 7.95 | 5.50 | 8.10 |
| **Total Fund** ● | 6.60 | 10.34 | 7.54 | 10.22 |
| Policy Target ▲ | 6.28 | 8.73 | 6.43 | 8.79 |

* Current Quarter Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

# Total Fund
# Period Ended June 30, 2019

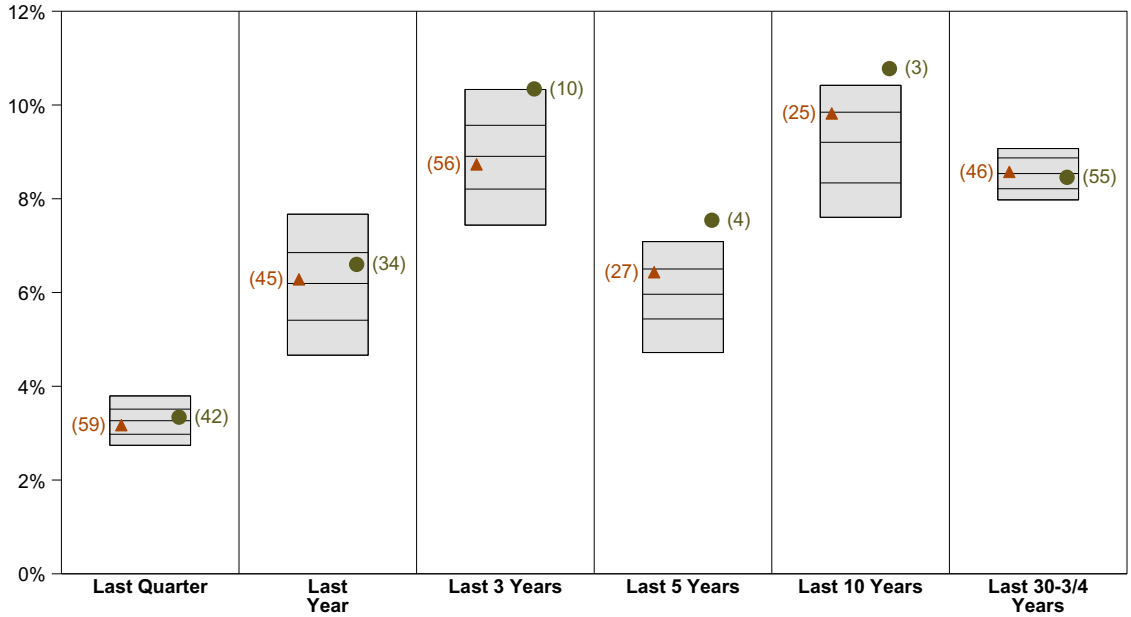
## Investment Philosophy

The total fund return stream starts the third quarter of 1988.

## Quarterly Summary and Highlights

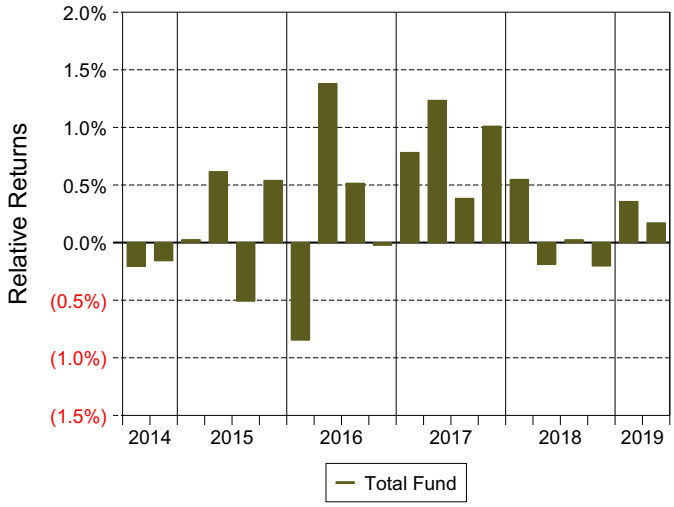
- Total Fund's portfolio posted a 3.34% return for the quarter placing it in the 42 percentile of the Callan Public Fund Sponsor Database group for the quarter and in the 34 percentile for the last year.
- Total Fund's portfolio outperformed the Total Fund Benchmark by 0.17% for the quarter and outperformed the Total Fund Benchmark for the year by 0.32%.

## Performance vs Callan Public Fund Sponsor Database (Gross)

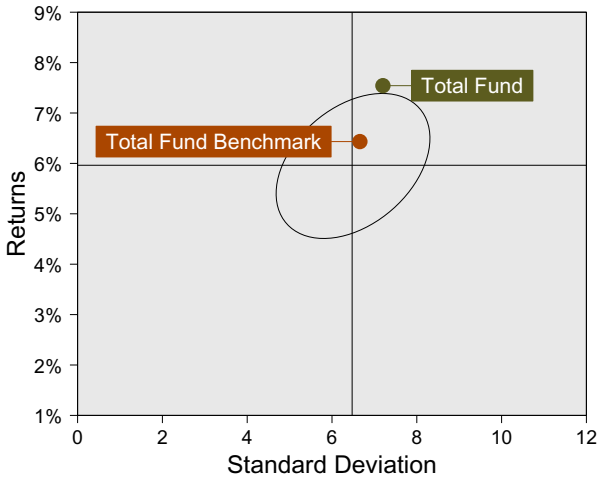



| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years | Last 30-3/4 Years |
|---|---|---|---|---|---|---|
| 10th Percentile | 3.79 | 7.67 | 10.33 | 7.09 | 10.42 | 9.07 |
| 25th Percentile | 3.51 | 6.85 | 9.57 | 6.50 | 9.85 | 8.87 |
| Median | 3.27 | 6.19 | 8.91 | 5.96 | 9.20 | 8.54 |
| 75th Percentile | 2.98 | 5.41 | 8.21 | 5.44 | 8.34 | 8.21 |
| 90th Percentile | 2.74 | 4.66 | 7.44 | 4.72 | 7.60 | 7.98 |
| **Total Fund** ● | 3.34 | 6.60 | 10.34 | 7.54 | 10.78 | 8.46 |
| Total Fund Benchmark ▲ | 3.17 | 6.28 | 8.73 | 6.43 | 9.82 | 8.57 |

### Relative Return vs Total Fund Benchmark




### Callan Public Fund Sponsor Database (Gross) Annualized Five Year Risk vs Return



Domestic Equity

# Domestic Equity
# Period Ended June 30, 2019

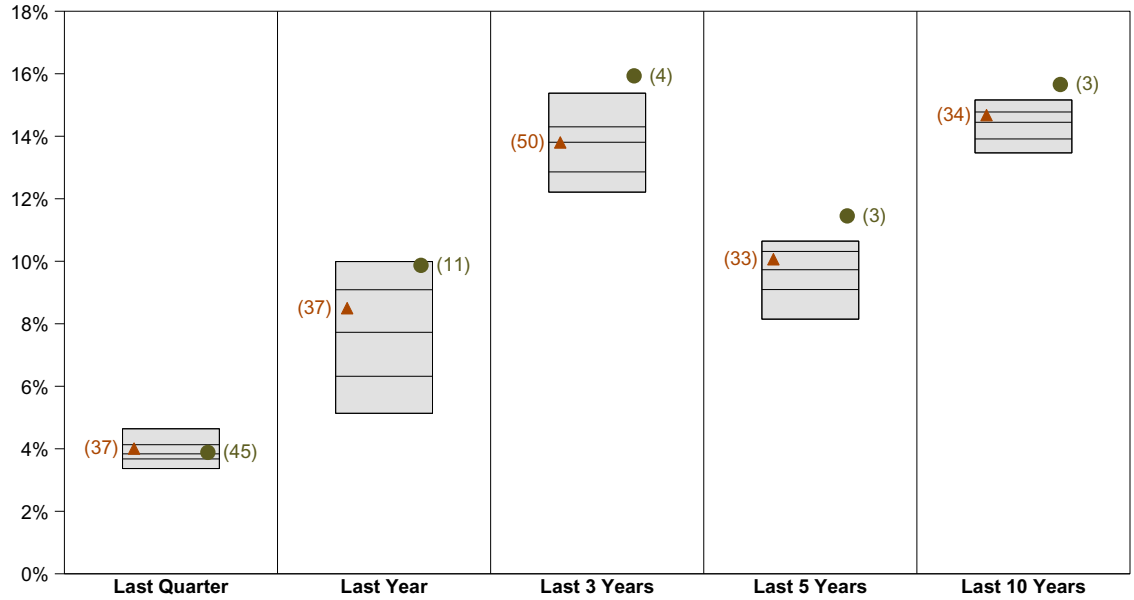
## Investment Philosophy

The Total Domestic Equity target is currently composed of 78% S&P 500 Index and 22% Russell 2500 Index.

## Quarterly Summary and Highlights

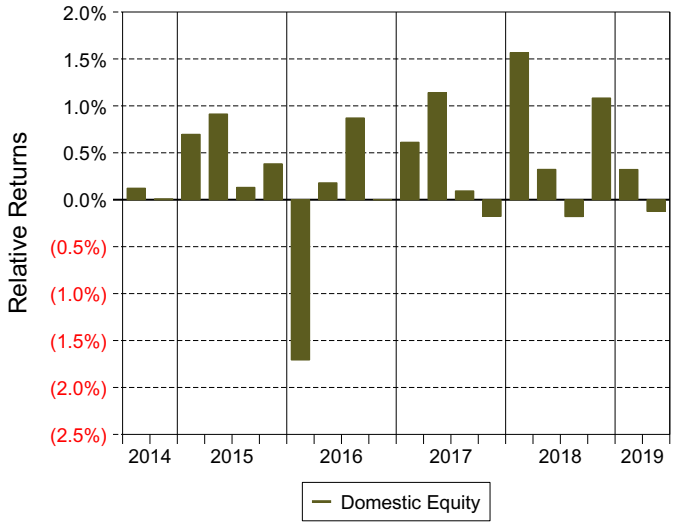
- Domestic Equity's portfolio posted a 3.88% return for the quarter placing it in the 45 percentile of the Public Fund - Domestic Equity group for the quarter and in the 11 percentile for the last year.
- Domestic Equity's portfolio underperformed the Total Domestic Equity Target by 0.12% for the quarter and outperformed the Total Domestic Equity Target for the year by 1.37%.

## Performance vs Public Fund - Domestic Equity (Gross)

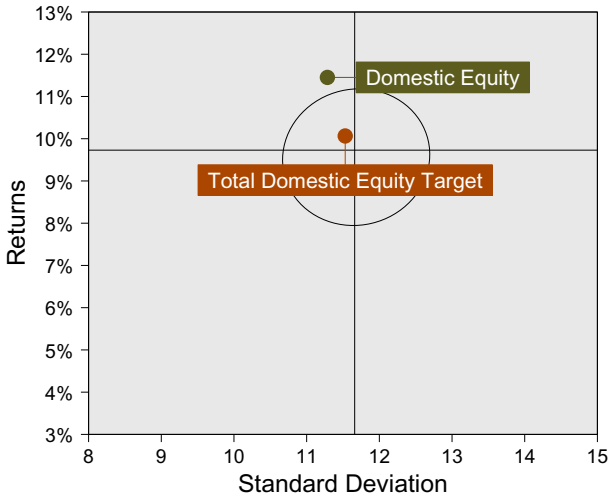



| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years |
|---|---|---|---|---|---|
| 10th Percentile | 4.64 | 9.99 | 15.38 | 10.64 | 15.16 |
| 25th Percentile | 4.13 | 9.09 | 14.30 | 10.32 | 14.78 |
| Median | 3.84 | 7.73 | 13.81 | 9.73 | 14.45 |
| 75th Percentile | 3.68 | 6.32 | 12.86 | 9.09 | 13.91 |
| 90th Percentile | 3.37 | 5.14 | 12.21 | 8.15 | 13.47 |
| **Domestic Equity** ● | 3.88 | 9.87 | 15.93 | 11.45 | 15.66 |
| Total Domestic Equity Target ▲ | 4.01 | 8.50 | 13.80 | 10.07 | 14.68 |

### Relative Returns vs Total Domestic Equity Target




### Public Fund - Domestic Equity (Gross) Annualized Five Year Risk vs Return

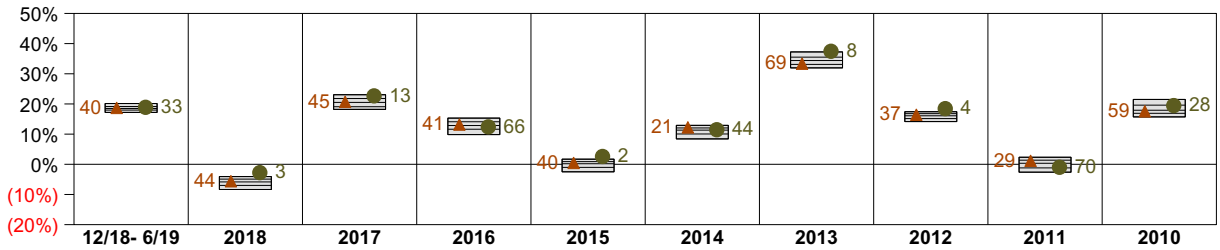


# Domestic Equity
# Return Analysis Summary

## Return Analysis

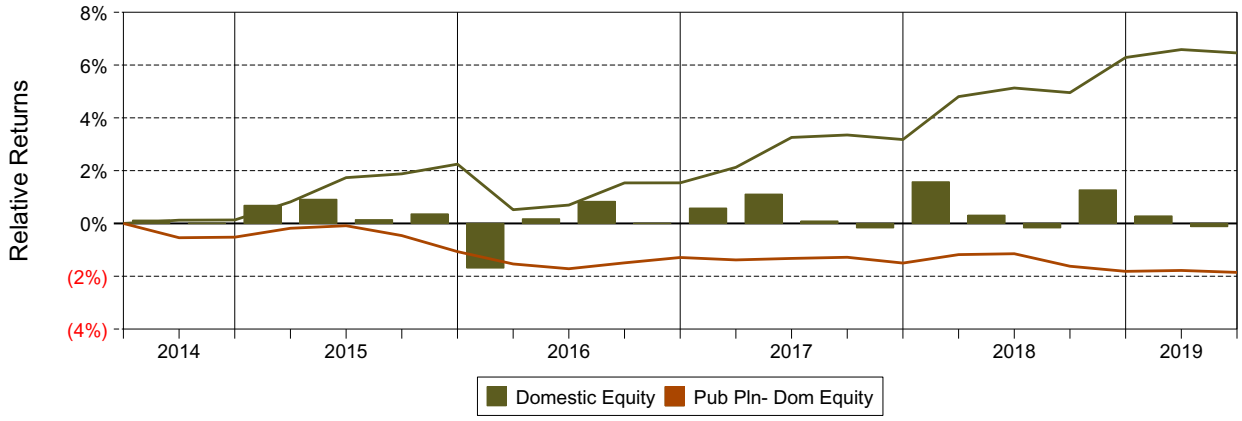
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Public Fund - Domestic Equity (Gross)

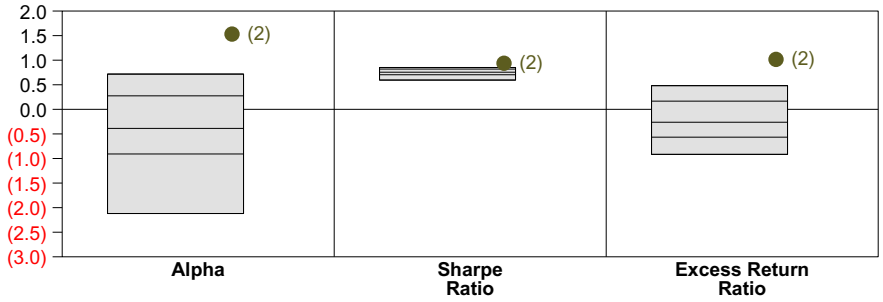



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 20.14 | (4.06) | 23.06 | 15.31 | 1.70 | 12.91 | 37.25 | 17.42 | 2.34 | 21.49 |
| 25th Percentile | 19.14 | (4.91) | 21.80 | 14.10 | 0.89 | 12.05 | 35.51 | 16.79 | 1.36 | 19.60 |
| Median | 18.51 | (5.84) | 20.51 | 12.86 | 0.19 | 11.32 | 34.39 | 16.08 | 0.33 | 17.92 |
| 75th Percentile | 17.97 | (7.00) | 19.08 | 11.63 | (1.03) | 10.05 | 33.11 | 15.15 | (1.19) | 16.90 |
| 90th Percentile | 17.20 | (8.35) | 18.20 | 9.85 | (2.49) | 8.41 | 31.95 | 14.16 | (2.61) | 15.71 |
| **Domestic Equity** ● | 18.89 | (2.77) | 22.67 | 12.40 | 2.59 | 11.46 | 37.46 | 18.44 | (0.99) | 19.45 |
| Total Domestic Equity Target ▲ | 18.70 | (5.61) | 20.72 | 13.19 | 0.47 | 12.25 | 33.37 | 16.43 | 1.16 | 17.56 |

## Cumulative and Quarterly Relative Return vs Total Domestic Equity Target




## Risk Adjusted Return Measures vs Total Domestic Equity Target
## Rankings Against Public Fund - Domestic Equity (Gross)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 0.72 | 0.85 | 0.48 |
| 25th Percentile | 0.27 | 0.82 | 0.17 |
| Median | (0.39) | 0.76 | (0.26) |
| 75th Percentile | (0.91) | 0.70 | (0.57) |
| 90th Percentile | (2.12) | 0.60 | (0.92) |
| **Domestic Equity** ● | 1.53 | 0.94 | 1.02 |

# Alliance S&P Index
# Period Ended June 30, 2019

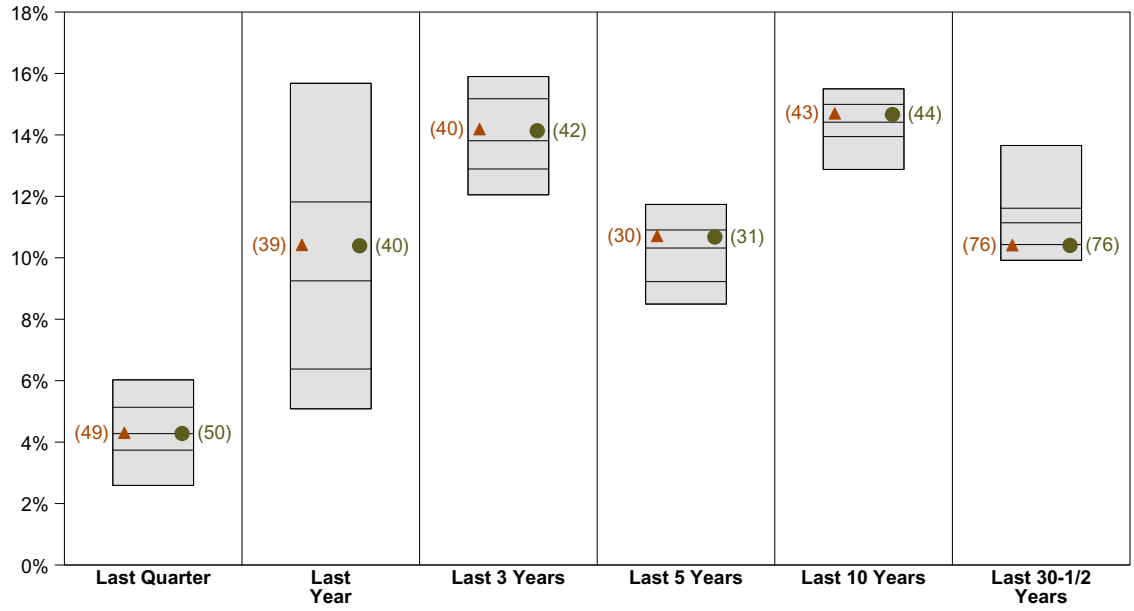
## Investment Philosophy

Alliance uses a stratified sampling methodology and purchases a majority of the index stocks to replicate the Standard and Poor's 500. The product was funded during the third quarter of 1988.

## Quarterly Summary and Highlights

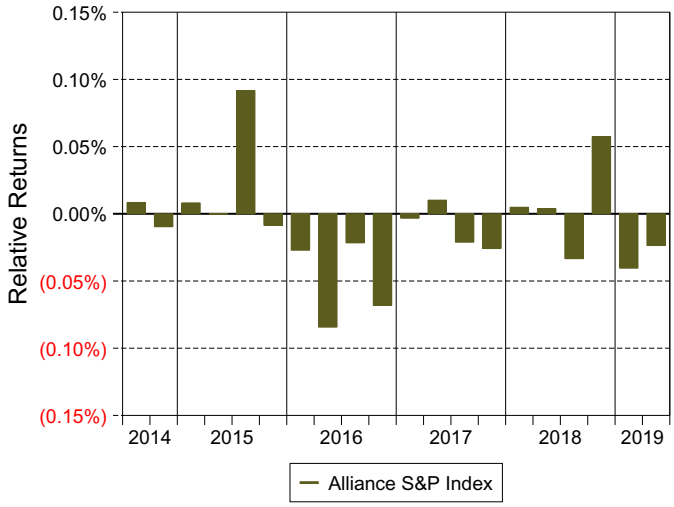
- Alliance S&P Index's portfolio posted a 4.28% return for the quarter placing it in the 50 percentile of the Callan Large Cap Core group for the quarter and in the 40 percentile for the last year.
- Alliance S&P Index's portfolio underperformed the S&P 500 Index by 0.02% for the quarter and underperformed the S&P 500 Index for the year by 0.03%.

## Performance vs Callan Large Cap Core (Gross)

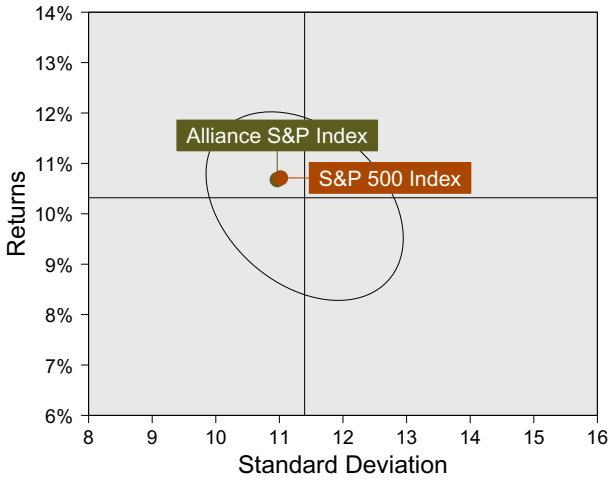



| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years | Last 30-1/2 Years |
|---|---|---|---|---|---|---|
| 10th Percentile | 6.03 | 15.68 | 15.90 | 11.74 | 15.50 | 13.66 |
| 25th Percentile | 5.13 | 11.82 | 15.18 | 10.91 | 15.00 | 11.61 |
| Median | 4.28 | 9.25 | 13.81 | 10.32 | 14.41 | 11.14 |
| 75th Percentile | 3.74 | 6.38 | 12.89 | 9.23 | 13.95 | 10.43 |
| 90th Percentile | 2.59 | 5.08 | 12.05 | 8.49 | 12.88 | 9.92 |
| **Alliance S&P Index** ● | 4.28 | 10.39 | 14.14 | 10.68 | 14.66 | 10.40 |
| S&P 500 Index ▲ | 4.30 | 10.42 | 14.19 | 10.71 | 14.70 | 10.41 |

### Relative Return vs S&P 500 Index




### Callan Large Cap Core (Gross) Annualized Five Year Risk vs Return

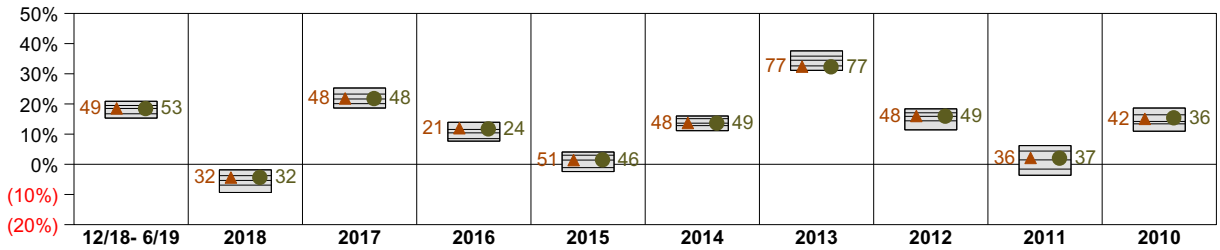


# Alliance S&P Index
# Return Analysis Summary

## Return Analysis

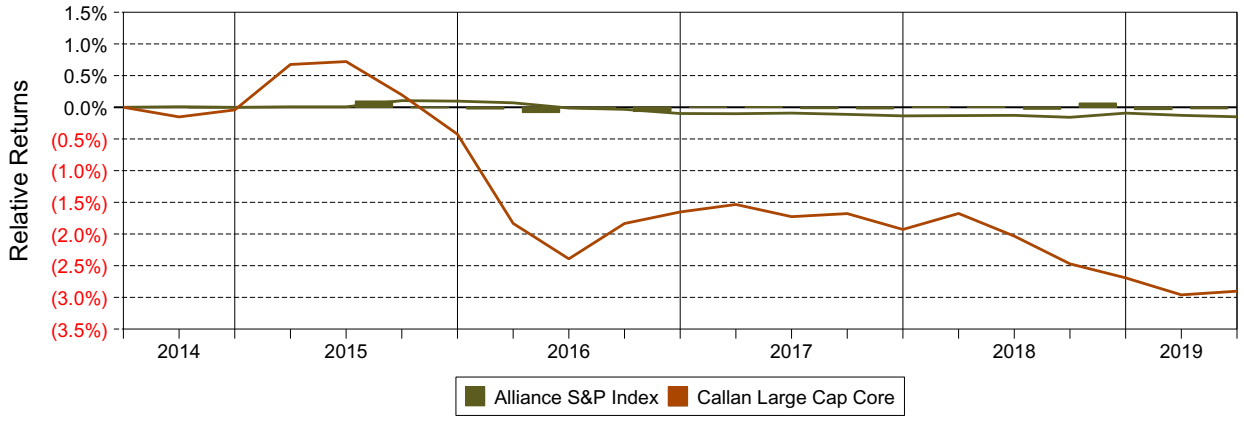
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Callan Large Cap Core (Gross)

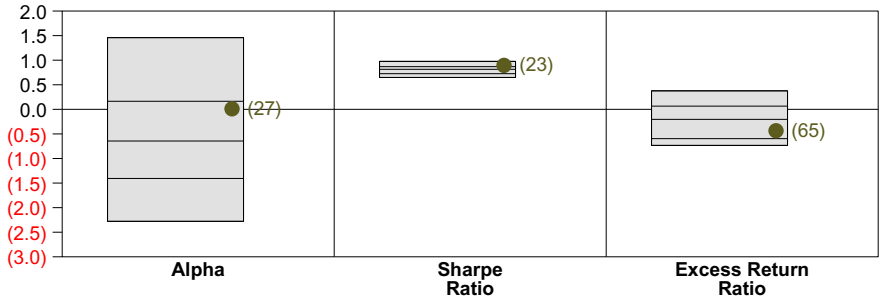



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 20.89 | (1.83) | 25.28 | 13.93 | 4.08 | 16.01 | 37.59 | 18.38 | 6.19 | 18.65 |
| 25th Percentile | 19.49 | (3.76) | 23.27 | 11.55 | 3.01 | 15.12 | 35.85 | 17.07 | 4.38 | 16.40 |
| Median | 18.51 | (5.35) | 21.65 | 10.42 | 1.40 | 13.63 | 34.49 | 15.89 | 1.46 | 14.20 |
| 75th Percentile | 16.74 | (6.90) | 20.10 | 8.50 | (1.10) | 12.82 | 32.61 | 14.41 | (1.59) | 13.41 |
| 90th Percentile | 15.31 | (9.34) | 18.65 | 7.68 | (2.41) | 11.14 | 31.14 | 11.41 | (3.64) | 10.96 |
| **Alliance S&P Index** ● | 18.47 | (4.34) | 21.79 | 11.74 | 1.48 | 13.65 | 32.31 | 15.95 | 2.03 | 15.41 |
| S&P 500 Index ▲ | 18.54 | (4.38) | 21.83 | 11.96 | 1.38 | 13.69 | 32.39 | 16.00 | 2.11 | 15.06 |

## Cumulative and Quarterly Relative Return vs S&P 500 Index




## Risk Adjusted Return Measures vs S&P 500 Index
## Rankings Against Callan Large Cap Core (Gross)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 1.46 | 0.98 | 0.38 |
| 25th Percentile | 0.16 | 0.87 | 0.07 |
| Median | (0.64) | 0.81 | (0.20) |
| 75th Percentile | (1.41) | 0.73 | (0.60) |
| 90th Percentile | (2.28) | 0.65 | (0.73) |
| **Alliance S&P Index** ● | 0.01 | 0.89 | (0.44) |

# PIMCO StocksPLUS
# Period Ended June 30, 2019

## Investment Philosophy

PIMCO's StocksPLUS investment philosophy is based on the principal that stock index futures and swaps, when used as a non-leveraged vehicle for obtaining long-term equity exposure, offer an attractive means for enhancing equity market returns. The strategy seeks a longer time horizon of their investors relative to that of typical money market investors. This long time horizon allows PIMCO to use their fixed income and associated risk management skill set to seek out attractive yields relative to money market financing rates on a portion of the high quality fixed-income securities they use to back the futures contracts. Since they only require sufficient liquidity to meet a worst case margin outflow caused by a stock market decline, a portion of their fixed-income portfolio can be invested in somewhat less liquid, higher yielding securities. In addition, they generally take advantage of the typical upward slope of the short end of the yield curve by extending their duration to six months in most market environments and sometimes up to one year. PIMCO also feels that it is appropriate in most market environments to capture both the credit yield premium provided by holding a portion of the fixed-income portfolio in low duration corporate securities and the volatility yield premium provided by holding high quality mortgage securities. The product was funded during the first quarter of 2006.

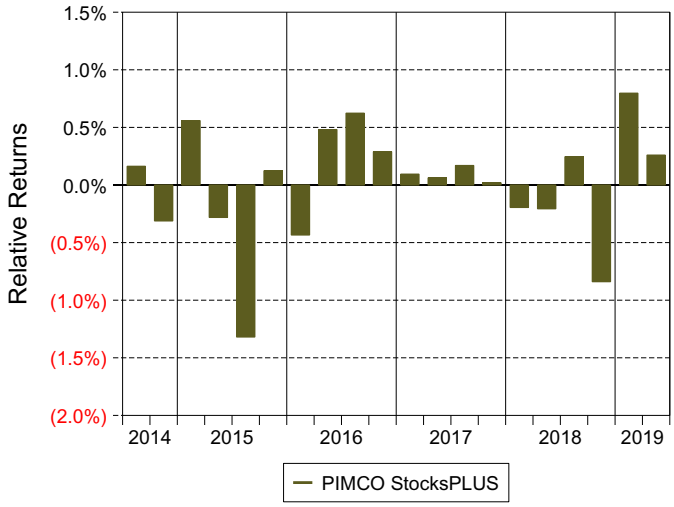
## Quarterly Summary and Highlights

- PIMCO StocksPLUS's portfolio posted a 4.56% return for the quarter placing it in the 42 percentile of the Callan Large Capitalization group for the quarter and in the 40 percentile for the last year.
- PIMCO StocksPLUS's portfolio outperformed the S&P 500 Index by 0.26% for the quarter and outperformed the S&P 500 Index for the year by 0.22%.

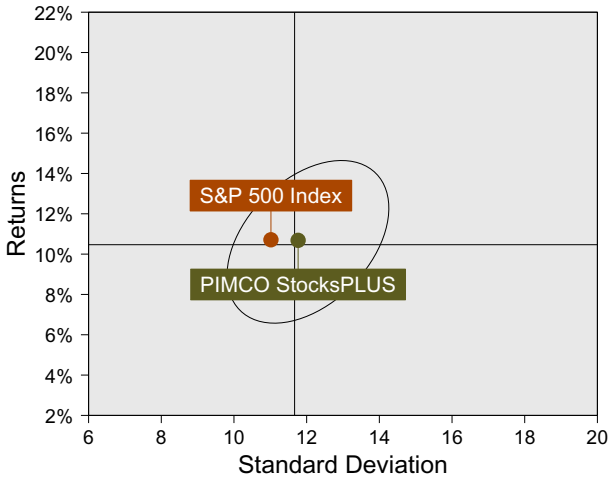
## Performance vs Callan Large Capitalization (Gross)

| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years | Last 13-1/4 Years |
|---|---|---|---|---|---|---|
| 10th Percentile | 6.55 | 15.75 | 20.92 | 14.30 | 16.75 | 11.01 |
| 25th Percentile | 5.39 | 12.56 | 17.42 | 12.70 | 15.79 | 10.10 |
| Median | 4.33 | 9.47 | 14.23 | 10.47 | 14.56 | 8.94 |
| 75th Percentile | 3.36 | 6.29 | 12.14 | 8.37 | 13.43 | 7.80 |
| 90th Percentile | 2.53 | 2.88 | 10.44 | 7.29 | 12.70 | 6.88 |
| **PIMCO StocksPLUS** ● | 4.56 | 10.64 | 14.57 | 10.68 | 16.77 | 10.17 |
| S&P 500 Index ▲ | 4.30 | 10.42 | 14.19 | 10.71 | 14.70 | 8.65 |

### Relative Return vs S&P 500 Index




### Callan Large Capitalization (Gross) Annualized Five Year Risk vs Return

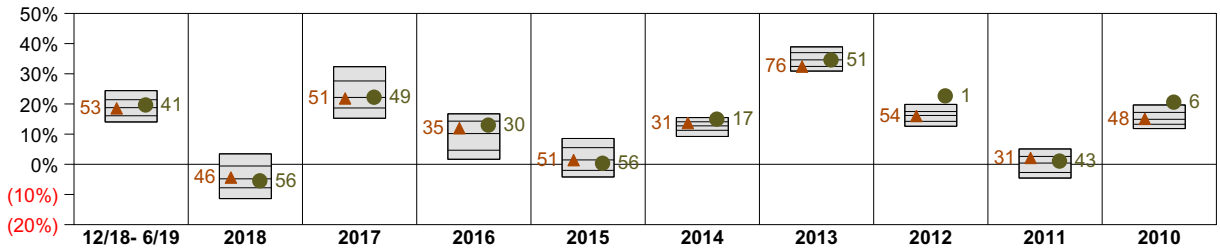


# PIMCO StocksPLUS
# Return Analysis Summary

## Return Analysis

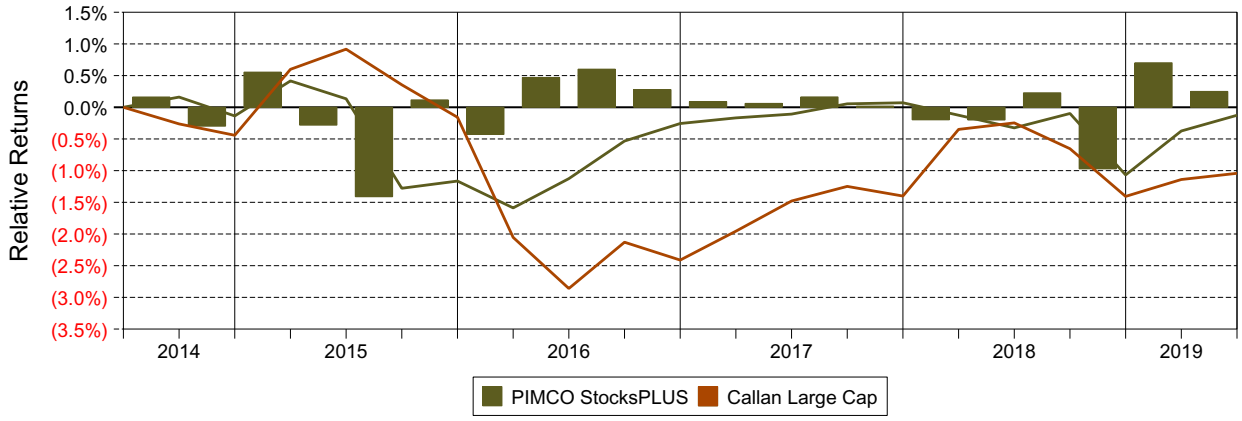
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Callan Large Capitalization (Gross)

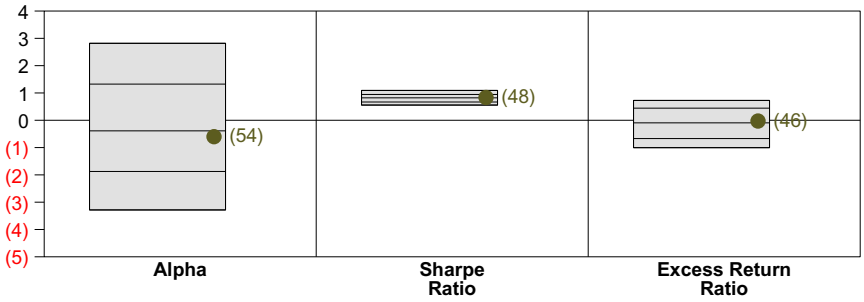



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 24.41 | 3.47 | 32.35 | 16.73 | 8.56 | 15.49 | 38.93 | 19.85 | 5.09 | 19.67 |
| 25th Percentile | 21.41 | (0.57) | 27.62 | 14.30 | 5.52 | 14.09 | 37.01 | 17.48 | 2.61 | 17.20 |
| Median | 18.77 | (4.82) | 22.16 | 10.18 | 1.45 | 12.73 | 34.61 | 16.18 | 0.40 | 14.92 |
| 75th Percentile | 16.08 | (7.78) | 18.67 | 4.67 | (2.01) | 11.27 | 32.43 | 14.23 | (2.71) | 13.26 |
| 90th Percentile | 14.02 | (11.38) | 15.26 | 1.67 | (4.21) | 9.23 | 30.89 | 12.61 | (4.56) | 11.84 |
| **PIMCO StocksPLUS** ● | 19.67 | (5.47) | 22.23 | 12.99 | 0.34 | 14.97 | 34.59 | 22.68 | 1.07 | 20.60 |
| S&P 500 Index ▲ | 18.54 | (4.38) | 21.83 | 11.96 | 1.38 | 13.69 | 32.39 | 16.00 | 2.11 | 15.06 |

## Cumulative and Quarterly Relative Return vs S&P 500 Index




## Risk Adjusted Return Measures vs S&P 500 Index
## Rankings Against Callan Large Capitalization (Gross)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 2.82 | 1.09 | 0.73 |
| 25th Percentile | 1.32 | 0.95 | 0.44 |
| Median | (0.39) | 0.82 | (0.10) |
| 75th Percentile | (1.88) | 0.67 | (0.67) |
| 90th Percentile | (3.28) | 0.56 | (1.00) |
| **PIMCO StocksPLUS** ● | (0.60) | 0.83 | (0.03) |

# BlackRock Russell 1000 Value
# Period Ended June 30, 2019

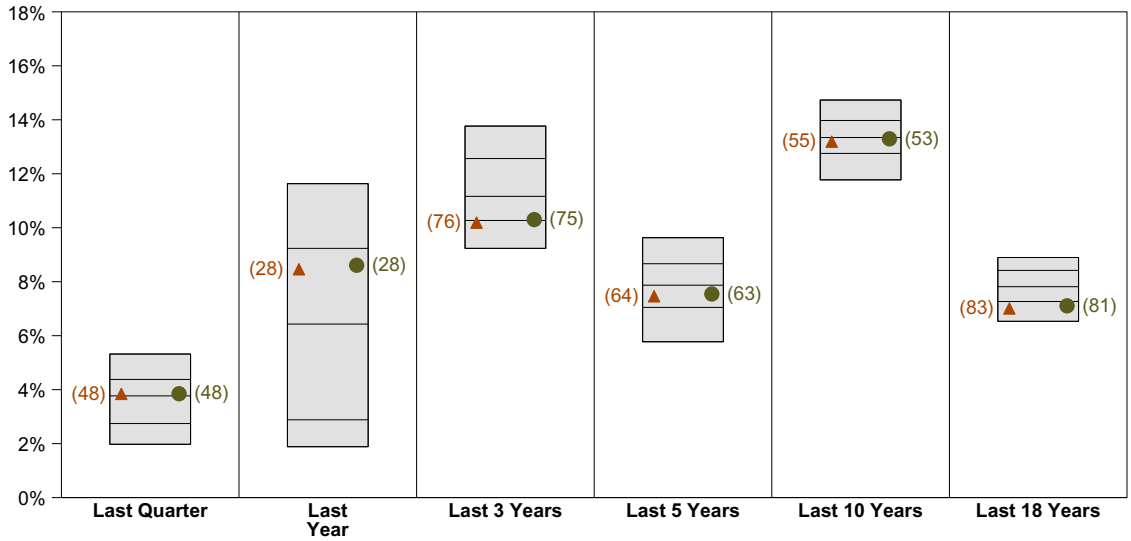
## Investment Philosophy

The objective of the Russell 1000 Value Index Fund is to track the performance of its benchmark, the Russell 1000 Value Index. They seek to deliver a high quality and cost-effective index-based solution to institutional investors. The product was funded during the second quarter of 2001.

## Quarterly Summary and Highlights

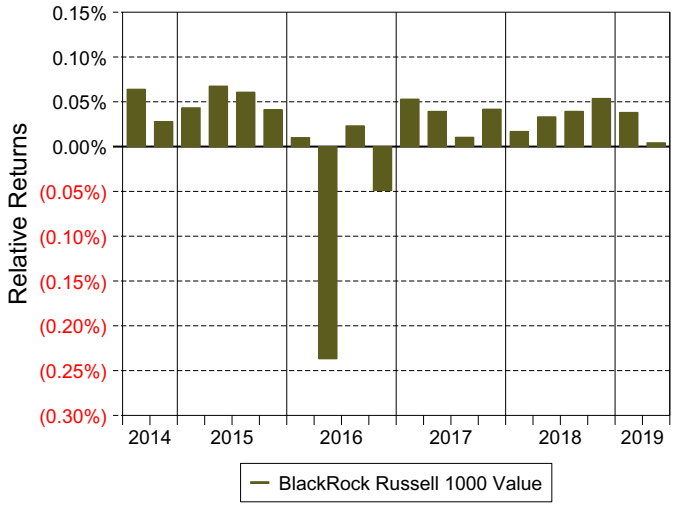
- BlackRock Russell 1000 Value's portfolio posted a 3.85% return for the quarter placing it in the 48 percentile of the Callan Large Cap Value group for the quarter and in the 28 percentile for the last year.
- BlackRock Russell 1000 Value's portfolio outperformed the Russell 1000 Value Index by 0.00% for the quarter and outperformed the Russell 1000 Value Index for the year by 0.15%.

## Performance vs Callan Large Cap Value (Gross)

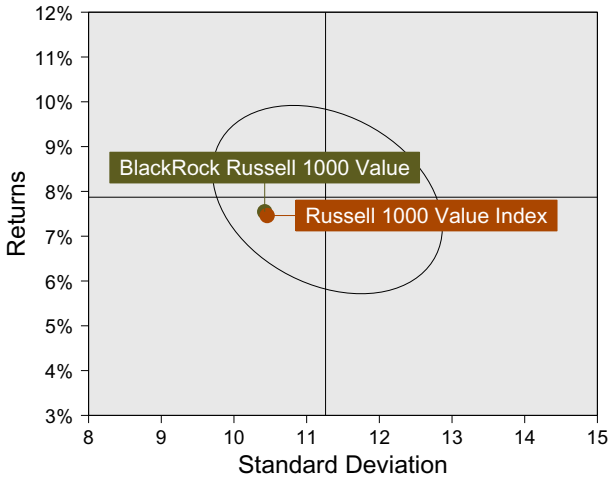



| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years | Last 18 Years |
|---|---|---|---|---|---|---|
| 10th Percentile | 5.32 | 11.63 | 13.77 | 9.63 | 14.73 | 8.90 |
| 25th Percentile | 4.38 | 9.24 | 12.56 | 8.67 | 13.97 | 8.42 |
| Median | 3.77 | 6.43 | 11.16 | 7.87 | 13.34 | 7.82 |
| 75th Percentile | 2.74 | 2.88 | 10.27 | 7.05 | 12.75 | 7.27 |
| 90th Percentile | 1.98 | 1.89 | 9.23 | 5.77 | 11.77 | 6.53 |
| **BlackRock Russell 1000 Value** ● | 3.85 | 8.61 | 10.30 | 7.55 | 13.29 | 7.11 |
| Russell 1000 Value Index ▲ | 3.84 | 8.46 | 10.19 | 7.46 | 13.19 | 7.01 |

### Relative Return vs Russell 1000 Value Index




### Callan Large Cap Value (Gross) Annualized Five Year Risk vs Return

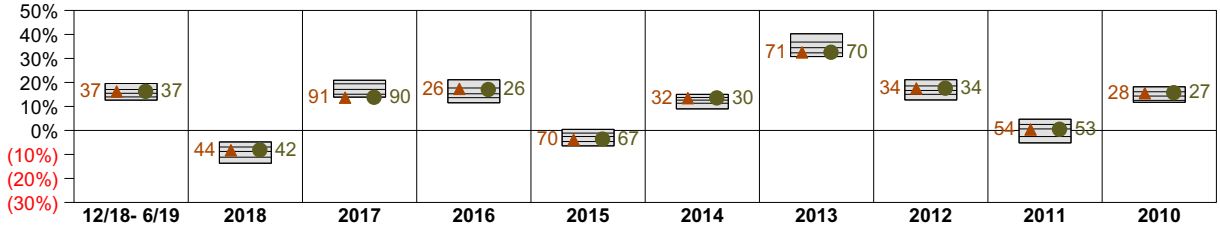


# BlackRock Russell 1000 Value
# Return Analysis Summary

## Return Analysis

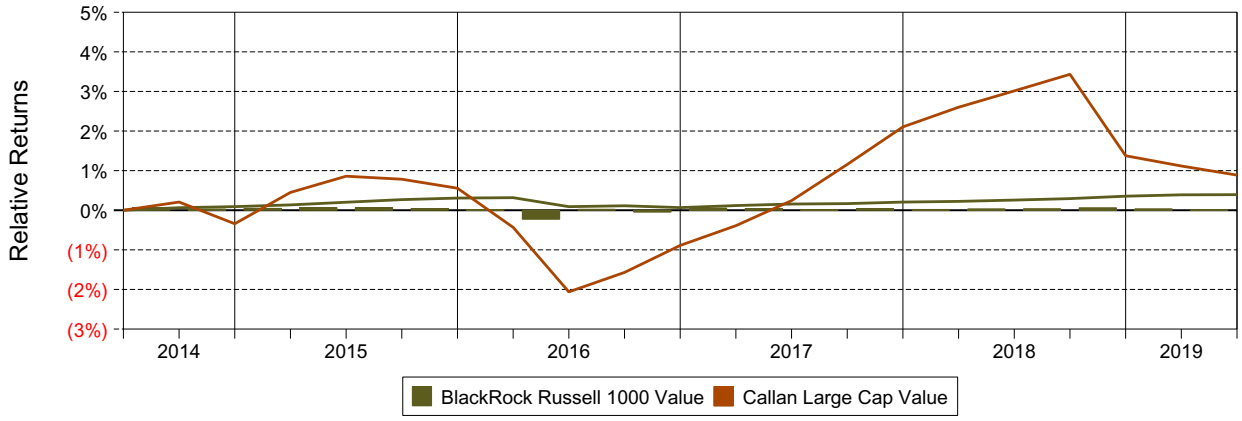
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Callan Large Cap Value (Gross)

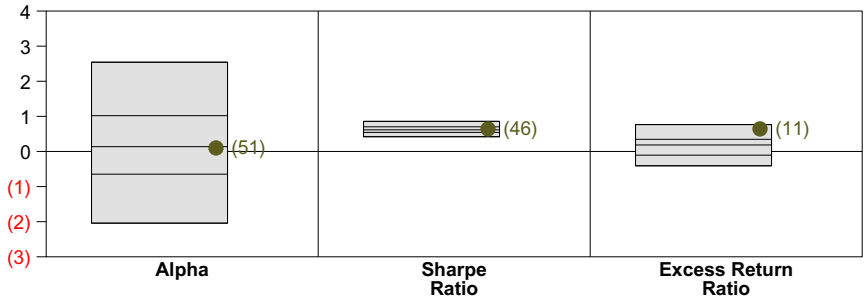



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 19.56 | (4.79) | 20.91 | 21.12 | 0.44 | 15.04 | 40.28 | 21.14 | 4.68 | 18.18 |
| 25th Percentile | 17.05 | (6.90) | 19.44 | 17.69 | (1.11) | 13.74 | 36.82 | 18.54 | 2.50 | 16.11 |
| Median | 15.48 | (8.76) | 17.10 | 15.27 | (2.53) | 12.63 | 34.48 | 16.66 | 0.64 | 14.32 |
| 75th Percentile | 13.97 | (11.14) | 15.09 | 13.66 | (4.62) | 11.33 | 32.34 | 15.04 | (2.54) | 12.53 |
| 90th Percentile | 12.63 | (13.67) | 13.87 | 11.52 | (6.43) | 8.98 | 30.78 | 12.70 | (5.19) | 11.72 |
| **BlackRock Russell 1000 Value** ● | 16.28 | (8.13) | 13.82 | 17.06 | (3.62) | 13.56 | 32.57 | 17.60 | 0.49 | 15.73 |
| Russell 1000 Value Index ▲ | 16.24 | (8.27) | 13.66 | 17.34 | (3.83) | 13.45 | 32.53 | 17.51 | 0.39 | 15.51 |

## Cumulative and Quarterly Relative Return vs Russell 1000 Value Index




## Risk Adjusted Return Measures vs Russell 1000 Value Index
## Rankings Against Callan Large Cap Value (Gross)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 2.54 | 0.86 | 0.77 |
| 25th Percentile | 1.02 | 0.70 | 0.35 |
| Median | 0.14 | 0.62 | 0.19 |
| 75th Percentile | (0.65) | 0.54 | (0.11) |
| 90th Percentile | (2.04) | 0.42 | (0.41) |
| **BlackRock Russell 1000 Value** ● | 0.10 | 0.64 | 0.64 |

# T. Rowe Price Large Cap Growth
# Period Ended June 30, 2019

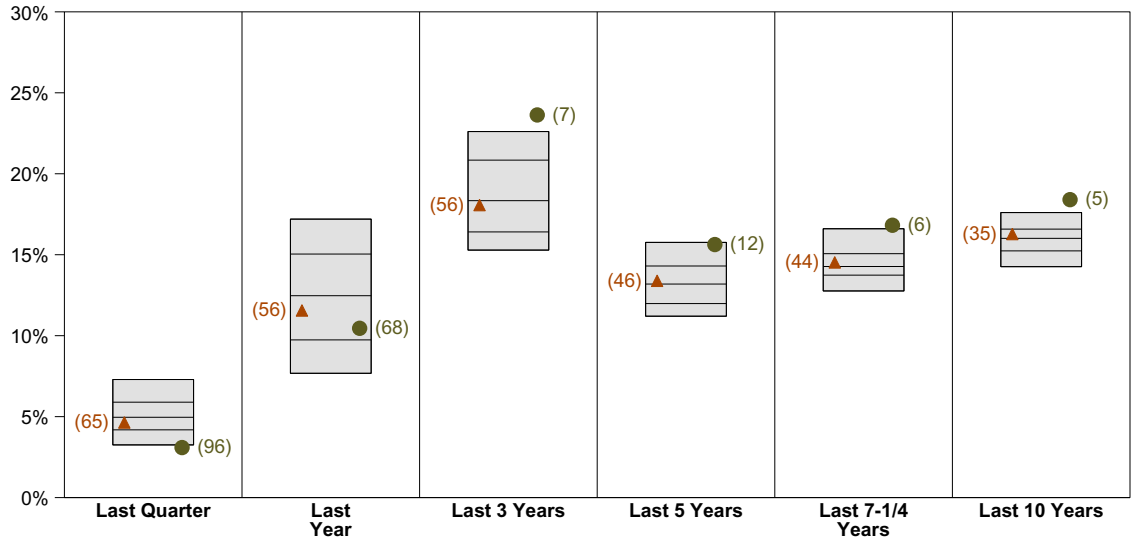
## Investment Philosophy

The Large-Cap Growth Strategy is a fundamentally driven, active approach to large company growth investing. The investment philosophy is centered around the manager's belief that long-term growth in earnings and cash flow drive stockholder returns. The product was funded during the first quarter of 2012. Performance prior is that of the composite.

## Quarterly Summary and Highlights

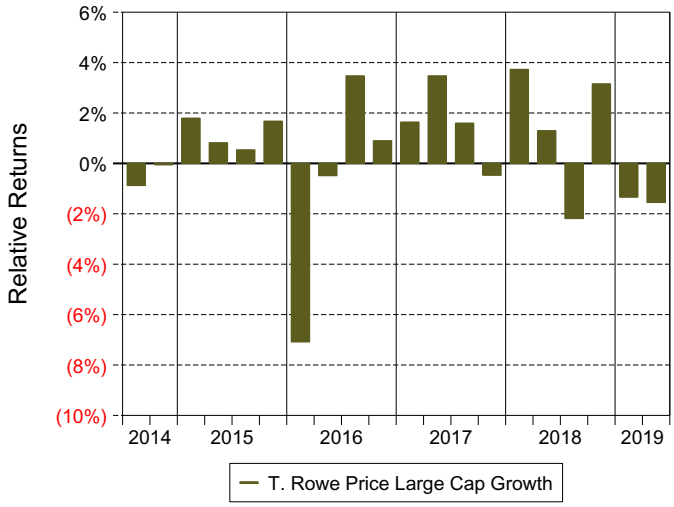
- T. Rowe Price Large Cap Growth's portfolio posted a 3.09% return for the quarter placing it in the 96 percentile of the Callan Large Cap Growth group for the quarter and in the 68 percentile for the last year.
- T. Rowe Price Large Cap Growth's portfolio underperformed the Russell 1000 Growth Index by 1.55% for the quarter and underperformed the Russell 1000 Growth Index for the year by 1.10%.

## Performance vs Callan Large Cap Growth (Gross)

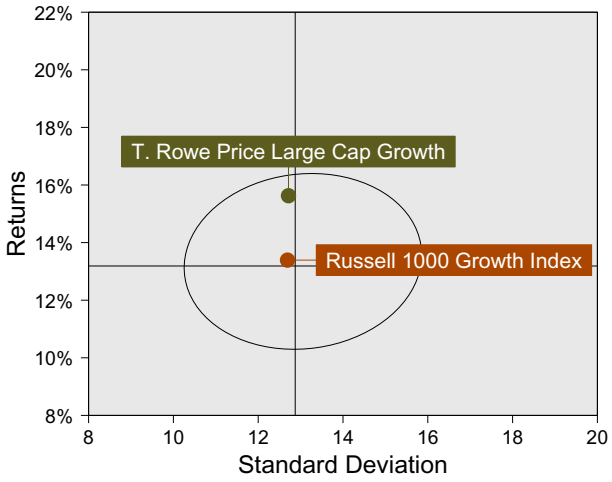



| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 7-1/4 Years | Last 10 Years |
|---|---|---|---|---|---|---|
| 10th Percentile | 7.29 | 17.20 | 22.61 | 15.76 | 16.60 | 17.60 |
| 25th Percentile | 5.89 | 15.04 | 20.84 | 14.30 | 15.07 | 16.58 |
| Median | 4.96 | 12.47 | 18.34 | 13.19 | 14.27 | 16.01 |
| 75th Percentile | 4.18 | 9.74 | 16.41 | 11.98 | 13.74 | 15.24 |
| 90th Percentile | 3.25 | 7.68 | 15.28 | 11.20 | 12.76 | 14.26 |
| **T. Rowe Price Large Cap Growth** ● | 3.09 | 10.46 | 23.63 | 15.63 | 16.82 | 18.40 |
| Russell 1000 Growth Index ▲ | 4.64 | 11.56 | 18.07 | 13.39 | 14.53 | 16.28 |

## Relative Return vs Russell 1000 Growth Index




## Callan Large Cap Growth (Gross) Annualized Five Year Risk vs Return

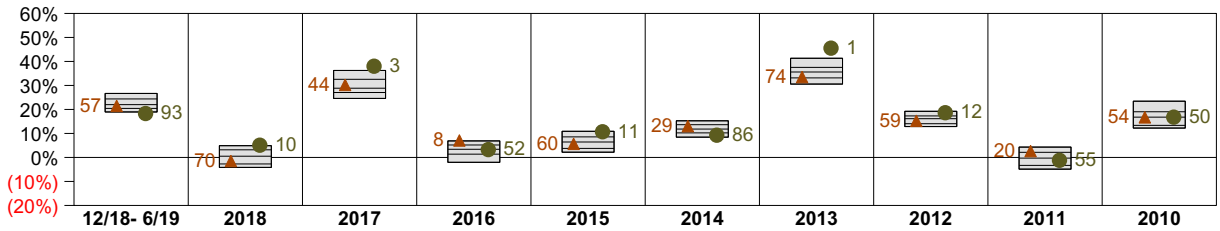


# T. Rowe Price Large Cap Growth
# Return Analysis Summary

## Return Analysis

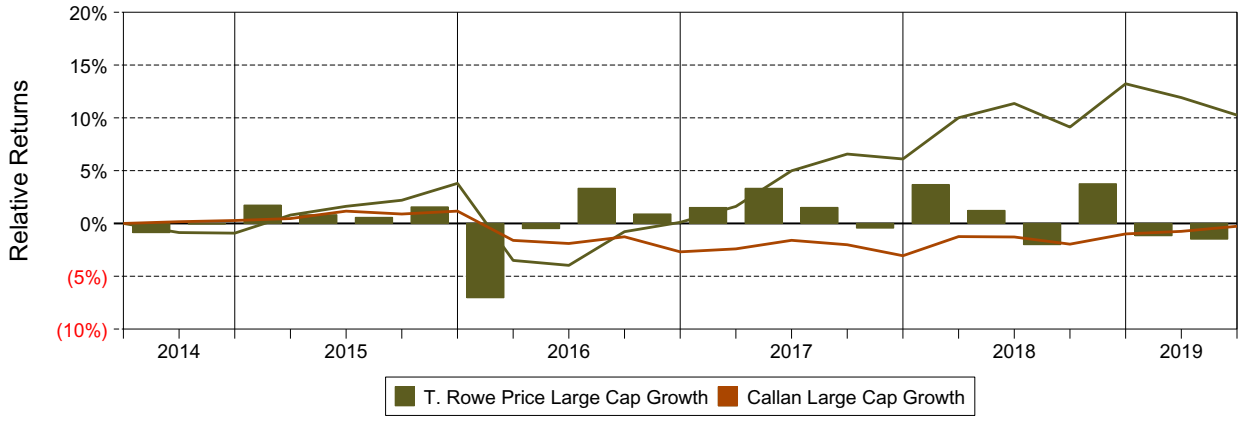
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Callan Large Cap Growth (Gross)

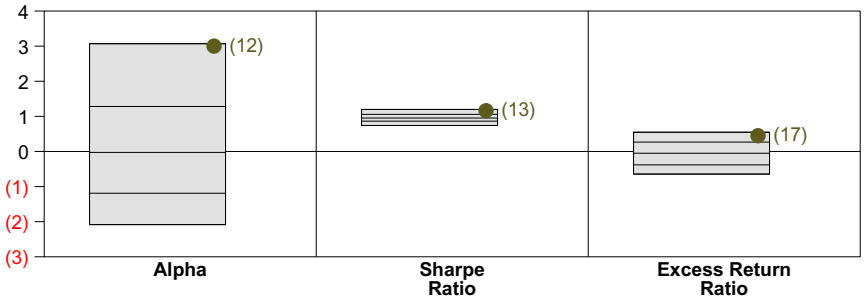



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 26.67 | 4.90 | 36.25 | 6.89 | 10.89 | 15.27 | 41.32 | 19.23 | 4.31 | 23.43 |
| 25th Percentile | 24.38 | 3.18 | 32.56 | 5.19 | 8.56 | 13.65 | 37.53 | 17.30 | 2.13 | 19.03 |
| Median | 22.00 | 0.51 | 28.84 | 3.39 | 6.43 | 11.82 | 35.60 | 16.14 | (0.28) | 16.79 |
| 75th Percentile | 20.43 | (2.72) | 27.06 | 1.37 | 3.77 | 10.23 | 33.14 | 14.05 | (3.31) | 13.37 |
| 90th Percentile | 18.95 | (4.16) | 24.59 | (2.03) | 2.18 | 8.44 | 30.56 | 12.87 | (4.87) | 12.24 |
| **T. Rowe Price Large Cap Growth** ● | 18.30 | 5.10 | 38.02 | 3.27 | 10.69 | 9.27 | 45.54 | 18.63 | (1.19) | 16.79 |
| Russell 1000 Growth Index ▲ | 21.49 | (1.51) | 30.21 | 7.08 | 5.67 | 13.05 | 33.48 | 15.26 | 2.64 | 16.71 |

## Cumulative and Quarterly Relative Return vs Russell 1000 Growth Index




## Risk Adjusted Return Measures vs Russell 1000 Growth Index
## Rankings Against Callan Large Cap Growth (Gross)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 3.07 | 1.20 | 0.55 |
| 25th Percentile | 1.28 | 1.06 | 0.27 |
| Median | (0.03) | 0.95 | (0.05) |
| 75th Percentile | (1.19) | 0.86 | (0.38) |
| 90th Percentile | (2.08) | 0.74 | (0.64) |
| **T. Rowe Price Large Cap Growth** ● | 3.00 | 1.16 | 0.45 |

## Champlain Mid Cap
## Period Ended June 30, 2019

### Investment Philosophy

Champlain Investment Partners believes buying the shares of superior businesses with credible and sincere managements at a discount to fair or intrinsic value gives investors several potential paths to wealth creation. First, the market may bid the shares to a premium over fair value. Second, management may grow the fair value over time at a faster rate than market appreciation. Third, the company may be bought by a larger company or private market investor. They are willing to sell over-priced stocks and harvest gains, reducing valuation risk. The product was funded during the third quarter of 2010. Performance prior is that of the composite.

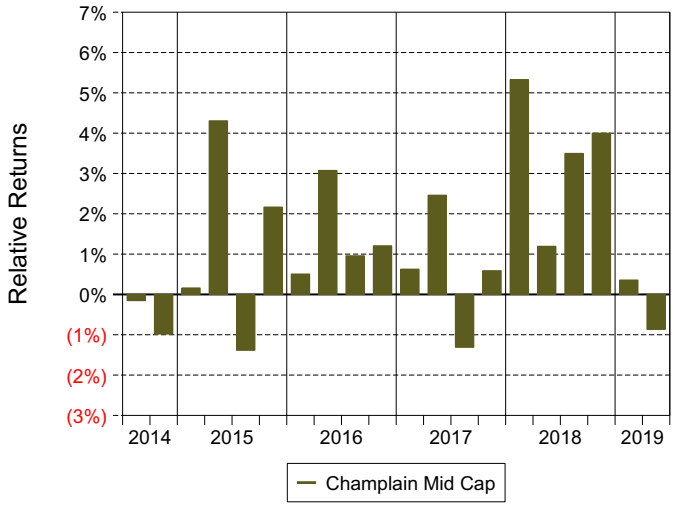
### Quarterly Summary and Highlights

- Champlain Mid Cap's portfolio posted a 3.26% return for the quarter placing it in the 66 percentile of the Callan Mid Capitalization group for the quarter and in the 14 percentile for the last year.
- Champlain Mid Cap's portfolio underperformed the Russell MidCap Index by 0.87% for the quarter and outperformed the Russell MidCap Index for the year by 8.24%.

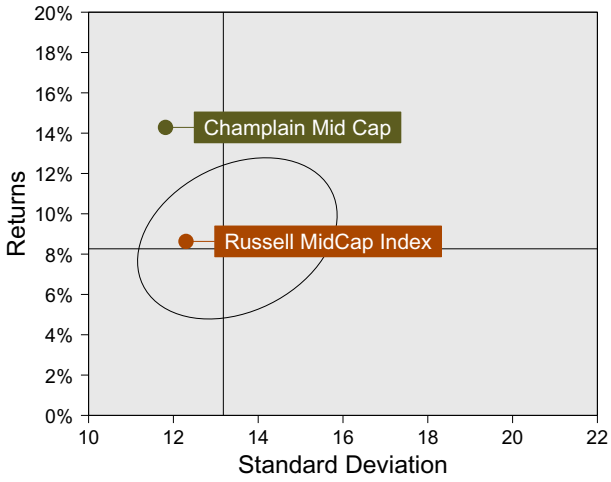
### Performance vs Callan Mid Capitalization (Gross)

| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 8-3/4 Years | Last 10 Years |
|---|---|---|---|---|---|---|
| 10th Percentile | 7.80 | 16.97 | 18.56 | 12.43 | 15.12 | 17.14 |
| 25th Percentile | 5.90 | 12.73 | 16.06 | 10.92 | 14.15 | 15.95 |
| Median | 4.54 | 5.38 | 12.49 | 8.26 | 13.00 | 15.12 |
| 75th Percentile | 2.92 | 1.29 | 9.88 | 6.94 | 11.81 | 13.97 |
| 90th Percentile | 1.76 | (0.94) | 8.35 | 5.35 | 10.87 | 12.96 |
| **Champlain Mid Cap** ● | 3.26 | 16.06 | 19.11 | 14.29 | 16.43 | 17.25 |
| Russell MidCap Index ▲ | 4.13 | 7.83 | 12.16 | 8.63 | 12.91 | 15.16 |

### Relative Return vs Russell MidCap Index




### Callan Mid Capitalization (Gross) Annualized Five Year Risk vs Return

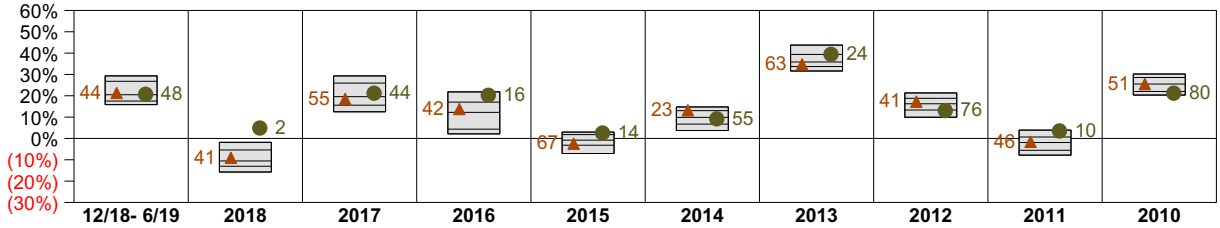


# Champlain Mid Cap
# Return Analysis Summary

## Return Analysis

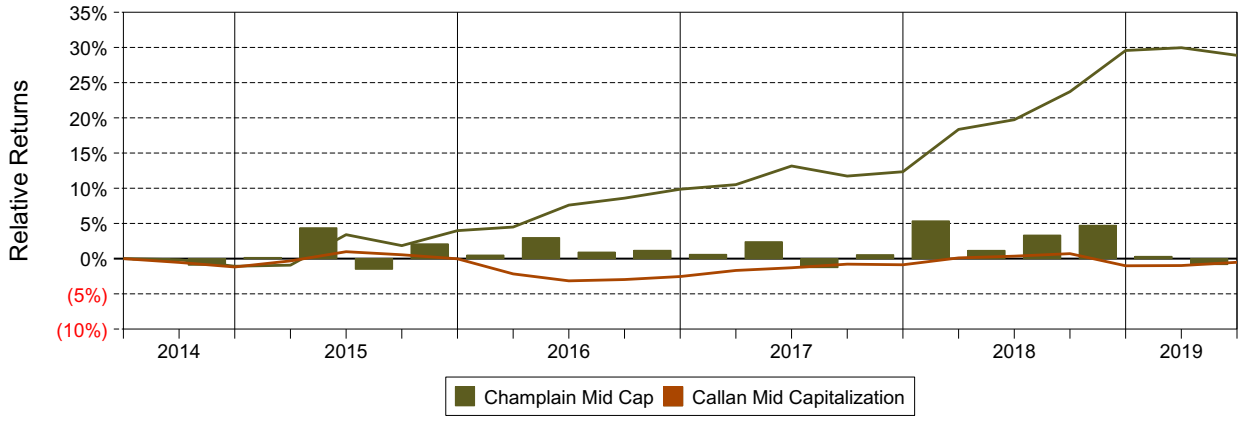
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Callan Mid Capitalization (Gross)

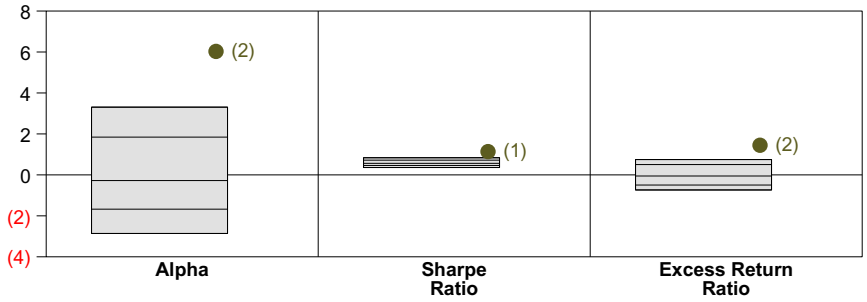



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 29.32 | (1.83) | 29.31 | 21.83 | 2.97 | 14.76 | 43.76 | 21.34 | 3.90 | 30.19 |
| 25th Percentile | 26.78 | (5.40) | 25.93 | 17.03 | 1.80 | 13.03 | 39.39 | 18.82 | 0.68 | 28.56 |
| Median | 20.49 | (10.55) | 19.58 | 12.23 | (0.80) | 9.88 | 35.84 | 16.26 | (1.92) | 25.49 |
| 75th Percentile | 17.52 | (13.03) | 15.59 | 4.35 | (3.18) | 6.72 | 33.70 | 13.33 | (5.57) | 22.01 |
| 90th Percentile | 15.85 | (15.76) | 12.48 | 2.13 | (7.07) | 3.72 | 31.60 | 9.94 | (7.83) | 20.33 |
| **Champlain Mid Cap** ● | 20.70 | 4.88 | 21.20 | 20.24 | 2.55 | 9.17 | 39.44 | 13.05 | 3.53 | 21.21 |
| Russell MidCap Index ▲ | 21.35 | (9.06) | 18.52 | 13.80 | (2.44) | 13.22 | 34.76 | 17.28 | (1.55) | 25.48 |

## Cumulative and Quarterly Relative Return vs Russell MidCap Index




## Risk Adjusted Return Measures vs Russell MidCap Index
## Rankings Against Callan Mid Capitalization (Gross)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 3.31 | 0.84 | 0.75 |
| 25th Percentile | 1.84 | 0.72 | 0.50 |
| Median | (0.28) | 0.56 | (0.05) |
| 75th Percentile | (1.67) | 0.46 | (0.50) |
| 90th Percentile | (2.86) | 0.36 | (0.74) |
| **Champlain Mid Cap** ● | 6.03 | 1.14 | 1.45 |

# Pyramis Small Cap
# Period Ended June 30, 2019

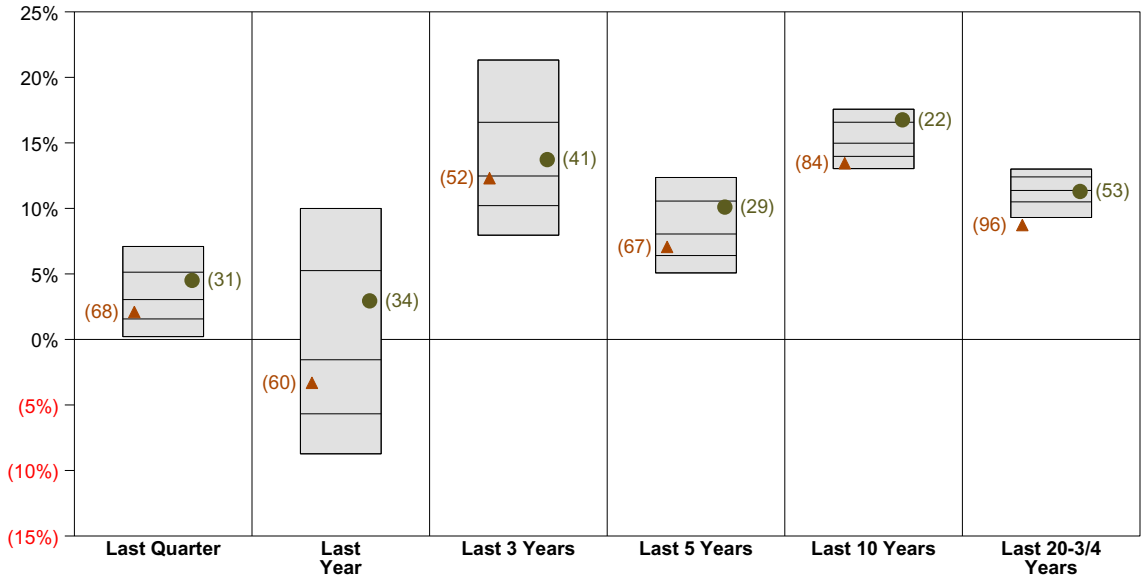
## Investment Philosophy

FIAM believes that equity markets are semi-efficient and that pricing anomalies exist within the marketplace. The Small Cap Core strategy seeks to build a balanced portfolio where returns will be driven by stock selections and not by systemic biases or exposures to market factors. The product was funded during the third quarter of 1998.

## Quarterly Summary and Highlights

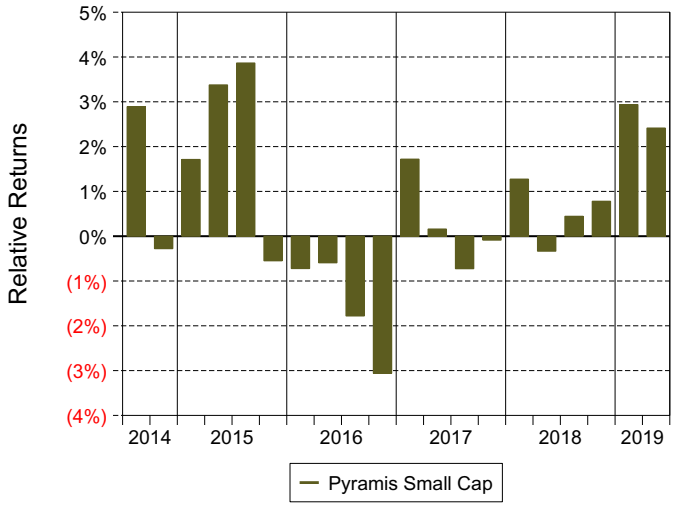
- Pyramis Small Cap's portfolio posted a 4.51% return for the quarter placing it in the 31 percentile of the Callan Small Capitalization group for the quarter and in the 34 percentile for the last year.
- Pyramis Small Cap's portfolio outperformed the Russell 2000 Index by 2.41% for the quarter and outperformed the Russell 2000 Index for the year by 6.25%.

## Performance vs Callan Small Capitalization (Gross)

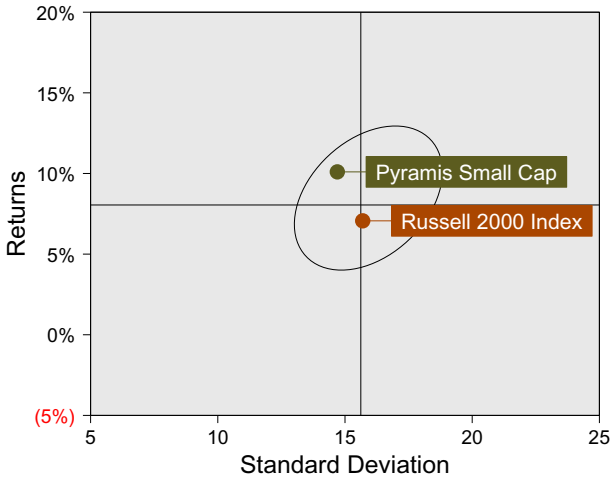



| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years | Last 20-3/4 Years |
|---|---|---|---|---|---|---|
| 10th Percentile | 7.09 | 9.99 | 21.32 | 12.36 | 17.57 | 13.00 |
| 25th Percentile | 5.13 | 5.25 | 16.57 | 10.56 | 16.58 | 12.40 |
| Median | 3.04 | (1.55) | 12.47 | 8.05 | 14.98 | 11.37 |
| 75th Percentile | 1.56 | (5.68) | 10.21 | 6.40 | 13.97 | 10.50 |
| 90th Percentile | 0.22 | (8.73) | 7.95 | 5.08 | 13.04 | 9.31 |
| **Pyramis Small Cap** ● | 4.51 | 2.94 | 13.72 | 10.10 | 16.76 | 11.29 |
| Russell 2000 Index ▲ | 2.10 | (3.31) | 12.30 | 7.06 | 13.45 | 8.73 |

### Relative Return vs Russell 2000 Index




### Callan Small Capitalization (Gross) Annualized Five Year Risk vs Return

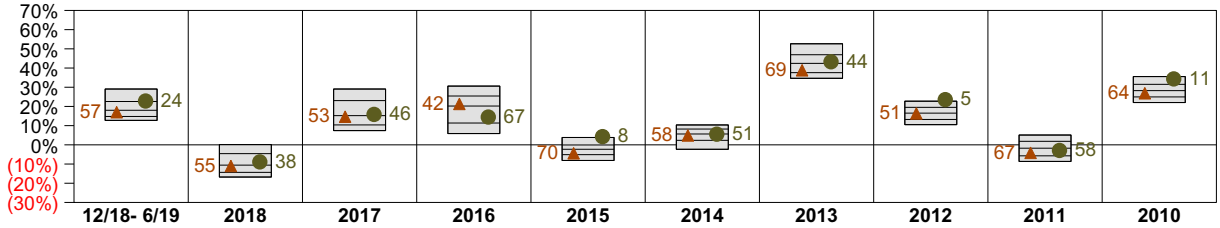


# Pyramis Small Cap
# Return Analysis Summary

## Return Analysis

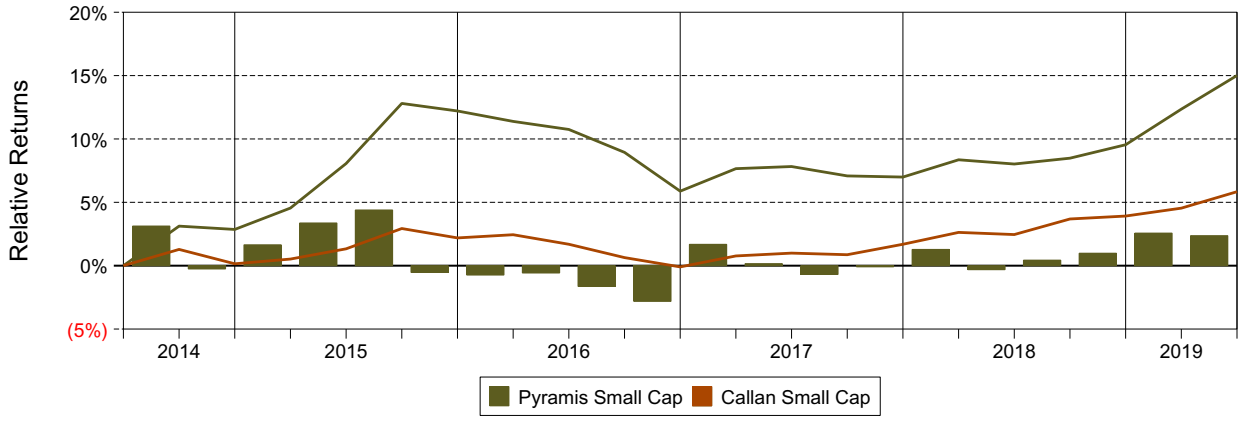
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Callan Small Capitalization (Gross)

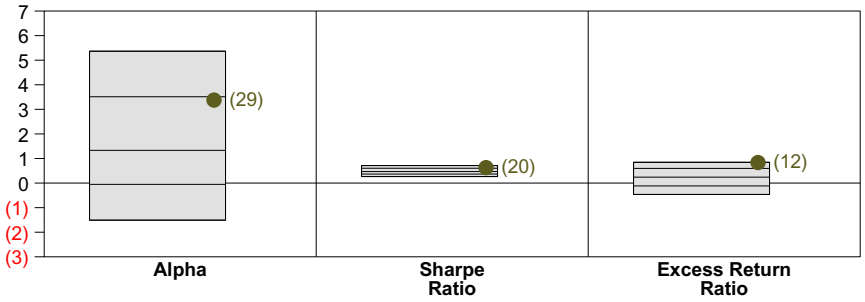



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 29.07 | 0.12 | 29.07 | 30.60 | 3.84 | 10.36 | 52.64 | 22.74 | 5.11 | 35.55 |
| 25th Percentile | 22.57 | (4.58) | 23.04 | 25.44 | (0.06) | 8.23 | 46.93 | 19.53 | 1.84 | 31.52 |
| Median | 18.00 | (10.56) | 15.21 | 20.21 | (2.30) | 5.66 | 42.44 | 16.51 | (1.75) | 28.24 |
| 75th Percentile | 14.78 | (14.34) | 10.37 | 11.37 | (5.11) | 2.35 | 37.59 | 13.22 | (5.72) | 24.96 |
| 90th Percentile | 12.74 | (16.78) | 7.42 | 5.88 | (8.14) | (2.32) | 34.65 | 10.51 | (8.64) | 22.03 |
| **Pyramis Small Cap** ● | 22.82 | (8.89) | 15.85 | 14.47 | 4.27 | 5.54 | 43.26 | 23.54 | (2.91) | 34.34 |
| Russell 2000 Index ▲ | 16.98 | (11.01) | 14.65 | 21.31 | (4.41) | 4.89 | 38.82 | 16.35 | (4.18) | 26.85 |

## Cumulative and Quarterly Relative Return vs Russell 2000 Index




## Risk Adjusted Return Measures vs Russell 2000 Index
## Rankings Against Callan Small Capitalization (Gross)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 5.37 | 0.71 | 0.85 |
| 25th Percentile | 3.51 | 0.60 | 0.60 |
| Median | 1.33 | 0.47 | 0.24 |
| 75th Percentile | (0.05) | 0.37 | (0.12) |
| 90th Percentile | (1.51) | 0.26 | (0.46) |
| **Pyramis Small Cap** ● | 3.38 | 0.63 | 0.83 |

# International Equity
# Period Ended June 30, 2019

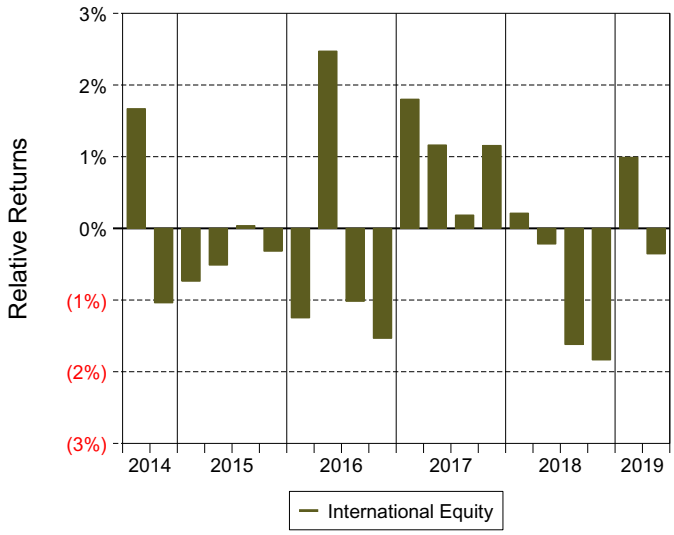
## Quarterly Summary and Highlights

- International Equity's portfolio posted a 2.63% return for the quarter placing it in the 70 percentile of the Public Fund - International Equity group for the quarter and in the 89 percentile for the last year.
- International Equity's portfolio underperformed the MSCI ACWI ex US by 0.36% for the quarter and underperformed the MSCI ACWI ex US for the year by 3.16%.

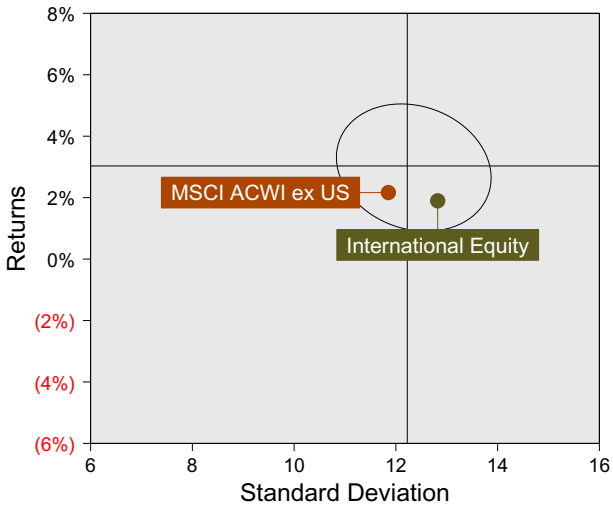
## Performance vs Public Fund - International Equity (Gross)

| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years |
|---|---|---|---|---|---|
| 10th Percentile | 3.82 | 2.53 | 11.12 | 4.23 | 8.51 |
| 25th Percentile | 3.38 | 1.52 | 10.40 | 3.70 | 8.20 |
| Median | 3.00 | 0.57 | 9.74 | 3.03 | 7.64 |
| 75th Percentile | 2.43 | (0.67) | 9.00 | 2.44 | 6.79 |
| 90th Percentile | 1.78 | (1.92) | 8.01 | 1.61 | 5.79 |
| **International Equity** ● | 2.63 | (1.87) | 8.78 | 1.90 | 6.92 |
| MSCI ACWI ex US ▲ | 2.98 | 1.29 | 9.39 | 2.16 | 6.54 |

### Relative Return vs MSCI ACWI ex US




### Public Fund - International Equity (Gross) Annualized Five Year Risk vs Return

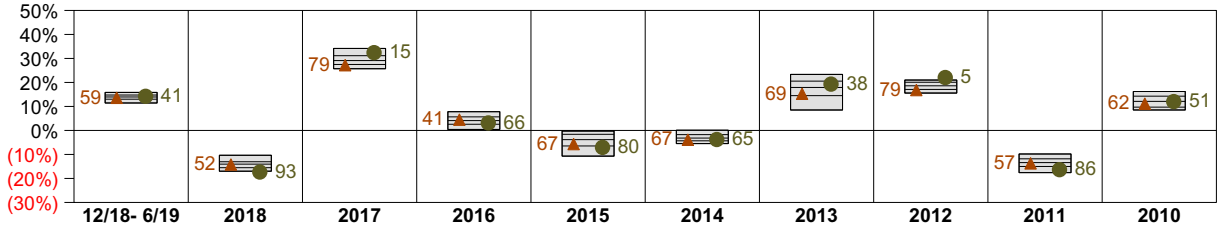


# International Equity
# Return Analysis Summary

## Return Analysis

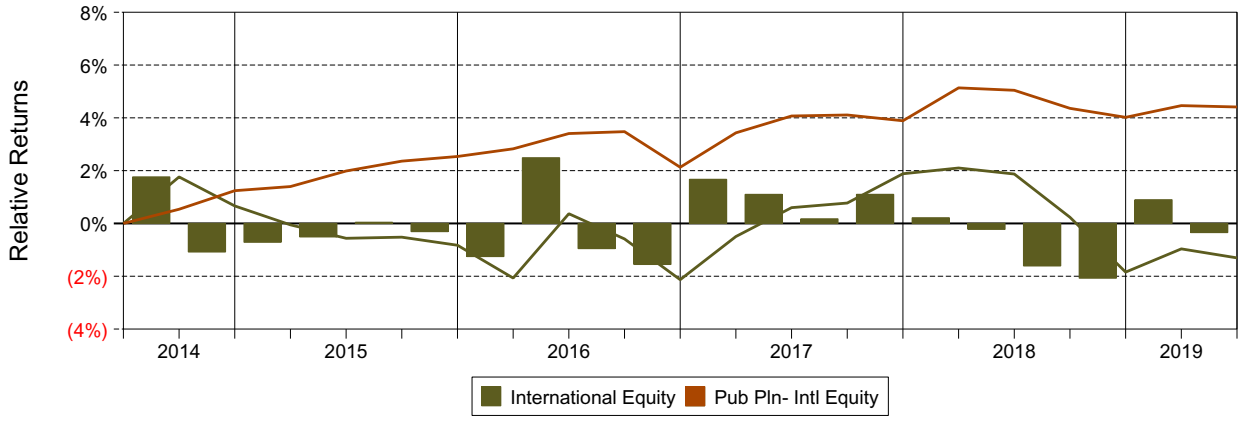
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Public Fund - International Equity (Gross)

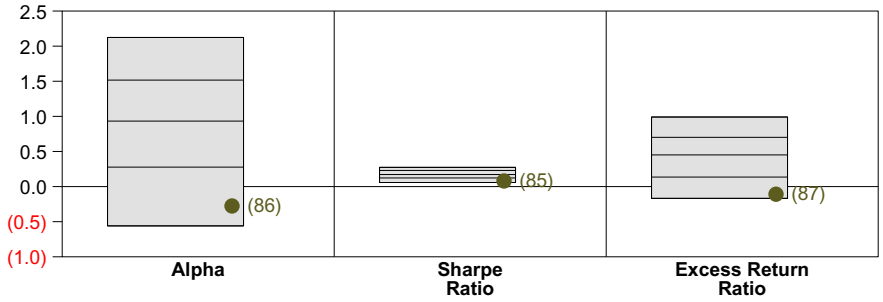



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 15.85 | (10.34) | 34.17 | 7.81 | (0.26) | 0.08 | 23.34 | 21.00 | (9.81) | 16.23 |
| 25th Percentile | 14.76 | (13.05) | 31.15 | 5.65 | (1.61) | (1.75) | 20.55 | 20.07 | (11.83) | 14.28 |
| Median | 13.95 | (14.04) | 29.11 | 4.10 | (3.83) | (3.17) | 17.91 | 18.60 | (13.40) | 12.11 |
| 75th Percentile | 13.02 | (15.52) | 27.49 | 2.58 | (6.46) | (4.32) | 14.50 | 17.09 | (15.01) | 9.72 |
| 90th Percentile | 11.43 | (16.99) | 25.71 | 0.41 | (10.70) | (5.48) | 8.51 | 15.58 | (17.58) | 8.52 |
| **International Equity** ● | 14.23 | (17.33) | 32.41 | 3.12 | (7.06) | (3.78) | 19.30 | 22.05 | (16.34) | 12.02 |
| MSCI ACWI ex US ▲ | 13.60 | (14.20) | 27.19 | 4.50 | (5.66) | (3.87) | 15.29 | 16.83 | (13.71) | 11.15 |

## Cumulative and Quarterly Relative Return vs MSCI ACWI ex US




## Risk Adjusted Return Measures vs MSCI ACWI ex US
## Rankings Against Public Fund - International Equity (Gross)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 2.12 | 0.27 | 0.99 |
| 25th Percentile | 1.52 | 0.23 | 0.70 |
| Median | 0.93 | 0.17 | 0.45 |
| 75th Percentile | 0.28 | 0.12 | 0.14 |
| 90th Percentile | (0.56) | 0.06 | (0.17) |
| **International Equity** ● | (0.28) | 0.08 | (0.11) |

## Causeway International Opportunities
## Period Ended June 30, 2019

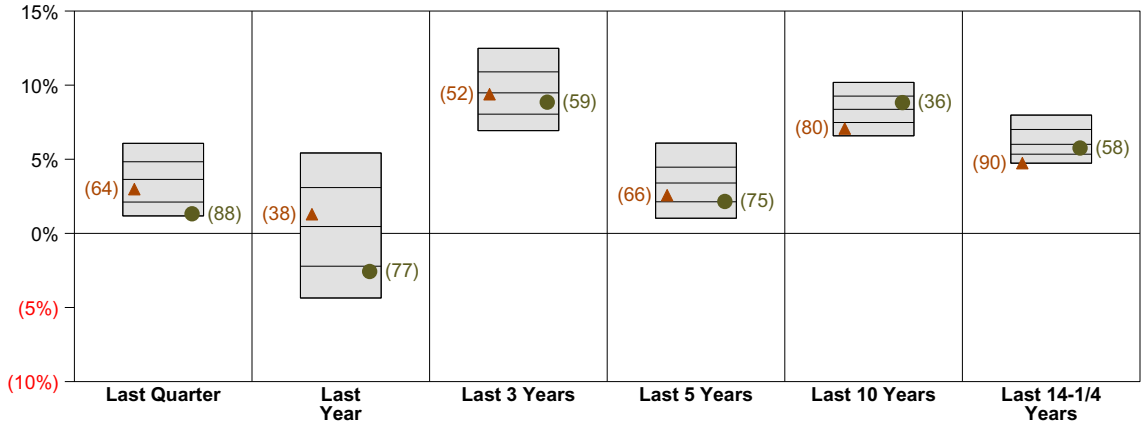
### Investment Philosophy

Causeway employs a three-step process: 1) The International Value piece (developed markets only) utilizes bottom-up selection of undervalued stocks as well as the compounding of dividend returns; 2) The Emerging Markets portion implements through the use of proprietary quantitative models that are a combination of bottom-up and top-down factors; 3) The team also utilizes quantitative allocation models to tactically allocate (within specified ranges) between developed and emerging markets based on their relative attractiveness. The product was funded during the first quarter of 2005. In May 2016 the strategy transitioned from International Value to International Opportunities. As such, the index has been updated accordingly from EAFE to ACWI ex-US (Net Div).

### Quarterly Summary and Highlights

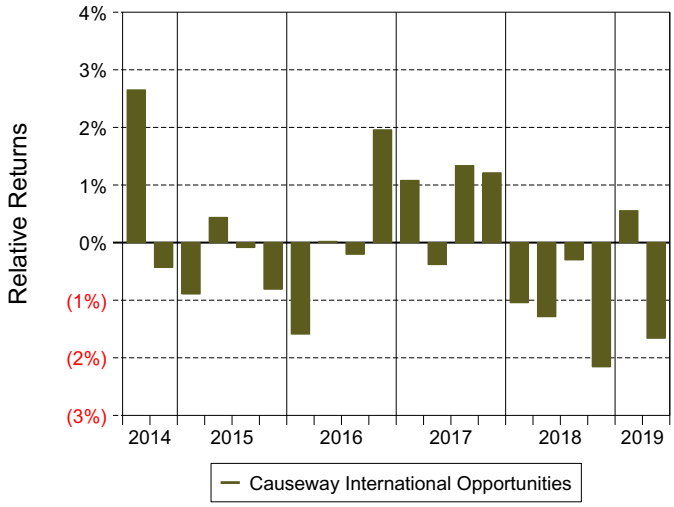
- Causeway International Opportunities's portfolio posted a 1.32% return for the quarter placing it in the 88 percentile of the Callan Non-US Equity group for the quarter and in the 77 percentile for the last year.
- Causeway International Opportunities's portfolio underperformed the Causeway Linked Index by 1.66% for the quarter and underperformed the Causeway Linked Index for the year by 3.86%.

### Performance vs Callan Non-US Equity (Gross)

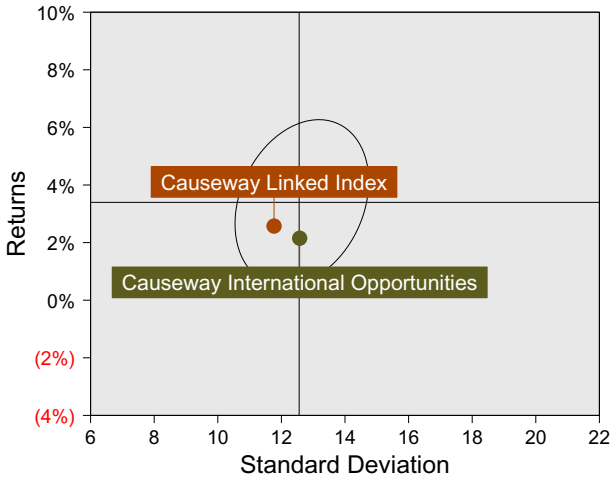



| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years | Last 14-1/4 Years |
|---|---|---|---|---|---|---|
| 10th Percentile | 6.08 | 5.42 | 12.49 | 6.09 | 10.19 | 7.98 |
| 25th Percentile | 4.83 | 3.09 | 10.90 | 4.47 | 9.26 | 7.01 |
| Median | 3.64 | 0.46 | 9.48 | 3.40 | 8.37 | 6.01 |
| 75th Percentile | 2.11 | (2.22) | 8.04 | 2.13 | 7.48 | 5.34 |
| 90th Percentile | 1.18 | (4.36) | 6.93 | 1.02 | 6.58 | 4.74 |
| **Causeway International Opportunities** ● | 1.32 | (2.57) | 8.85 | 2.15 | 8.82 | 5.76 |
| Causeway Linked Index ▲ | 2.98 | 1.29 | 9.39 | 2.57 | 7.07 | 4.74 |

### Relative Return vs Causeway Linked Index




### Callan Non-US Equity (Gross) Annualized Five Year Risk vs Return

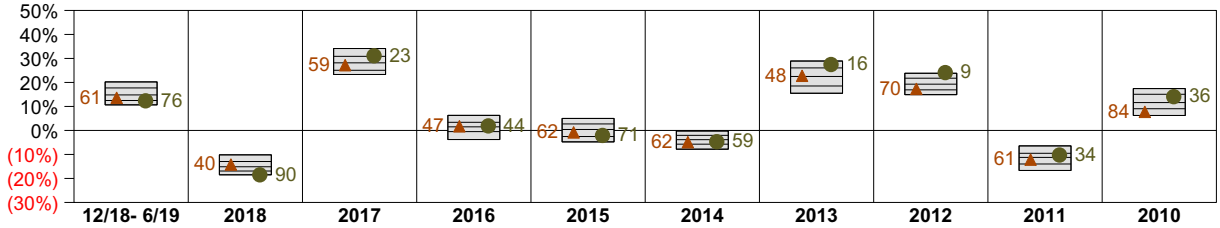


# Causeway International Opportunities
# Return Analysis Summary

## Return Analysis

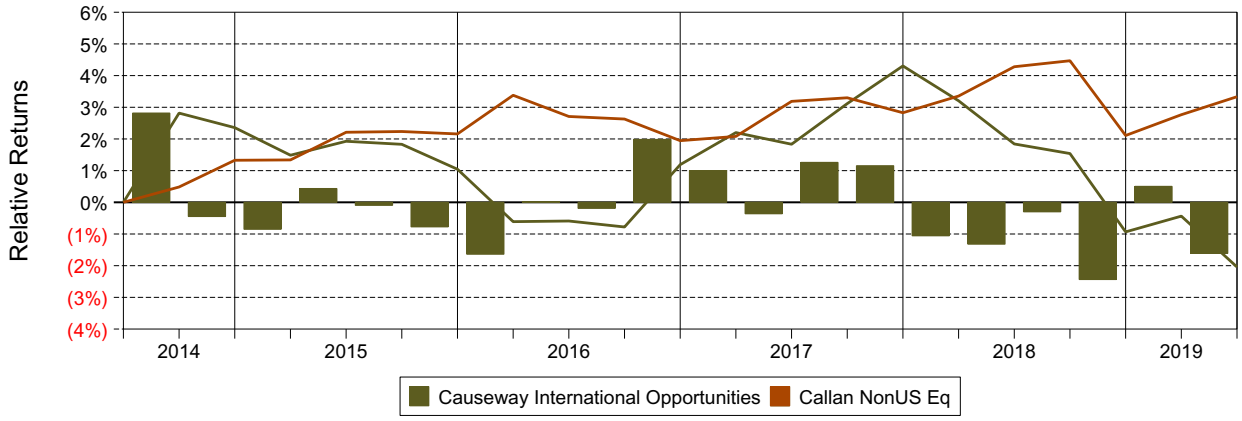
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Callan Non-US Equity (Gross)

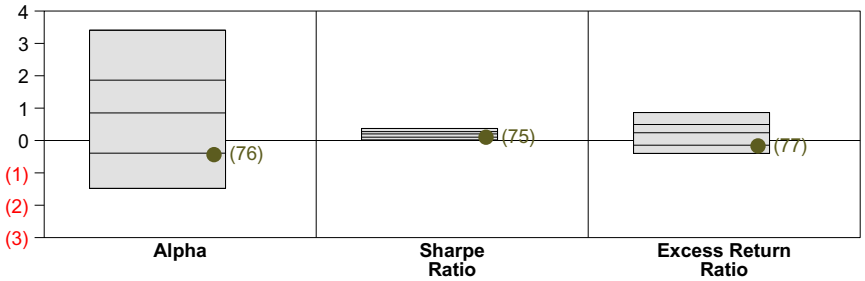



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 20.22 | (10.17) | 34.14 | 6.28 | 5.00 | (0.22) | 28.92 | 23.83 | (6.44) | 17.45 |
| 25th Percentile | 17.71 | (12.94) | 30.88 | 3.39 | 2.71 | (2.04) | 26.05 | 21.76 | (9.53) | 15.07 |
| Median | 14.80 | (15.13) | 28.16 | 1.50 | 0.40 | (3.85) | 22.49 | 19.28 | (11.24) | 11.62 |
| 75th Percentile | 12.48 | (16.91) | 25.06 | (0.49) | (2.53) | (5.73) | 18.53 | 16.91 | (13.97) | 9.05 |
| 90th Percentile | 10.66 | (18.49) | 23.31 | (3.79) | (4.77) | (7.82) | 15.49 | 14.91 | (16.68) | 6.24 |
| **Causeway International Opportunities** ● | 12.33 | (18.50) | 31.11 | 1.88 | (2.09) | (4.70) | 27.47 | 24.10 | (10.24) | 14.06 |
| Causeway Linked Index ▲ | 13.60 | (14.20) | 27.19 | 1.74 | (0.81) | (4.90) | 22.78 | 17.32 | (12.14) | 7.75 |

## Cumulative and Quarterly Relative Return vs Causeway Linked Index




## Risk Adjusted Return Measures vs Causeway Linked Index
## Rankings Against Callan Non-US Equity (Gross)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 3.41 | 0.37 | 0.86 |
| 25th Percentile | 1.86 | 0.28 | 0.49 |
| Median | 0.85 | 0.20 | 0.24 |
| 75th Percentile | (0.39) | 0.10 | (0.14) |
| 90th Percentile | (1.48) | 0.01 | (0.40) |
| **Causeway International Opportunities** ● | (0.44) | 0.10 | (0.17) |

# Aberdeen EAFE Plus
# Period Ended June 30, 2019

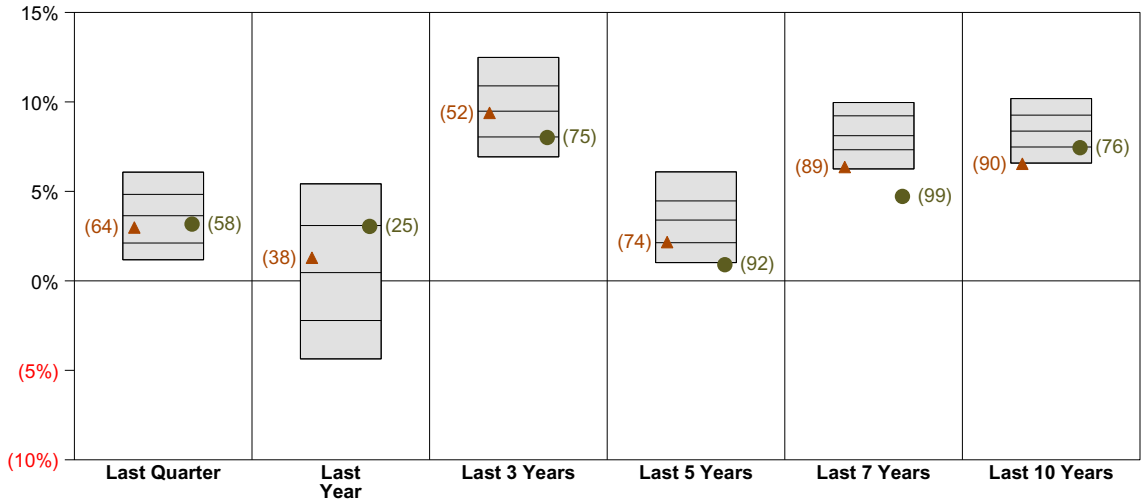
## Investment Philosophy

Aberdeen believes that given the inefficiency of markets, superior long-term returns are achieved by identifying high quality stocks, buying them at reasonable/cheap prices, and ultimately investing in those securities for the long term. Absolute return is held to be of the utmost importance. The strategy is benchmark aware, but not benchmark driven. This benchmark stance is born from their belief that indices do not provide meaningful guidance to the prospects of a company or its inherent worth.

## Quarterly Summary and Highlights

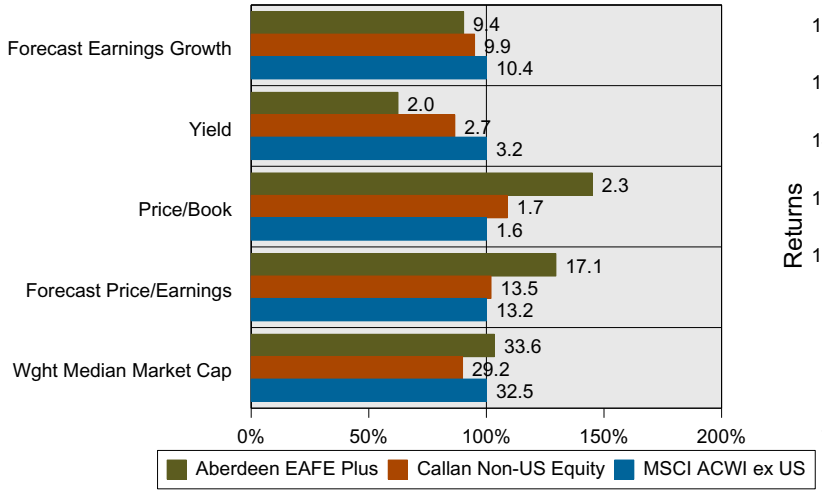
- Aberdeen EAFE Plus's portfolio posted a 3.17% return for the quarter placing it in the 58 percentile of the Callan Non-US Equity group for the quarter and in the 25 percentile for the last year.
- Aberdeen EAFE Plus's portfolio outperformed the MSCI ACWI ex US by 0.19% for the quarter and outperformed the MSCI ACWI ex US for the year by 1.75%.

## Performance vs Callan Non-US Equity (Gross)

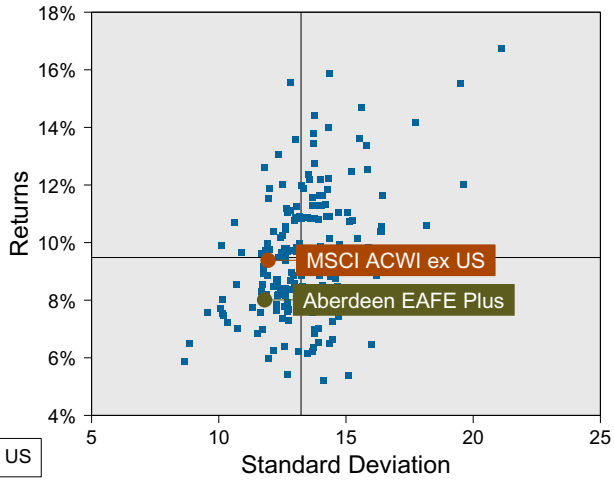



| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 7 Years | Last 10 Years |
|---|---|---|---|---|---|---|
| 10th Percentile | 6.08 | 5.42 | 12.49 | 6.09 | 9.97 | 10.19 |
| 25th Percentile | 4.83 | 3.09 | 10.90 | 4.47 | 9.22 | 9.26 |
| Median | 3.64 | 0.46 | 9.48 | 3.40 | 8.11 | 8.37 |
| 75th Percentile | 2.11 | (2.22) | 8.04 | 2.13 | 7.33 | 7.48 |
| 90th Percentile | 1.18 | (4.36) | 6.93 | 1.02 | 6.26 | 6.58 |
| **Aberdeen EAFE Plus** ● | 3.17 | 3.04 | 8.01 | 0.90 | 4.72 | 7.44 |
| MSCI ACWI ex US ▲ | 2.98 | 1.29 | 9.39 | 2.16 | 6.36 | 6.54 |

### Portfolio Characteristics as a Percentage of the MSCI ACWI ex US




### Callan Non-US Equity (Gross) Annualized Three Year Risk vs Return

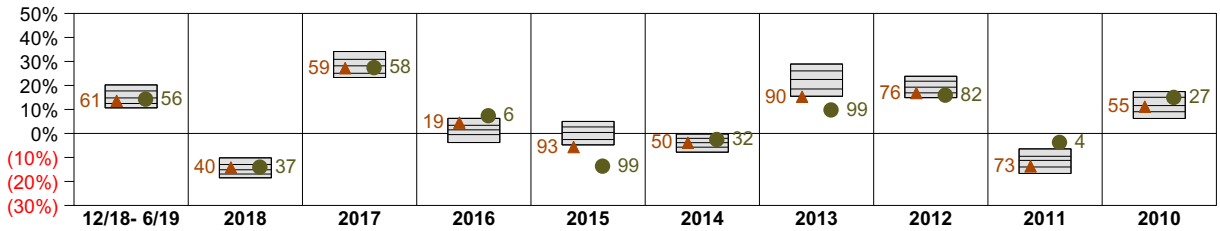


# Aberdeen EAFE Plus
# Return Analysis Summary

## Return Analysis

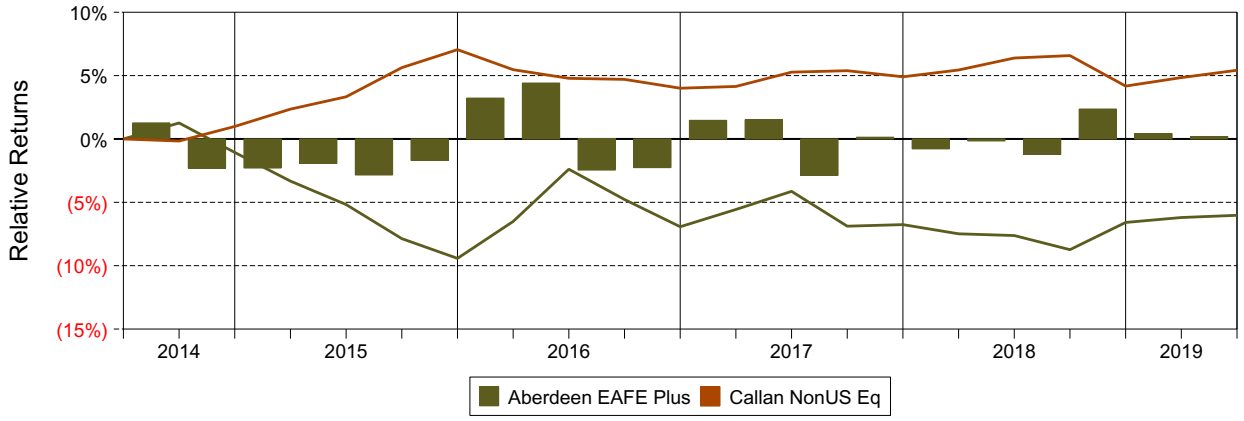
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Callan Non-US Equity (Gross)

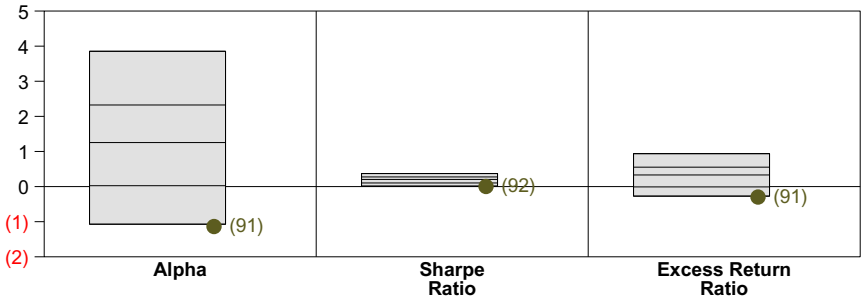



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 20.22 | (10.17) | 34.14 | 6.28 | 5.00 | (0.22) | 28.92 | 23.83 | (6.44) | 17.45 |
| 25th Percentile | 17.71 | (12.94) | 30.88 | 3.39 | 2.71 | (2.04) | 26.05 | 21.76 | (9.53) | 15.07 |
| Median | 14.80 | (15.13) | 28.16 | 1.50 | 0.40 | (3.85) | 22.49 | 19.28 | (11.24) | 11.62 |
| 75th Percentile | 12.48 | (16.91) | 25.06 | (0.49) | (2.53) | (5.73) | 18.53 | 16.91 | (13.97) | 9.05 |
| 90th Percentile | 10.66 | (18.49) | 23.31 | (3.79) | (4.77) | (7.82) | 15.49 | 14.91 | (16.68) | 6.24 |
| **Aberdeen EAFE Plus** ● | 14.29 | (14.04) | 27.42 | 7.37 | (13.63) | (2.53) | 9.79 | 15.94 | (3.72) | 15.02 |
| MSCI ACWI ex US ▲ | 13.60 | (14.20) | 27.19 | 4.50 | (5.66) | (3.87) | 15.29 | 16.83 | (13.71) | 11.15 |

## Cumulative and Quarterly Relative Return vs MSCI ACWI ex US




## Risk Adjusted Return Measures vs MSCI ACWI ex US
## Rankings Against Callan Non-US Equity (Gross)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 3.85 | 0.37 | 0.94 |
| 25th Percentile | 2.32 | 0.28 | 0.55 |
| Median | 1.25 | 0.20 | 0.33 |
| 75th Percentile | 0.02 | 0.10 | (0.01) |
| 90th Percentile | (1.07) | 0.01 | (0.27) |
| **Aberdeen EAFE Plus** ● | (1.14) | 0.00 | (0.30) |

# American Century Non-US SC
# Period Ended June 30, 2019

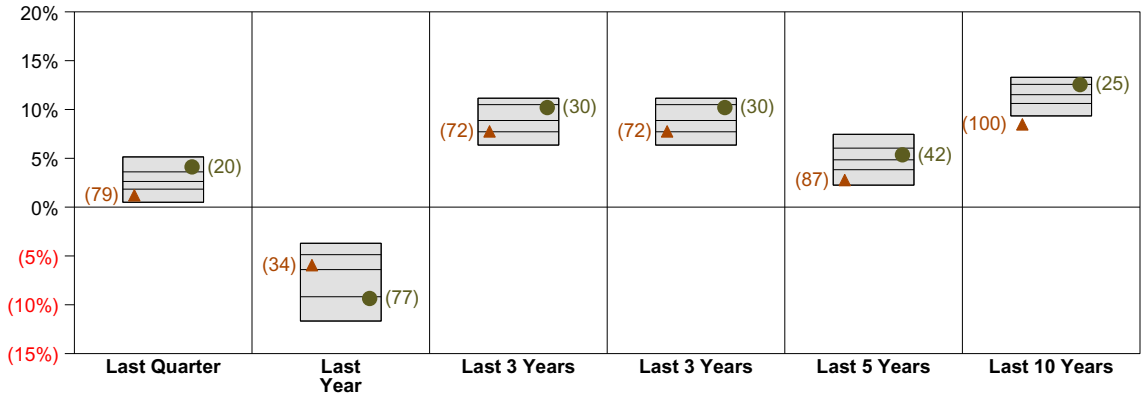
## Investment Philosophy

American Century's philosophy of growth investing is centered on the belief that accelerating growth in earnings and revenues, rather than the absolute level of growth, is more highly correlated to stock price performance. This philosophy often directs analysts to research different companies than other growth managers, as they do not require an absolute threshold of earnings or revenue growth. This philosophy allows American Century to take advantage of both the normal price appreciation that results from a company's earnings growth, and the markets re-rating of a company's price-to-earnings multiple. The goal is to construct a portfolio of international stocks that are experiencing accelerating growth that are believed to be sustainable over time. The product was funded during the second quarter of 2016. Prior performance represents that of the composite for supplementary purposes.

## Quarterly Summary and Highlights

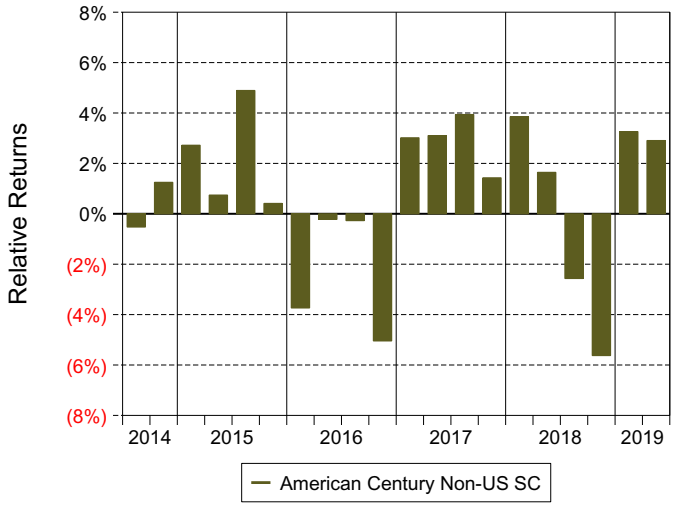
- American Century Non-US SC's portfolio posted a 4.12% return for the quarter placing it in the 20 percentile of the Callan International Small Cap group for the quarter and in the 77 percentile for the last year.
- American Century Non-US SC's portfolio outperformed the MSCI ACWI ex US Small Cap by 2.91% for the quarter and underperformed the MSCI ACWI ex US Small Cap for the year by 3.41%.

## Performance vs Callan International Small Cap (Gross)

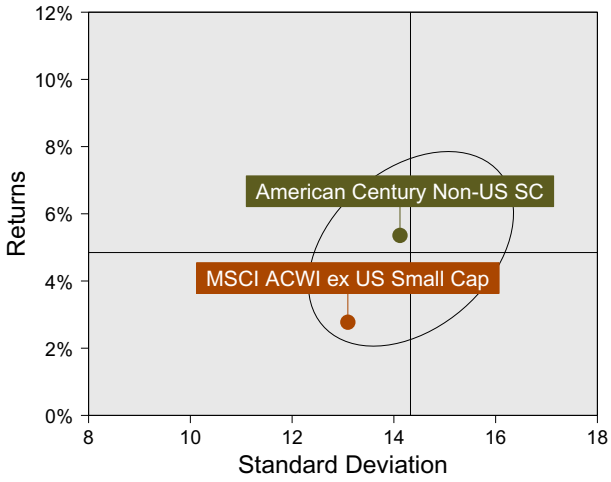



| | Last Quarter | Last Year | Last 3 Years | Last 3 Years | Last 5 Years | Last 10 Years |
|---|---|---|---|---|---|---|
| 10th Percentile | 5.14 | (3.70) | 11.16 | 11.16 | 7.46 | 13.30 |
| 25th Percentile | 3.61 | (4.87) | 10.50 | 10.50 | 6.04 | 12.57 |
| Median | 2.63 | (6.40) | 8.87 | 8.87 | 4.85 | 11.52 |
| 75th Percentile | 1.84 | (9.18) | 7.72 | 7.72 | 3.83 | 10.62 |
| 90th Percentile | 0.50 | (11.67) | 6.35 | 6.35 | 2.25 | 9.34 |
| **American Century Non-US SC** ● | 4.12 | (9.35) | 10.20 | 10.20 | 5.36 | 12.55 |
| MSCI ACWI ex US Small Cap ▲ | 1.21 | (5.94) | 7.76 | 7.76 | 2.77 | 8.48 |

### Relative Returns vs MSCI ACWI ex US Small Cap




### Callan International Small Cap (Gross) Annualized Five Year Risk vs Return

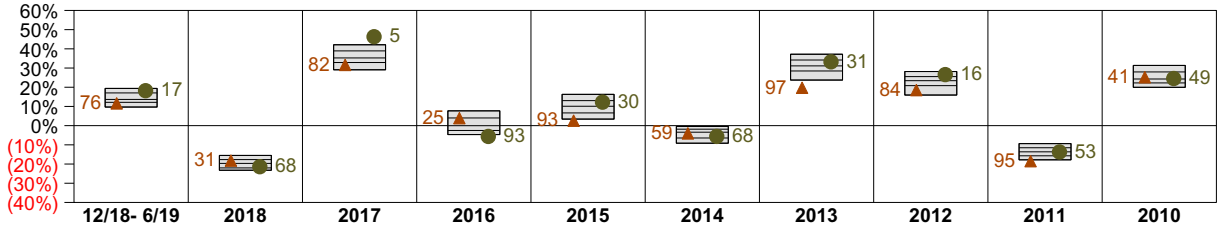


# American Century Non-US SC
# Return Analysis Summary

## Return Analysis

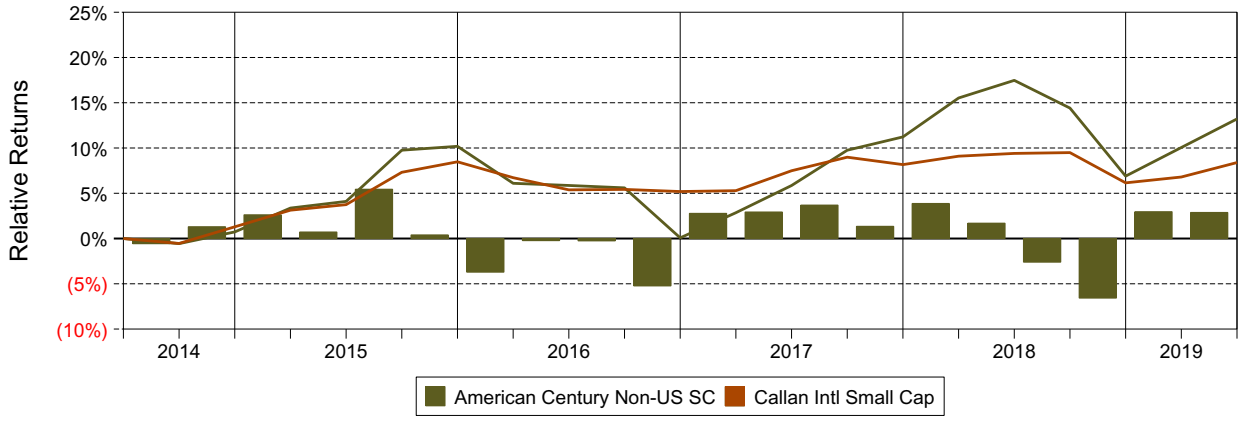
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Callan International Small Cap (Gross)

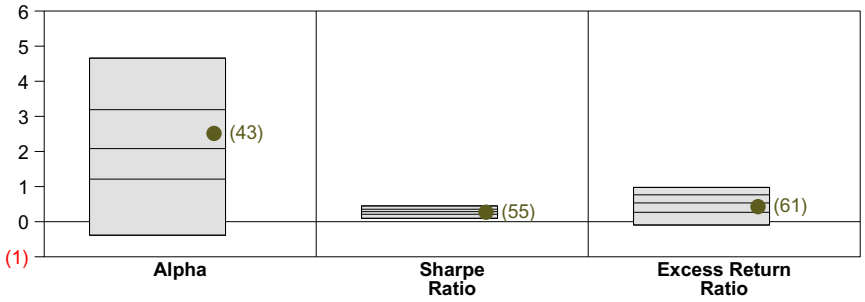



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 19.39 | (15.51) | 42.12 | 7.72 | 16.29 | (0.42) | 37.19 | 28.18 | (9.37) | 31.36 |
| 25th Percentile | 17.04 | (17.68) | 38.93 | 4.00 | 13.03 | (1.85) | 34.19 | 25.54 | (11.52) | 27.97 |
| Median | 13.66 | (19.66) | 35.27 | (0.03) | 10.09 | (3.42) | 31.13 | 23.41 | (13.65) | 24.29 |
| 75th Percentile | 12.14 | (22.02) | 32.87 | (2.51) | 6.62 | (6.43) | 28.47 | 20.84 | (15.71) | 22.25 |
| 90th Percentile | 9.67 | (23.23) | 29.08 | (4.66) | 3.40 | (9.15) | 23.74 | 15.92 | (17.80) | 19.96 |
| **American Century Non-US SC** ● | 18.20 | (21.39) | 46.31 | (5.63) | 12.24 | (5.61) | 33.23 | 26.58 | (13.72) | 24.55 |
| MSCI ACWI ex US Small Cap ▲ | 11.60 | (18.20) | 31.65 | 3.91 | 2.60 | (4.03) | 19.73 | 18.52 | (18.50) | 25.20 |

## Cumulative and Quarterly Relative Return vs MSCI ACWI ex US Small Cap




## Risk Adjusted Return Measures vs MSCI ACWI ex US Small Cap
## Rankings Against Callan International Small Cap (Gross)
## Five Years Ended June 30, 2019



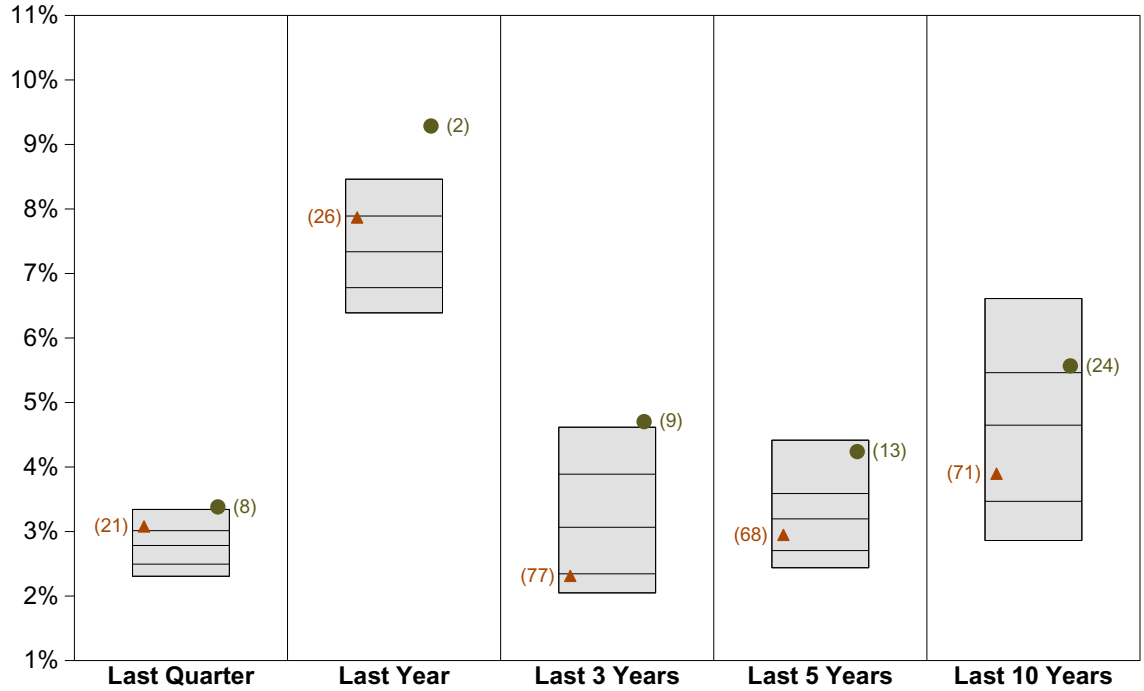

| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 4.66 | 0.45 | 0.98 |
| 25th Percentile | 3.19 | 0.35 | 0.77 |
| Median | 2.08 | 0.29 | 0.53 |
| 75th Percentile | 1.21 | 0.21 | 0.27 |
| 90th Percentile | (0.39) | 0.10 | (0.09) |
| **American Century Non-US SC** ● | 2.51 | 0.27 | 0.43 |

# Fixed Income
# Period Ended June 30, 2019

## Quarterly Summary and Highlights

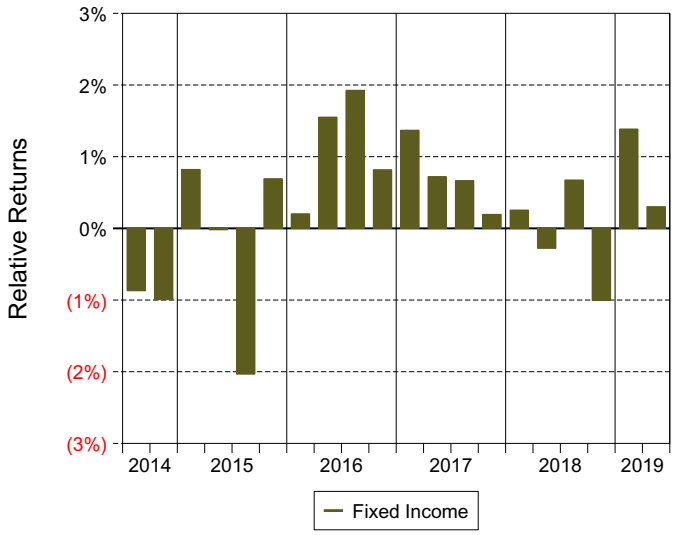
- Fixed Income's portfolio posted a 3.38% return for the quarter placing it in the 8 percentile of the Public Fund - Domestic Fixed group for the quarter and in the 2 percentile for the last year.
- Fixed Income's portfolio outperformed the Blmbg Aggregate Index by 0.30% for the quarter and outperformed the Blmbg Aggregate Index for the year by 1.42%.

## Performance vs Public Fund - Domestic Fixed (Gross)

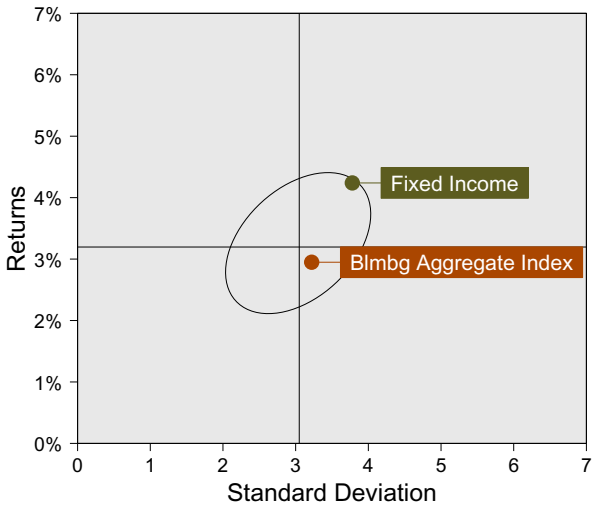



| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years |
|---|---|---|---|---|---|
| 10th Percentile | 3.34 | 8.46 | 4.62 | 4.42 | 6.61 |
| 25th Percentile | 3.01 | 7.89 | 3.89 | 3.59 | 5.46 |
| Median | 2.78 | 7.34 | 3.07 | 3.20 | 4.65 |
| 75th Percentile | 2.49 | 6.78 | 2.34 | 2.70 | 3.47 |
| 90th Percentile | 2.31 | 6.39 | 2.05 | 2.44 | 2.86 |
| **Fixed Income** ● | 3.38 | 9.29 | 4.70 | 4.24 | 5.57 |
| Blmbg Aggregate Index ▲ | 3.08 | 7.87 | 2.31 | 2.95 | 3.90 |

### Relative Return vs Blmbg Aggregate Index




### Public Fund - Domestic Fixed (Gross) Annualized Five Year Risk vs Return

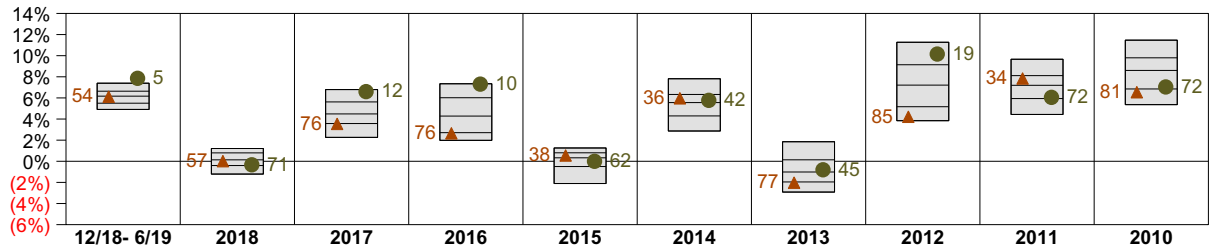


# Fixed Income
# Return Analysis Summary

## Return Analysis

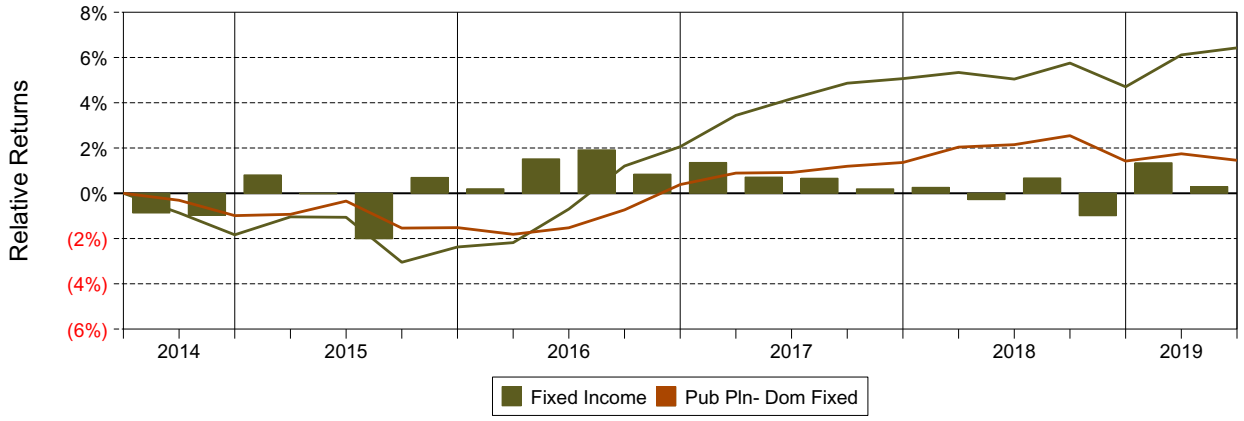
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Public Fund - Domestic Fixed (Gross)

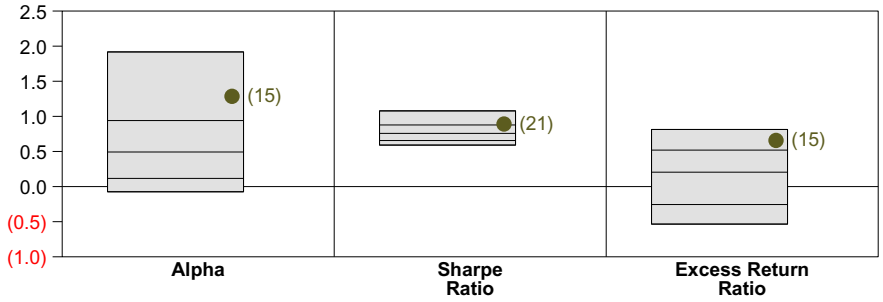



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 7.40 | 1.21 | 6.79 | 7.34 | 1.26 | 7.82 | 1.85 | 11.27 | 9.66 | 11.47 |
| 25th Percentile | 6.64 | 0.79 | 5.62 | 6.02 | 0.80 | 6.33 | 0.14 | 9.14 | 8.11 | 9.80 |
| Median | 6.17 | 0.14 | 4.49 | 4.28 | 0.33 | 5.56 | (1.02) | 7.21 | 7.19 | 8.60 |
| 75th Percentile | 5.50 | (0.40) | 3.57 | 2.71 | (0.50) | 4.30 | (1.96) | 5.17 | 5.94 | 6.85 |
| 90th Percentile | 4.91 | (1.21) | 2.26 | 1.98 | (2.11) | 2.87 | (2.92) | 3.84 | 4.44 | 5.36 |
| **Fixed Income** ● | 7.86 | (0.33) | 6.60 | 7.31 | (0.00) | 5.77 | (0.81) | 10.15 | 6.05 | 7.04 |
| Blmbg Aggregate Index ▲ | 6.11 | 0.01 | 3.54 | 2.65 | 0.55 | 5.97 | (2.02) | 4.21 | 7.84 | 6.54 |

## Cumulative and Quarterly Relative Return vs Blmbg Aggregate Index




## Risk Adjusted Return Measures vs Blmbg Aggregate Index
## Rankings Against Public Fund - Domestic Fixed (Gross)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 1.92 | 1.08 | 0.81 |
| 25th Percentile | 0.94 | 0.88 | 0.52 |
| Median | 0.49 | 0.76 | 0.20 |
| 75th Percentile | 0.12 | 0.66 | (0.26) |
| 90th Percentile | (0.07) | 0.59 | (0.53) |
| **Fixed Income** ● | 1.29 | 0.89 | 0.66 |

# BlackRock U.S. Debt Fund
# Period Ended June 30, 2019

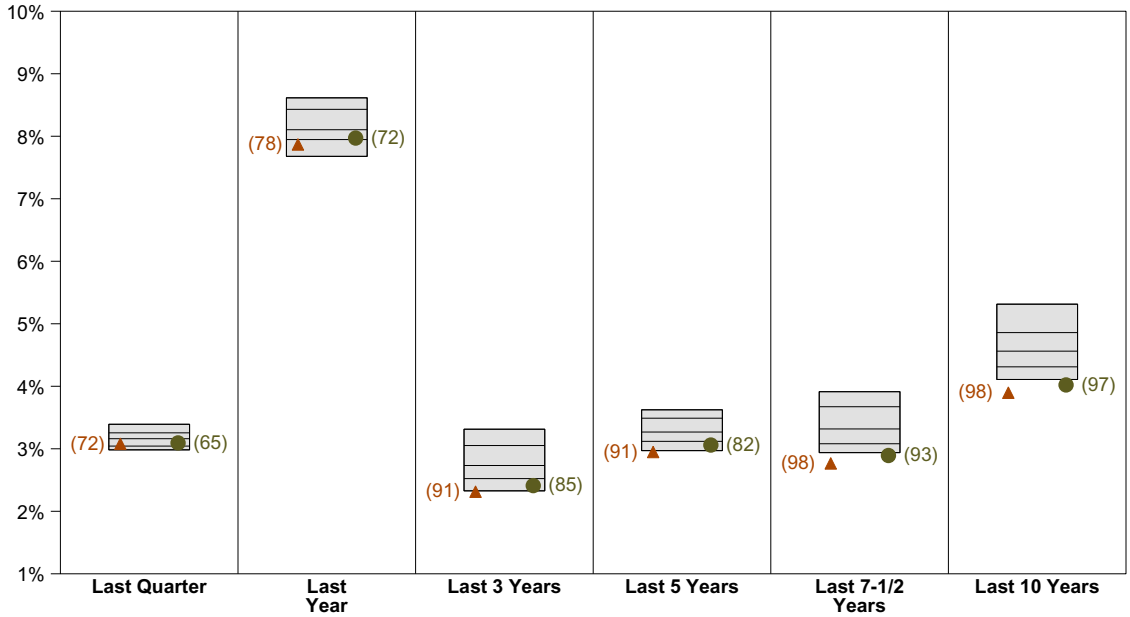
## Investment Philosophy

The product was funded during the fourth quarter of 2011. Performance prior is that of the composite.

## Quarterly Summary and Highlights

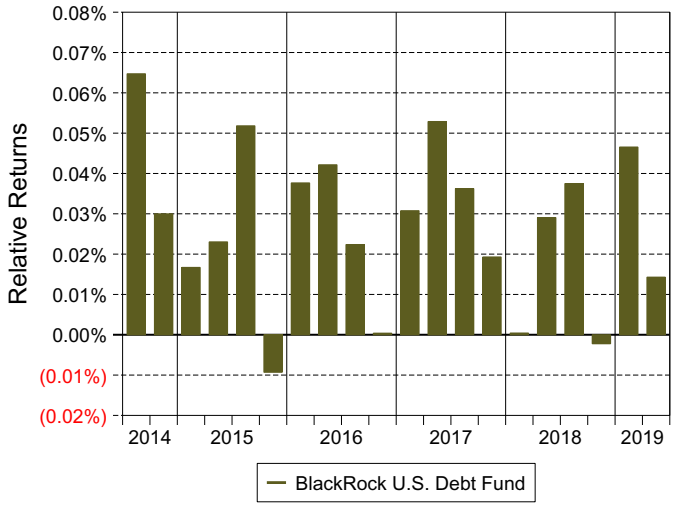
- BlackRock U.S. Debt Fund's portfolio posted a 3.09% return for the quarter placing it in the 65 percentile of the Callan Core Bond Fixed Income group for the quarter and in the 72 percentile for the last year.
- BlackRock U.S. Debt Fund's portfolio outperformed the Blmbg Aggregate by 0.01% for the quarter and outperformed the Blmbg Aggregate for the year by 0.10%.

## Performance vs Callan Core Bond Fixed Income (Gross)

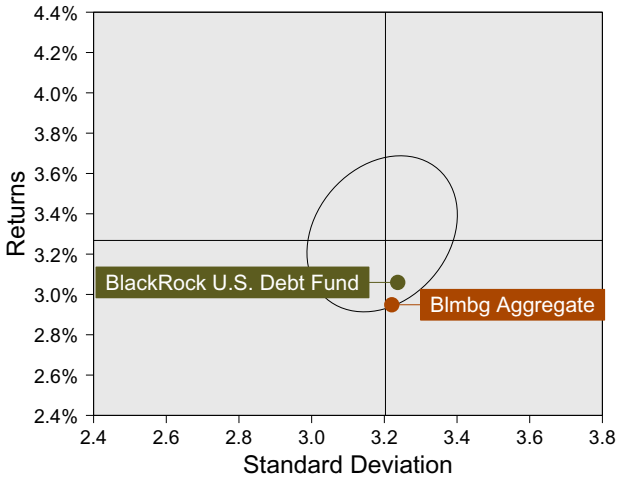



| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 7-1/2 Years | Last 10 Years |
|---|---|---|---|---|---|---|
| 10th Percentile | 3.39 | 8.61 | 3.31 | 3.62 | 3.91 | 5.31 |
| 25th Percentile | 3.25 | 8.43 | 3.05 | 3.49 | 3.67 | 4.86 |
| Median | 3.16 | 8.10 | 2.73 | 3.27 | 3.32 | 4.56 |
| 75th Percentile | 3.04 | 7.95 | 2.52 | 3.12 | 3.08 | 4.31 |
| 90th Percentile | 2.98 | 7.68 | 2.33 | 2.97 | 2.94 | 4.11 |
| **BlackRock U.S. Debt Fund** ● | 3.09 | 7.97 | 2.41 | 3.06 | 2.89 | 4.02 |
| Blmbg Aggregate ▲ | 3.08 | 7.87 | 2.31 | 2.95 | 2.77 | 3.90 |

### Relative Return vs Blmbg Aggregate




### Callan Core Bond Fixed Income (Gross) Annualized Five Year Risk vs Return

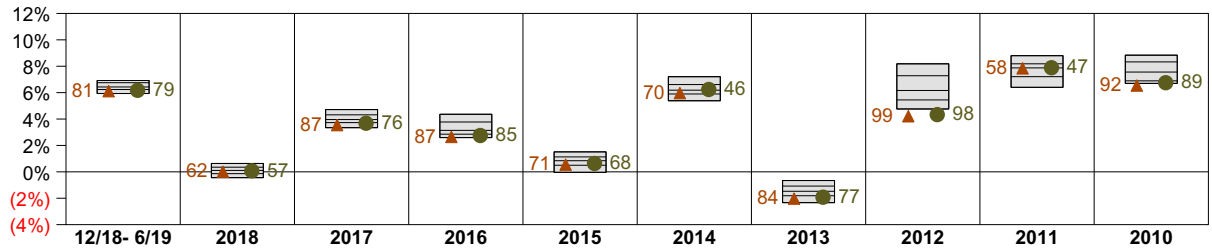


# BlackRock U.S. Debt Fund
# Return Analysis Summary

## Return Analysis

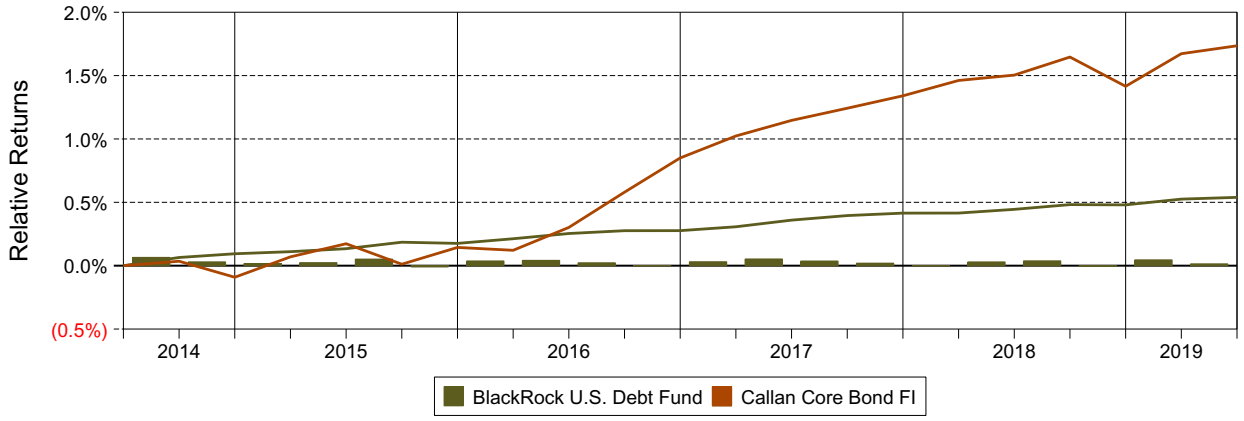
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Callan Core Bond Fixed Income (Gross)

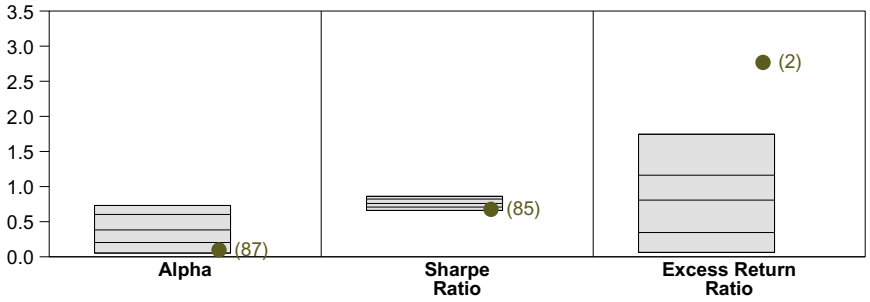



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 6.92 | 0.64 | 4.72 | 4.36 | 1.51 | 7.21 | (0.66) | 8.18 | 8.80 | 8.84 |
| 25th Percentile | 6.75 | 0.35 | 4.32 | 3.78 | 1.13 | 6.61 | (1.08) | 7.28 | 8.18 | 8.33 |
| Median | 6.43 | 0.11 | 3.96 | 3.14 | 0.84 | 6.19 | (1.47) | 6.16 | 7.87 | 7.56 |
| 75th Percentile | 6.24 | (0.14) | 3.73 | 2.85 | 0.50 | 5.90 | (1.81) | 5.45 | 7.21 | 6.89 |
| 90th Percentile | 5.93 | (0.44) | 3.34 | 2.59 | (0.04) | 5.39 | (2.33) | 4.76 | 6.40 | 6.70 |
| **BlackRock U.S. Debt Fund** ● | 6.18 | 0.08 | 3.68 | 2.75 | 0.63 | 6.24 | (1.92) | 4.34 | 7.89 | 6.75 |
| Blmbg Aggregate ▲ | 6.11 | 0.01 | 3.54 | 2.65 | 0.55 | 5.97 | (2.02) | 4.21 | 7.84 | 6.54 |

## Cumulative and Quarterly Relative Return vs Blmbg Aggregate




## Risk Adjusted Return Measures vs Blmbg Aggregate
## Rankings Against Callan Core Bond Fixed Income (Gross)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 0.73 | 0.86 | 1.75 |
| 25th Percentile | 0.60 | 0.82 | 1.16 |
| Median | 0.38 | 0.76 | 0.81 |
| 75th Percentile | 0.20 | 0.71 | 0.35 |
| 90th Percentile | 0.05 | 0.66 | 0.06 |
| **BlackRock U.S. Debt Fund** ● | 0.10 | 0.68 | 2.77 |

# PIMCO Fixed Income
# Period Ended June 30, 2019

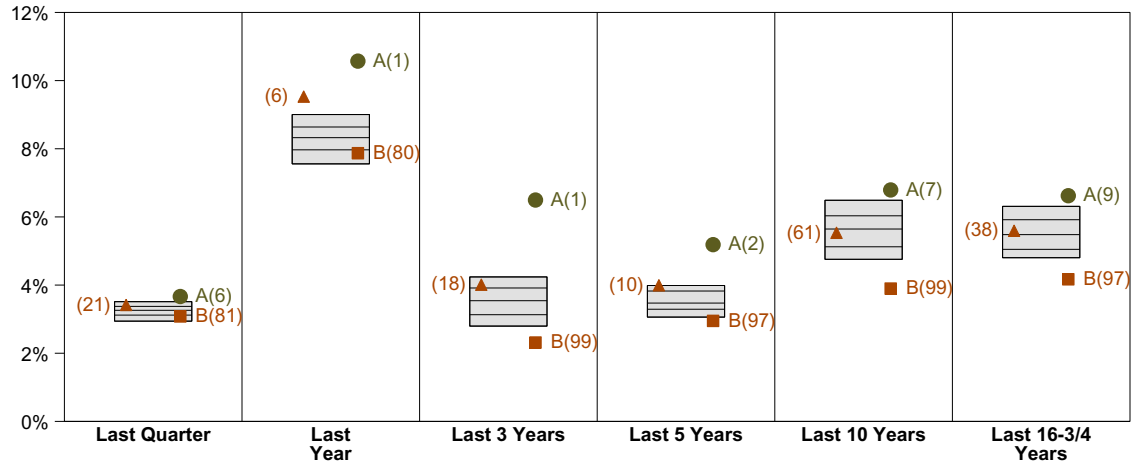
## Investment Philosophy

PIMCO emphasizes adding value by rotating through the major sectors of the domestic and international bond markets. They also seek to enhance returns through duration management. The product was funded during the third quarter of 2002. The custom index is currently composed of 25% Barclays Mortgage, 25% Barclays Credit, 25% Barclays High Yield, and 25% JP Morgan EMBI Global. Prior to 2/1/2012, the custom index was composed of 70% Barclays Mortgage, 15% Barclays Credit, and 15% Barclays High Yield.

## Quarterly Summary and Highlights

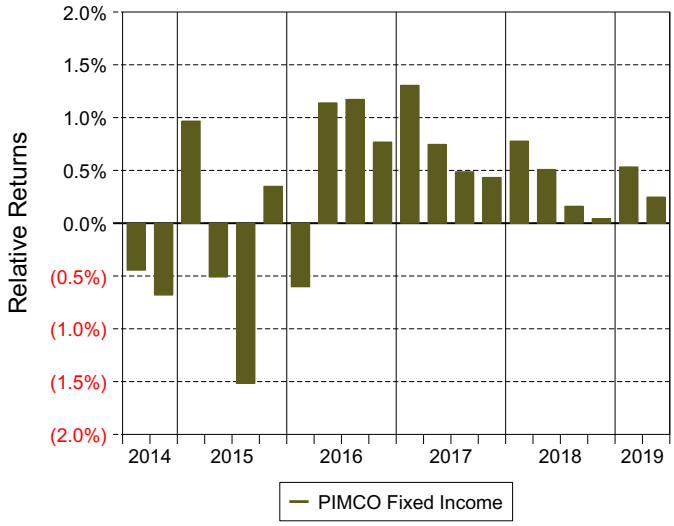
- PIMCO Fixed Income's portfolio posted a 3.66% return for the quarter placing it in the 6 percentile of the Callan Core Plus Fixed Income group for the quarter and in the 1 percentile for the last year.
- PIMCO Fixed Income's portfolio outperformed the Custom Index by 0.25% for the quarter and outperformed the Custom Index for the year by 1.04%.

## Performance vs Callan Core Plus Fixed Income (Gross)

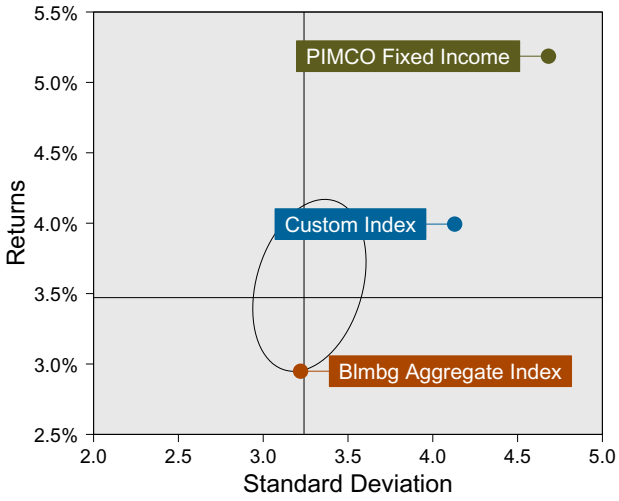



| | | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years | Last 16-3/4 Years |
|---|---|---|---|---|---|---|---|
| 10th Percentile | | 3.51 | 9.00 | 4.24 | 3.99 | 6.49 | 6.31 |
| 25th Percentile | | 3.37 | 8.64 | 3.91 | 3.83 | 6.03 | 5.92 |
| Median | | 3.26 | 8.33 | 3.54 | 3.47 | 5.64 | 5.48 |
| 75th Percentile | | 3.12 | 7.97 | 3.13 | 3.29 | 5.12 | 5.05 |
| 90th Percentile | | 2.94 | 7.56 | 2.80 | 3.06 | 4.76 | 4.80 |
| PIMCO Fixed Income | ● A | 3.66 | 10.57 | 6.50 | 5.19 | 6.79 | 6.62 |
| Blmbg Aggregate Index | ■ B | 3.08 | 7.87 | 2.31 | 2.95 | 3.90 | 4.17 |
| Custom Index | ▲ | 3.42 | 9.53 | 4.01 | 3.99 | 5.54 | 5.59 |

### Relative Return vs Custom Index




### Callan Core Plus Fixed Income (Gross) Annualized Five Year Risk vs Return

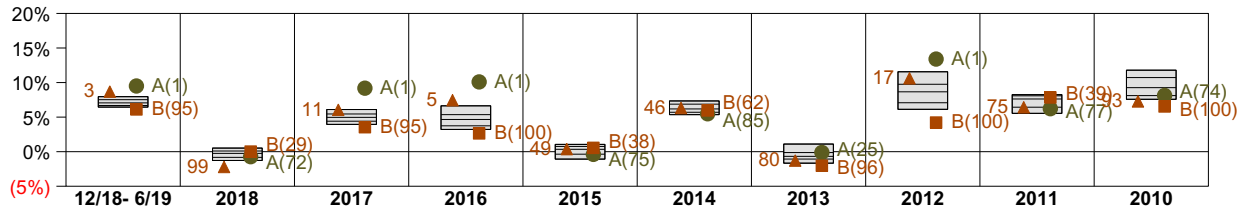


# PIMCO Fixed Income
# Return Analysis Summary

## Return Analysis

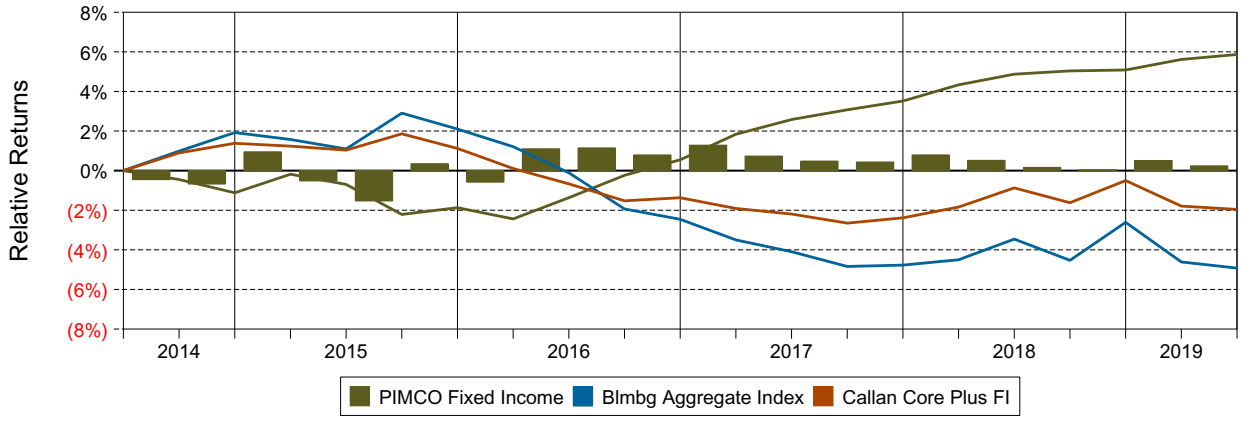
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Callan Core Plus Fixed Income (Gross)

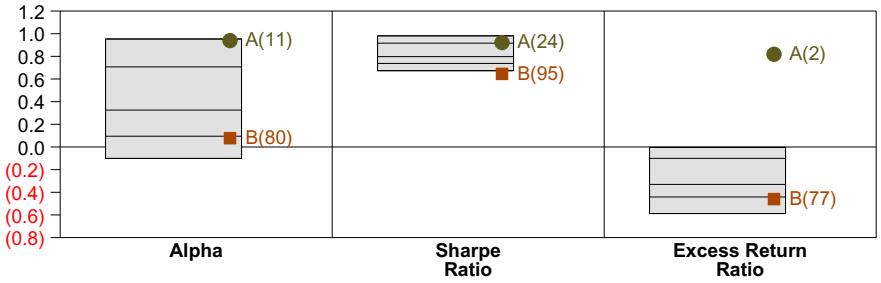



| | | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | | 7.96 | 0.52 | 6.10 | 6.64 | 1.05 | 7.34 | 1.10 | 11.56 | 8.25 | 11.79 |
| 25th Percentile | | 7.52 | 0.10 | 5.45 | 5.36 | 0.76 | 6.88 | (0.13) | 9.75 | 8.08 | 10.72 |
| Median | | 7.06 | (0.25) | 4.97 | 4.66 | 0.34 | 6.18 | (0.67) | 8.66 | 7.62 | 9.26 |
| 75th Percentile | | 6.68 | (0.82) | 4.41 | 3.74 | (0.36) | 5.70 | (1.07) | 7.08 | 6.44 | 8.11 |
| 90th Percentile | | 6.45 | (1.27) | 3.94 | 3.22 | (1.08) | 5.36 | (1.66) | 6.13 | 5.54 | 7.58 |
| PIMCO Fixed Income | ● A | 9.50 | (0.73) | 9.19 | 10.09 | (0.39) | 5.48 | (0.12) | 13.40 | 6.22 | 8.14 |
| Blmbg Aggregate Index | ■ B | 6.11 | 0.01 | 3.54 | 2.65 | 0.55 | 5.97 | (2.02) | 4.21 | 7.84 | 6.54 |
| Custom Index | ▲ | 8.69 | (2.21) | 6.06 | 7.44 | 0.37 | 6.31 | (1.28) | 10.62 | 6.42 | 7.28 |

## Cumulative and Quarterly Relative Return vs Custom Index




## Risk Adjusted Return Measures vs Custom Index
## Rankings Against Callan Core Plus Fixed Income (Gross)
## Five Years Ended June 30, 2019




| | | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|---|
| 10th Percentile | | 0.95 | 0.98 | (0.00) |
| 25th Percentile | | 0.71 | 0.92 | (0.10) |
| Median | | 0.33 | 0.80 | (0.33) |
| 75th Percentile | | 0.09 | 0.74 | (0.44) |
| 90th Percentile | | (0.10) | 0.67 | (0.59) |
| PIMCO Fixed Income | ● A | 0.94 | 0.92 | 0.82 |
| Blmbg Aggregate Index | ■ B | 0.08 | 0.65 | (0.46) |

Real Estate

# Real Estate
# Period Ended June 30, 2019

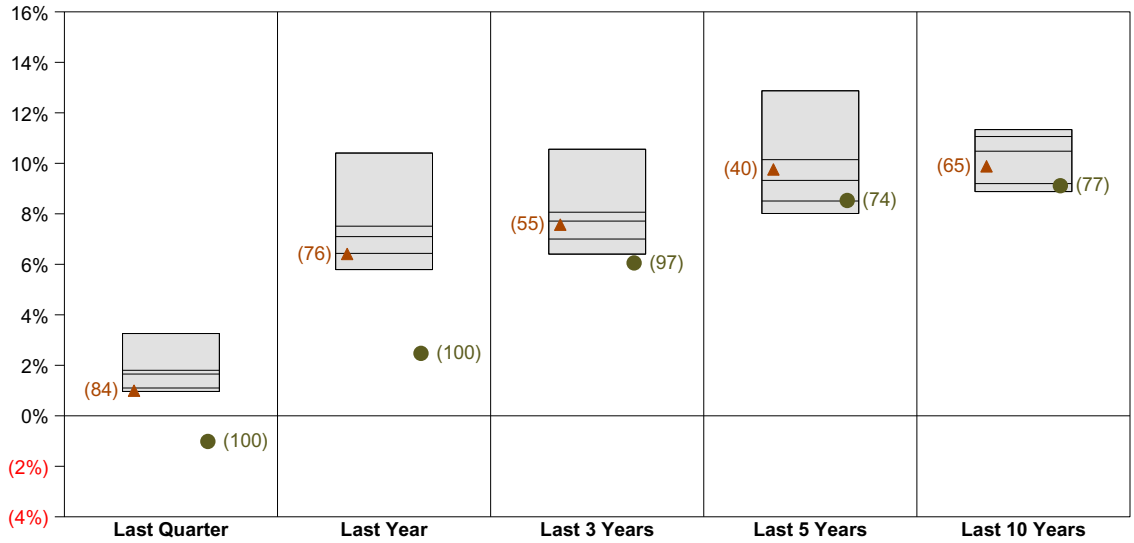
## Investment Philosophy

The Total Real Estate Funds Database consists of both open and closed-end commingled funds as well as separate accounts managed by real estate firms. The returns represent the overall performance of institutional capital invested in real estate properties.

## Quarterly Summary and Highlights

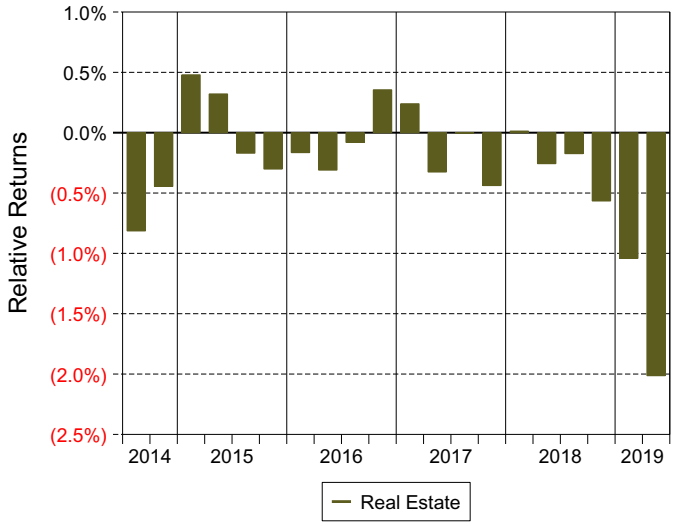
- Real Estate's portfolio posted a (1.02)% return for the quarter placing it in the 100 percentile of the Public Fund - Real Estate group for the quarter and in the 100 percentile for the last year.
- Real Estate's portfolio underperformed the NFI-ODCE Value Weight Gr by 2.01% for the quarter and underperformed the NFI-ODCE Value Weight Gr for the year by 3.94%.

## Performance vs Public Fund - Real Estate (Gross)

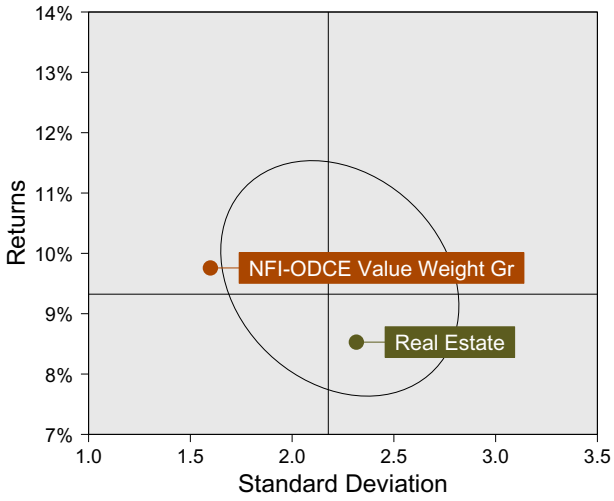



| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years |
|---|---|---|---|---|---|
| 10th Percentile | 3.26 | 10.41 | 10.56 | 12.87 | 11.34 |
| 25th Percentile | 1.80 | 7.51 | 8.06 | 10.15 | 11.06 |
| Median | 1.65 | 7.10 | 7.71 | 9.32 | 10.48 |
| 75th Percentile | 1.10 | 6.43 | 7.00 | 8.51 | 9.20 |
| 90th Percentile | 0.96 | 5.79 | 6.40 | 8.01 | 8.88 |
| **Real Estate** ● | (1.02) | 2.47 | 6.06 | 8.53 | 9.11 |
| NFI-ODCE Value Weight Gr ▲ | 1.00 | 6.41 | 7.57 | 9.76 | 9.88 |

### Relative Return vs NFI-ODCE Value Weight Gr




### Public Fund - Real Estate (Gross) Annualized Five Year Risk vs Return

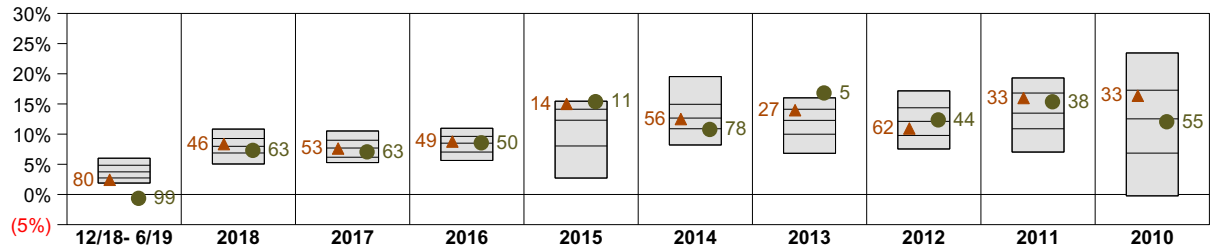


# Real Estate
# Return Analysis Summary

## Return Analysis

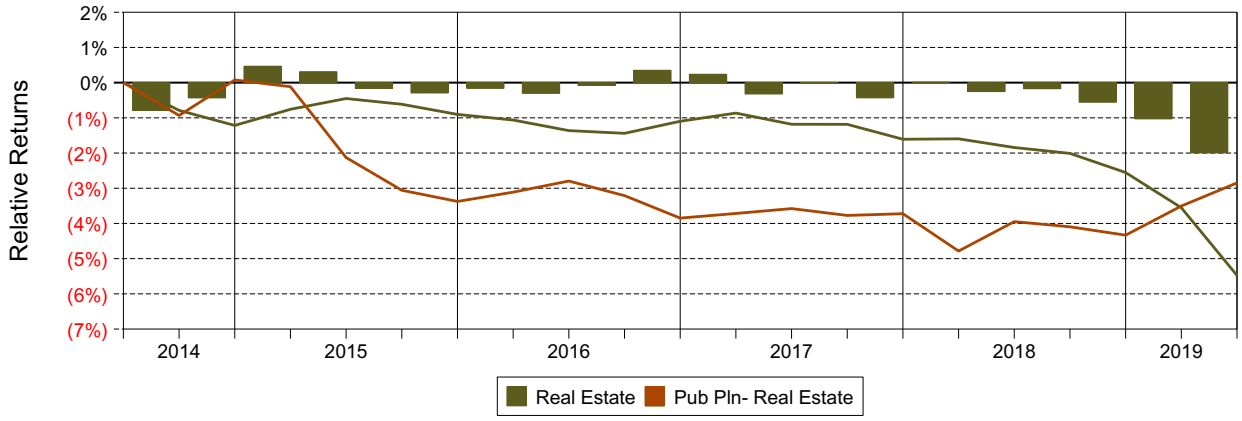
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Public Fund - Real Estate (Gross)

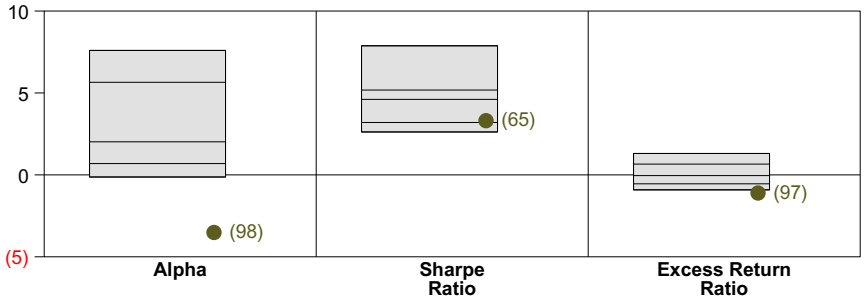



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 6.01 | 10.84 | 10.52 | 10.97 | 15.46 | 19.54 | 16.01 | 17.17 | 19.31 | 23.45 |
| 25th Percentile | 4.84 | 9.28 | 8.99 | 9.63 | 14.13 | 14.94 | 14.12 | 14.36 | 16.81 | 17.28 |
| Median | 3.74 | 7.98 | 7.70 | 8.50 | 12.31 | 12.66 | 12.28 | 12.11 | 13.48 | 12.53 |
| 75th Percentile | 2.74 | 6.87 | 6.17 | 7.03 | 8.04 | 10.89 | 9.99 | 9.78 | 10.89 | 6.85 |
| 90th Percentile | 1.89 | 5.05 | 5.29 | 5.64 | 2.72 | 8.20 | 6.82 | 7.54 | 7.03 | (0.23) |
| **Real Estate** ● | (0.64) | 7.31 | 7.06 | 8.56 | 15.38 | 10.78 | 16.82 | 12.36 | 15.36 | 12.05 |
| NCREIF NFI-ODCE Val Wt Gr ▲ | 2.43 | 8.35 | 7.62 | 8.77 | 15.02 | 12.50 | 13.96 | 10.94 | 15.99 | 16.36 |

## Cumulative and Quarterly Relative Return vs NCREIF NFI-ODCE Val Wt Gr




## Risk Adjusted Return Measures vs NCREIF NFI-ODCE Val Wt Gr
## Rankings Against Public Fund - Real Estate (Gross)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 7.60 | 7.88 | 1.31 |
| 25th Percentile | 5.65 | 5.18 | 0.66 |
| Median | 2.02 | 4.61 | (0.04) |
| 75th Percentile | 0.69 | 3.20 | (0.54) |
| 90th Percentile | (0.13) | 2.62 | (0.91) |
| **Real Estate** ● | (3.52) | 3.31 | (1.11) |

# JP Morgan Strategic Property Fund
# Period Ended June 30, 2019

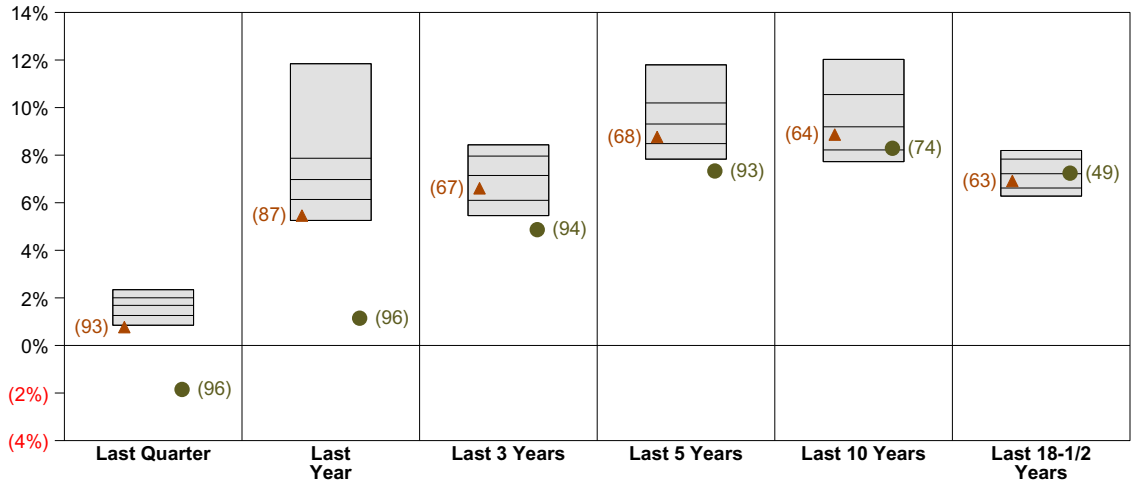
## Investment Philosophy

J.P. Morgan's Strategic Property Fund is an actively managed diversified, core, open-end commingled pension trust fund. It seeks an income-driven rate of return of 100 basis points over the NFI-ODCE Equal Weight Net Index over a full market cycle (three to five year horizon) through asset, geographic and sector selection and active asset management. The Fund invests in high quality stabilized assets with dominant competitive characteristics in markets with attractive demographics throughout the United States. The product was funded in the fourth quarter of 2008.

## Quarterly Summary and Highlights

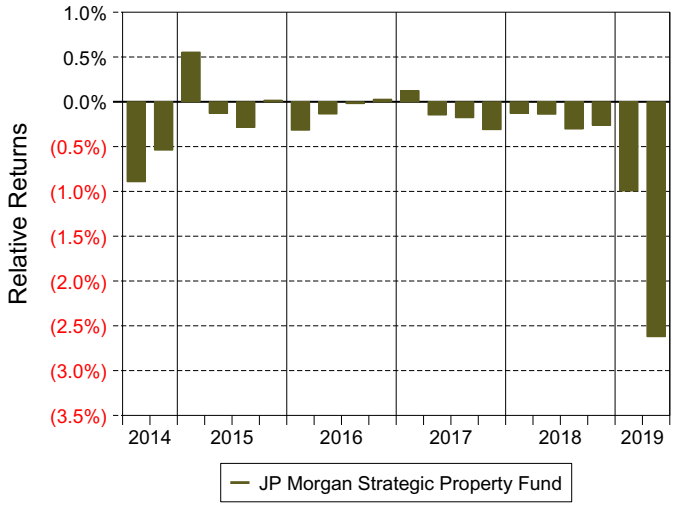
- JP Morgan Strategic Property Fund's portfolio posted a (1.85)% return for the quarter placing it in the 96 percentile of the Callan Open End Core Cmmingled Real Est group for the quarter and in the 96 percentile for the last year.
- JP Morgan Strategic Property Fund's portfolio underperformed the NCREIF NFI-ODCE Val Wt Nt by 2.62% for the quarter and underperformed the NCREIF NFI-ODCE Val Wt Nt for the year by 4.32%.

## Performance vs Callan Open End Core Cmmingled Real Est (Net)

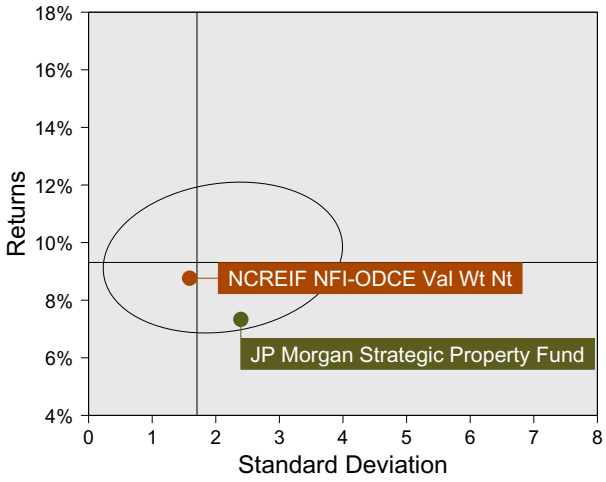



| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years | Last 18-1/2 Years |
|---|---|---|---|---|---|---|
| 10th Percentile | 2.34 | 11.84 | 8.44 | 11.80 | 12.03 | 8.20 |
| 25th Percentile | 2.00 | 7.87 | 7.96 | 10.20 | 10.55 | 7.83 |
| Median | 1.69 | 6.98 | 7.15 | 9.31 | 9.19 | 7.22 |
| 75th Percentile | 1.26 | 6.14 | 6.10 | 8.49 | 8.22 | 6.62 |
| 90th Percentile | 0.85 | 5.26 | 5.46 | 7.83 | 7.73 | 6.28 |
| **JP Morgan Strategic Property Fund** ● | (1.85) | 1.15 | 4.87 | 7.33 | 8.29 | 7.24 |
| NCREIF NFI-ODCE Val Wt Nt ▲ | 0.77 | 5.46 | 6.61 | 8.76 | 8.87 | 6.91 |

### Relative Returns vs NCREIF NFI-ODCE Val Wt Nt




### Callan Open End Core Cmmingled Real Est (Net) Annualized Five Year Risk vs Return

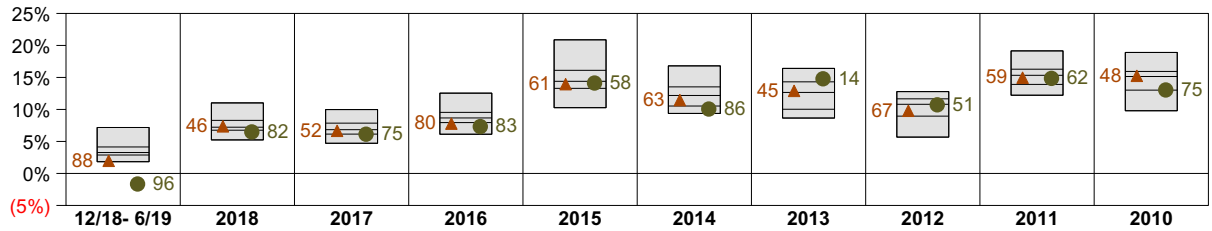


# JP Morgan Strategic Property Fund
# Return Analysis Summary

## Return Analysis

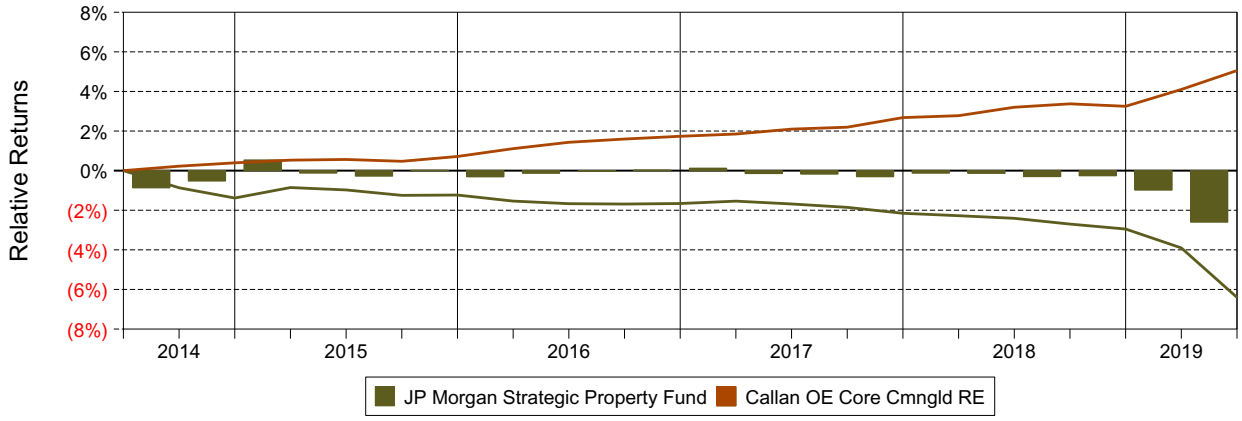
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Callan Open End Core Cmmingled Real Est (Net)

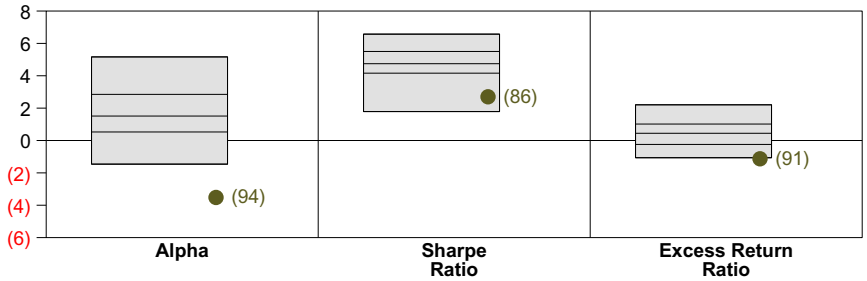



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 7.18 | 11.02 | 9.98 | 12.55 | 20.88 | 16.81 | 16.41 | 12.79 | 19.15 | 18.90 |
| 25th Percentile | 4.14 | 8.29 | 7.86 | 9.54 | 16.11 | 13.53 | 14.31 | 11.66 | 16.29 | 15.94 |
| Median | 3.27 | 7.22 | 6.84 | 8.67 | 14.40 | 12.18 | 12.66 | 10.80 | 15.33 | 15.14 |
| 75th Percentile | 2.88 | 6.75 | 6.15 | 7.95 | 13.29 | 10.53 | 10.03 | 8.95 | 13.91 | 13.02 |
| 90th Percentile | 1.83 | 5.24 | 4.71 | 6.13 | 10.28 | 9.38 | 8.65 | 5.67 | 12.22 | 9.80 |
| **JP Morgan Strategic Property Fund** ● | (1.65) | 6.49 | 6.13 | 7.32 | 14.12 | 10.06 | 14.79 | 10.72 | 14.86 | 13.04 |
| NCREIF NFI-ODCE Val Wt Nt ▲ | 1.98 | 7.36 | 6.66 | 7.79 | 13.95 | 11.46 | 12.90 | 9.79 | 14.96 | 15.26 |

## Cumulative and Quarterly Relative Return vs NCREIF NFI-ODCE Val Wt Nt




## Risk Adjusted Return Measures vs NCREIF NFI-ODCE Val Wt Nt
## Rankings Against Callan Open End Core Cmmingled Real Est (Net)
## Five Years Ended June 30, 2019




| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 5.17 | 6.57 | 2.21 |
| 25th Percentile | 2.85 | 5.50 | 1.02 |
| Median | 1.51 | 4.75 | 0.45 |
| 75th Percentile | 0.53 | 4.16 | (0.24) |
| 90th Percentile | (1.46) | 1.79 | (1.06) |
| **JP Morgan Strategic Property Fund** ● | (3.52) | 2.70 | (1.13) |

# JP Morgan Income and Growth Fund
# Period Ended June 30, 2019

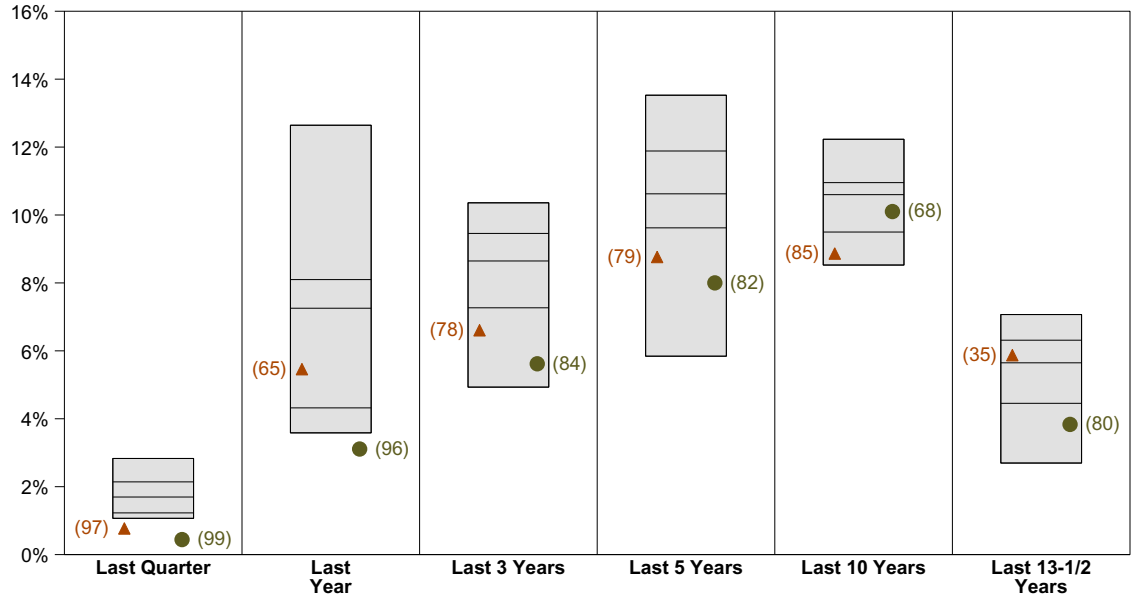
## Investment Philosophy

The product was funded in the fourth quarter of 2005.

## Quarterly Summary and Highlights

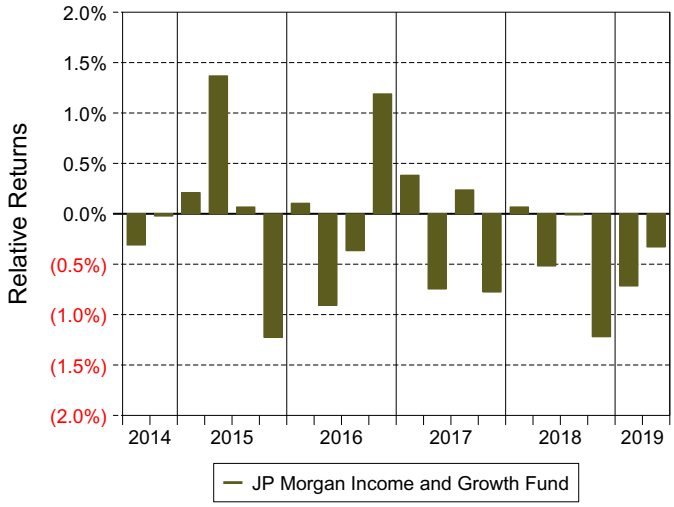
- JP Morgan Income and Growth Fund's portfolio posted a 0.44% return for the quarter placing it in the 99 percentile of the Callan Real Estate Val Add Open End Fds group for the quarter and in the 96 percentile for the last year.
- JP Morgan Income and Growth Fund's portfolio underperformed the NCREIF NFI-ODCE Val Wt Nt by 0.33% for the quarter and underperformed the NCREIF NFI-ODCE Val Wt Nt for the year by 2.35%.

## Performance vs Callan Real Estate Val Add Open End Fds (Net)

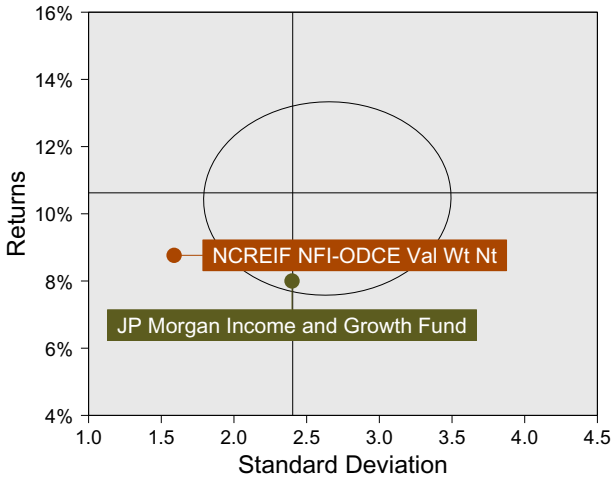



| | Last Quarter | Last Year | Last 3 Years | Last 5 Years | Last 10 Years | Last 13-1/2 Years |
|---|---|---|---|---|---|---|
| 10th Percentile | 2.83 | 12.64 | 10.36 | 13.53 | 12.23 | 7.07 |
| 25th Percentile | 2.14 | 8.10 | 9.46 | 11.88 | 10.95 | 6.31 |
| Median | 1.70 | 7.26 | 8.65 | 10.62 | 10.60 | 5.65 |
| 75th Percentile | 1.23 | 4.32 | 7.27 | 9.62 | 9.50 | 4.45 |
| 90th Percentile | 1.07 | 3.58 | 4.93 | 5.84 | 8.53 | 2.70 |
| **JP Morgan Income and Growth Fund** ● | 0.44 | 3.11 | 5.62 | 8.00 | 10.10 | 3.83 |
| NCREIF NFI-ODCE Val Wt Nt ▲ | 0.77 | 5.46 | 6.61 | 8.76 | 8.87 | 5.87 |

### Relative Returns vs NCREIF NFI-ODCE Val Wt Nt




### Callan Real Estate Val Add Open End Fds (Net) Annualized Five Year Risk vs Return

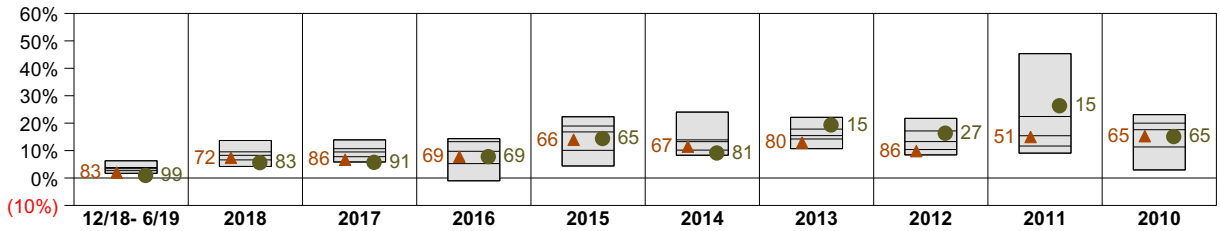


# JPM Income and Growth Fund
# Return Analysis Summary

## Return Analysis

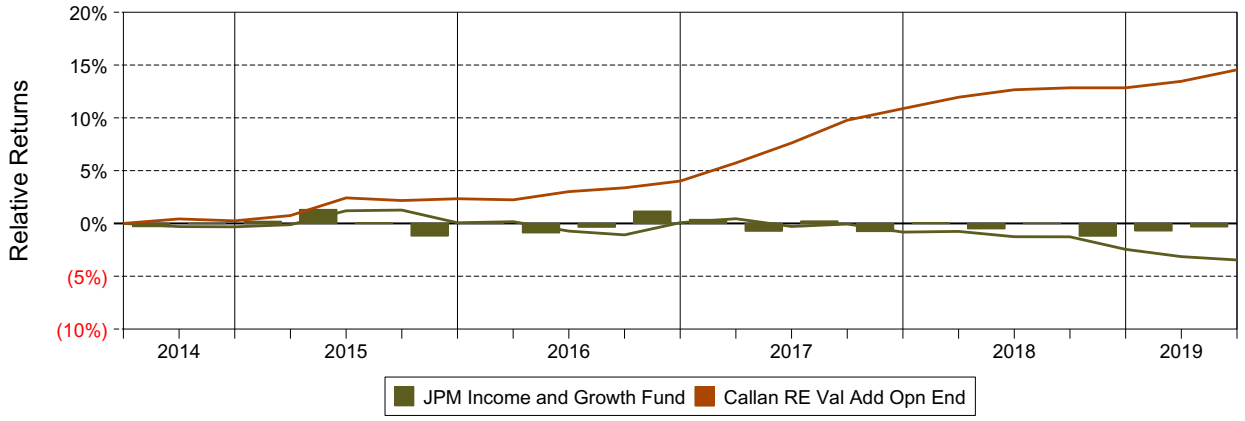
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

## Performance vs Callan Real Estate Val Add Open End Fds (Net)

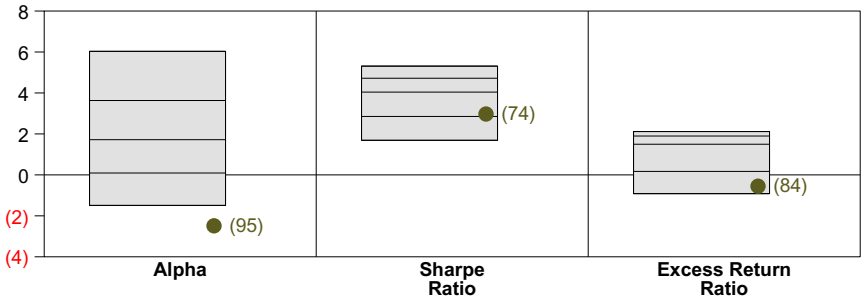



| | 12/18- 6/19 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10th Percentile | 6.28 | 13.67 | 13.90 | 14.34 | 22.33 | 24.03 | 22.12 | 21.75 | 45.34 | 23.11 |
| 25th Percentile | 3.83 | 9.54 | 10.69 | 13.24 | 18.95 | 13.91 | 17.84 | 17.17 | 22.42 | 20.00 |
| Median | 3.41 | 8.26 | 9.50 | 9.74 | 16.80 | 13.25 | 15.46 | 13.28 | 15.42 | 17.62 |
| 75th Percentile | 2.68 | 6.60 | 7.78 | 5.25 | 10.09 | 10.18 | 14.23 | 10.39 | 11.66 | 11.32 |
| 90th Percentile | 1.71 | 4.21 | 5.84 | (1.02) | 4.38 | 8.30 | 10.70 | 8.43 | 9.06 | 2.94 |
| **JPM Income and Growth Fund** ● | 0.93 | 5.59 | 5.71 | 7.80 | 14.39 | 9.13 | 19.35 | 16.33 | 26.36 | 15.12 |
| NCREIF NFI-ODCE Val Wt Nt ▲ | 1.98 | 7.36 | 6.66 | 7.79 | 13.95 | 11.46 | 12.90 | 9.79 | 14.96 | 15.26 |

## Cumulative and Quarterly Relative Return vs NCREIF NFI-ODCE Val Wt Nt




## Risk Adjusted Return Measures vs NCREIF NFI-ODCE Val Wt Nt
## Rankings Against Callan Real Estate Val Add Open End Fds (Net)
## Five Years Ended June 30, 2019



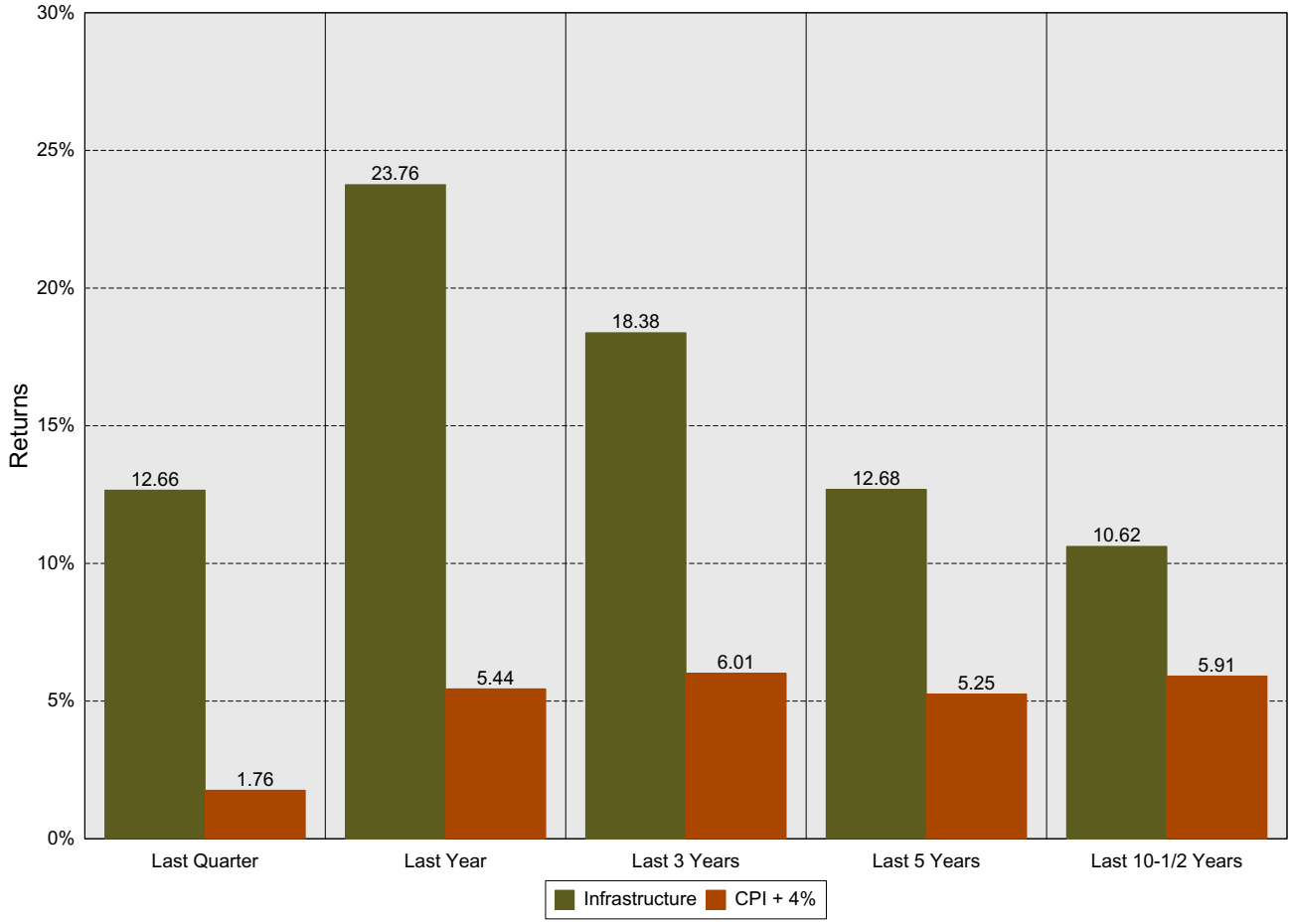

| | Alpha | Sharpe Ratio | Excess Return Ratio |
|---|---|---|---|
| 10th Percentile | 6.03 | 5.31 | 2.12 |
| 25th Percentile | 3.63 | 4.72 | 1.90 |
| Median | 1.72 | 4.04 | 1.50 |
| 75th Percentile | 0.09 | 2.85 | 0.17 |
| 90th Percentile | (1.49) | 1.69 | (0.92) |
| **JPM Income and Growth Fund** ● | (2.49) | 2.97 | (0.55) |

Infrastructure

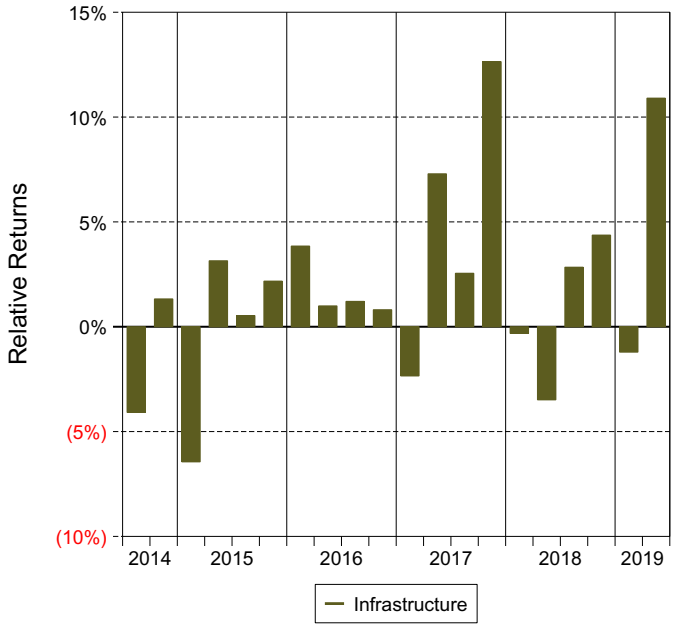
# Infrastructure
# Period Ended June 30, 2019

## Quarterly Summary and Highlights

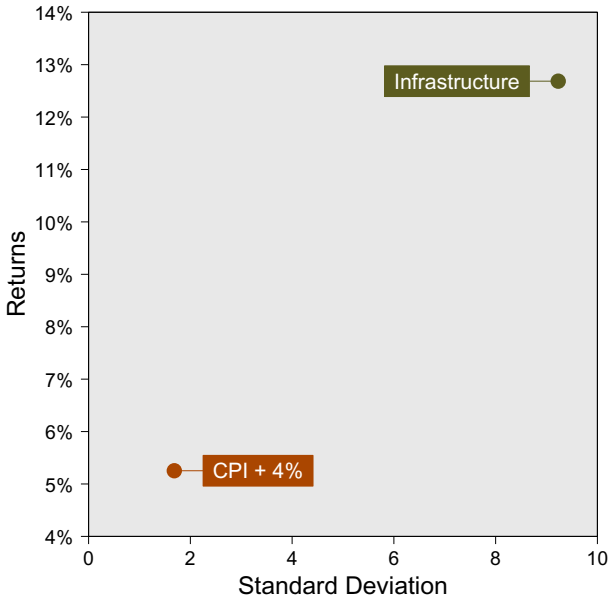
- Infrastructure's portfolio outperformed the CPI + 4% by 10.90% for the quarter and outperformed the CPI + 4% for the year by 18.31%.




### Relative Return vs CPI + 4%




### Annualized Five Year Risk vs Return



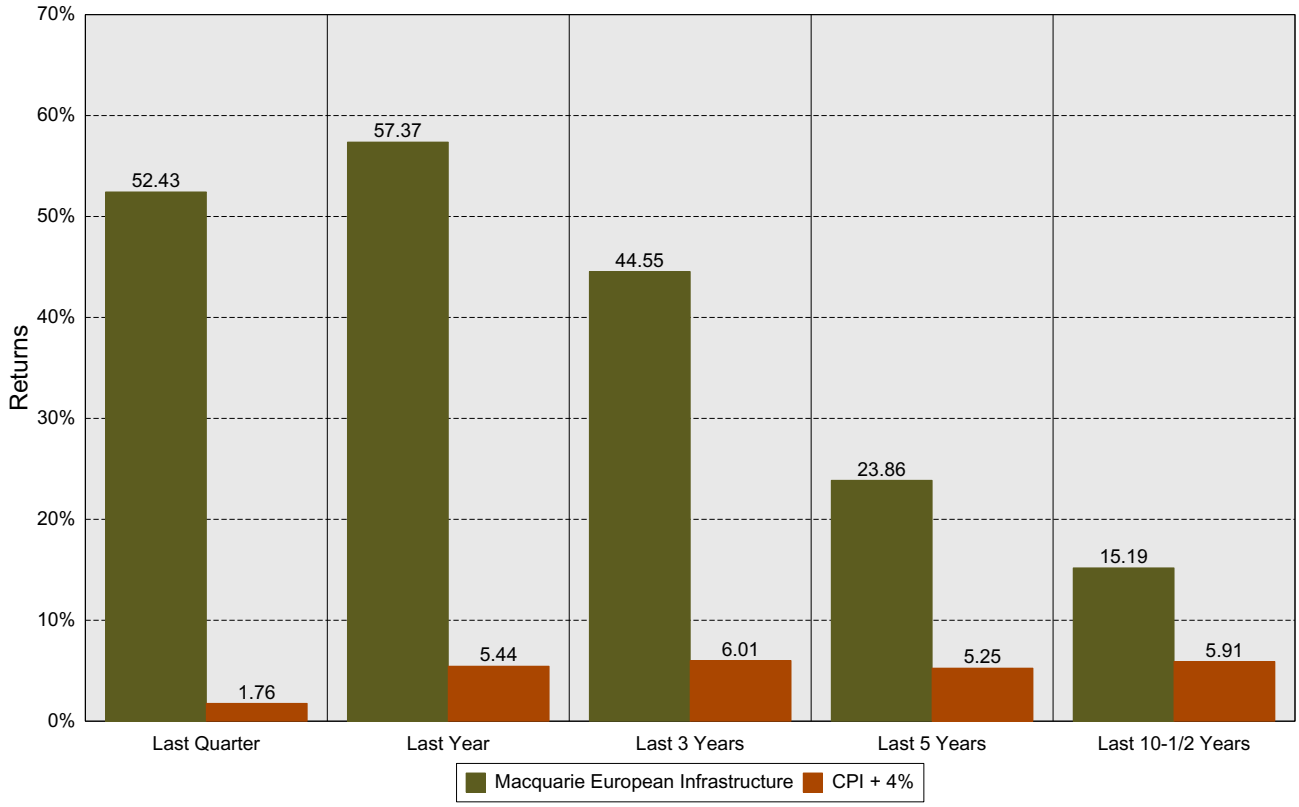
## Macquarie European Infrastructure
## Period Ended June 30, 2019

### Investment Philosophy

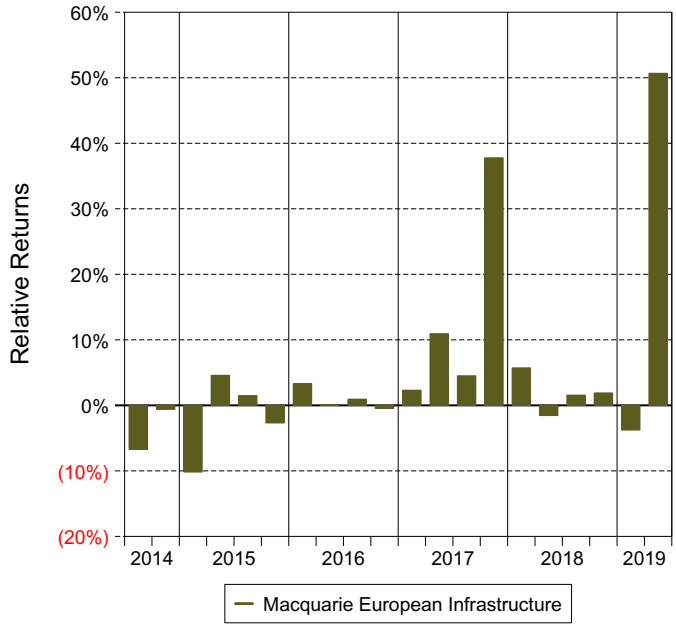
The product was funded in the fourth quarter of 2008.

### Quarterly Summary and Highlights

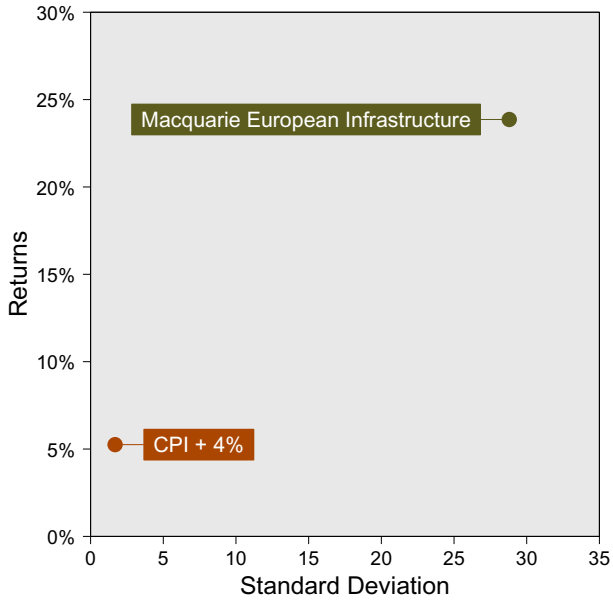
- Macquarie European Infrastructure's portfolio outperformed the CPI + 4% by 50.67% for the quarter and outperformed the CPI + 4% for the year by 51.93%.




### Relative Return vs CPI + 4%




### Annualized Five Year Risk vs Return



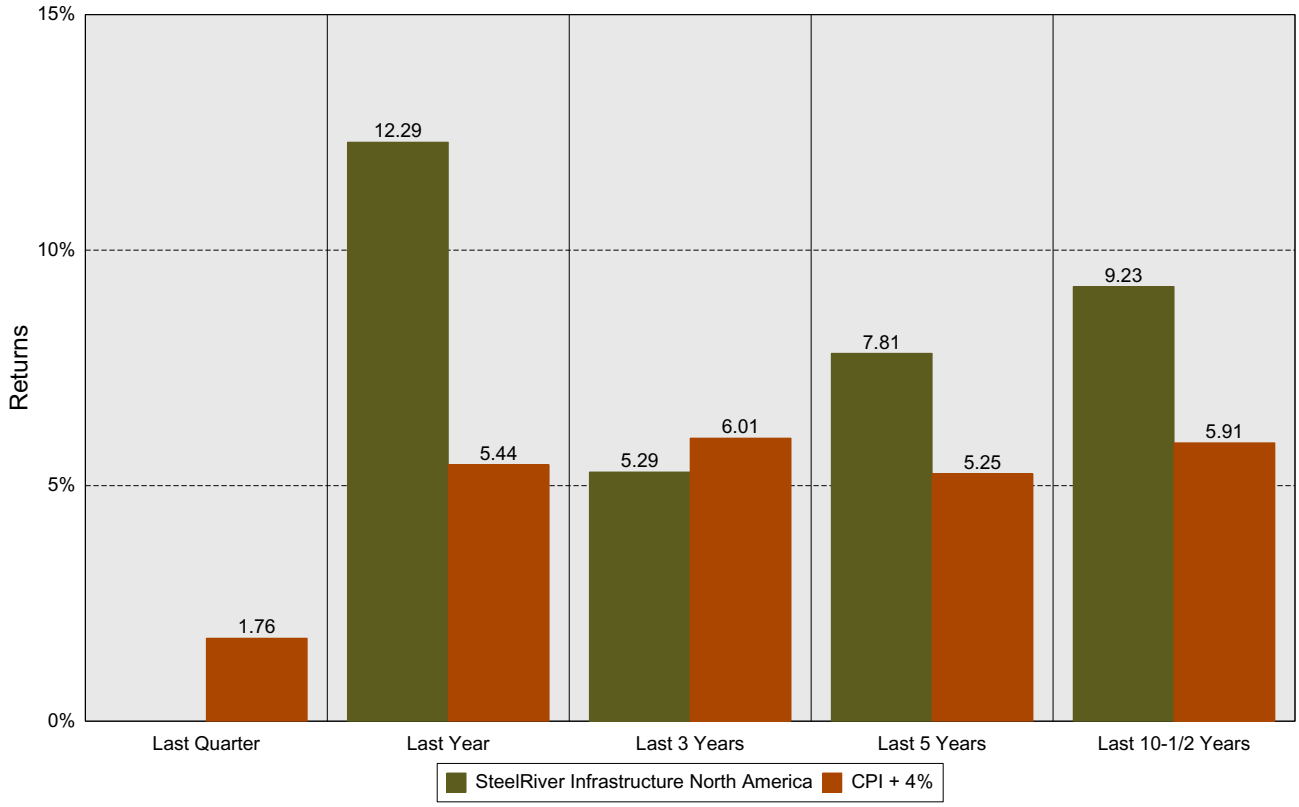
## SteelRiver Infrastructure North America
## Period Ended June 30, 2019

### Investment Philosophy

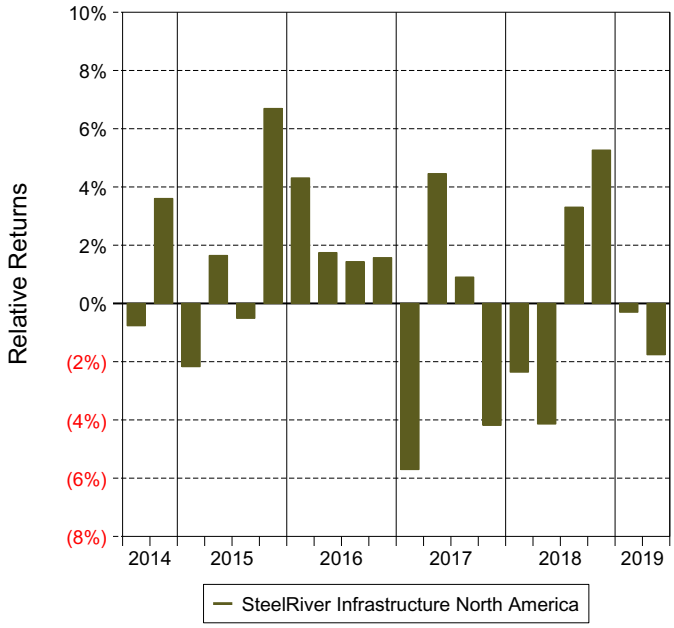
The product was funded in the fourth quarter of 2008.

### Quarterly Summary and Highlights

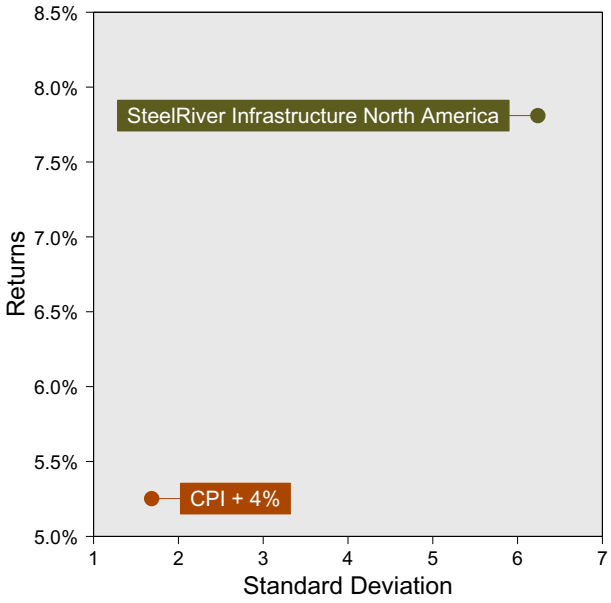
- SteelRiver Infrastructure North America's portfolio underperformed the CPI + 4% by 1.76% for the quarter and outperformed the CPI + 4% for the year by 6.85%.




### Relative Return vs CPI + 4%




### Annualized Five Year Risk vs Return



Callan Research/Education

## Research and Educational Programs

The Callan Institute provides research to update clients on the latest industry trends and carefully structured educational programs to enhance the knowledge of industry professionals. Visit www.callan.com/library to see all of our publications, and www.callan.com/blog to view our blog "Perspectives." For more information contact Barb Gerraty at 415-274-3093 / institute@callan.com.

## New Research from Callan's Experts

**The OCIO Model: How Do We Measure Success?** | This paper outlines the key issues for evaluating the success of outsourced chief investment officer (OCIO) services.

**Perspectives on Investing: The Evolution of Strategic Allocations** | In this video, Callan experts discuss the key challenges of evaluating non-U.S. equity investments.

**Opportunities & Challenges: Investing in Private Equity Partnerships** | In this video, Callan experts discuss investing directly in private equity partnerships.

**Building a Pool of Transition Managers: Both an Art and a Science** | Transition management is the restructuring of institutional portfolios from single or multiple investment managers/ asset classes to a new allocation over a short-term horizon. This paper offers guidance on building a pool of transition managers.

**Callan's Periodic Table Explained** | The popular Callan Periodic Table of Investment Returns turned 20 this year. This animated feature discusses the benefits and some of the history of the table.

**The Cobbler's Shoes: How Asset Managers Run Their Own 401(k) Plans** | Can investment manager-sponsored DC plans provide insights on plan design and implementation? To help answer this question, Callan examined the 401(k) plans of investment managers. The industry scored high on retirement savings metrics. But in contrast to the industry consensus, asset managers generally embraced complexity over simplicity in their investment designs.

**How to Distinguish Between Growth Equity and Late-Stage VC**

Both growth equity and late-stage venture capital are growth-oriented but differ significantly in the types of companies they invest in, the structure of their investments, the way in which they create value, and the trade-offs between risk and return.

**Nurturing Strong Cultures at Professional Firms** | In this paper, Callan Executive Chairman Ron Peyton offers advice for building effective and transparent corporate cultures.

**Opening Doors of Opportunity** | This paper reviews the types of co-investment opportunities offered by hedge funds and funds-of-funds (FOFs).

### Quarterly Periodicals

**Private Equity Trends** | A newsletter on private equity activity, covering both the fundraising cycle and performance over time.

**Market Pulse Flipbook** | A market reference guide covering trends in the U.S. economy, developments for fund sponsors, and the latest data for U.S. and non-U.S. equities and fixed income, alternatives, and defined contribution plans.

**Active vs. Passive Charts** | This series of charts compares active managers alongside relevant benchmarks over the long term.

**Capital Market Review** | A newsletter providing analysis and a broad overview of the economy and public and private market activity each quarter across a wide range of asset classes.

## Events

Miss out on a Callan conference or workshop? Event summaries and speakers' presentations are available on our website: www.callan.com/library/

Please mark your calendar and look forward to upcoming invitations.

### October Regional Workshops

*October 22, 2019 – Denver*
*October 24, 2019 – Chicago*

### 2020 National Conference

*January 27-29, 2020 – San Francisco*

Please also keep your eye out for upcoming Webinars in 2019! We will be sending invitations for these and also will have registration links on our website at www.callan.com/events.

**For more information about events, please contact Barb Gerraty: 415-274-3093 / gerraty@callan.com**

## The Center for Investment Training Educational Sessions

The Center for Investment Training, better known as the "Callan College," provides a foundation of knowledge for industry professionals who are involved in the investment decision-making process. It was founded in 1994 to provide clients and non-clients alike with basic- to intermediate-level instruction. Our next sessions are:

### Introduction to Investments

*San Francisco, July 23-24, 2019*
*Atlanta, October 8-9, 2019*
*Chicago, October 22-23, 2019*

This program familiarizes fund sponsor trustees, staff, and asset management advisers with basic investment theory, terminology, and practices. It lasts one-and-a-half days and is designed for individuals who have less than two years of experience with asset-management oversight and/or support responsibilities. Tuition for the Introductory "Callan College" session is $2,350 per person. Tuition includes instruction, all materials, breakfast and lunch on each day, and dinner on the first evening with the instructors.

### "Callan College" on Alternative Investments

*Chicago, October 29-30, 2019*

The "Callan College" on Alternative Investments will cover: private equity, private credit, hedge funds, real estate, and real assets. Tuition for the "Callan College" on Alternative Investments session is $2,500 per person. Tuition includes instruction, all materials, and breakfast and lunch on each day.

**Learn more at www.callan.com/events/callan-college-intro**

## Education: By the Numbers

| | | | |
|---|---|---|---|
| **525** | Attendees (on average) of the Institute's annual National Conference | **50+** | Unique pieces of research the Institute generates each year |
| **3,700** | Total attendees of the "Callan College" since 1994 | **1980** | Year the Callan Institute was founded |

"Research is the foundation of all we do at Callan, and sharing our best thinking with the investment community is our way of helping to foster dialogue to raise the bar across the industry."

Greg Allen, CEO and Chief Research Officer

Disclosures

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Quarterly List as of June 30, 2019

## List of Callan's Investment Manager Clients

Confidential – For Callan Client Use Only

Callan takes its fiduciary and disclosure responsibilities to clients very seriously. We recognize that there are numerous potential conflicts of interest encountered in the investment consulting industry and that it is our responsibility to manage those conflicts effectively and in the best interest of our clients. At Callan, we employ a robust process to identify, manage, monitor and disclose potential conflicts on an on-going basis.

The list below is an important component of our conflicts management and disclosure process. It identifies those investment managers that pay Callan fees for educational, consulting, software, database or reporting products and services. We update the list quarterly because we believe that our fund sponsor clients should know the investment managers that do business with Callan, particularly those investment manager clients that the fund sponsor clients may be using or considering using. Please note that if an investment manager receives a product or service on a complimentary basis (e.g. attending and educational event), they are not included in the list below. Callan is committed to ensuring that we do not consider an investment manager's business relationship with Callan, or lack thereof, in performing evaluations for or making suggestions or recommendations to its other clients. Please refer to Callan's ADV Part 2A for a more detailed description of the services and products that Callan makes available to investment manager clients through our Institutional Consulting Group, Independent Adviser Group and Fund Sponsor Consulting Group. Due to the complex corporate and organizational ownership structures of many investment management firms, parent and affiliate firm relationships are not indicated on our list.

Fund sponsor clients may request a copy of the most currently available list at any time. Fund sponsor clients may also request specific information regarding the fees paid to Callan by particular fund manager clients. Per company policy, information requests regarding fees are handled exclusively by Callan's Compliance Department.

| Manager Name |
|---|
| Aberdeen Standard Investments |
| Acadian Asset Management LLC |
| AEGON USA Investment Management |
| Alcentra |
| AllianceBernstein |
| Allianz Global Investors |
| Allianz Life Insurance Company of North America |
| American Century Investments |
| Amundi Pioneer Asset Management |
| AQR Capital Management |
| Ares Management LLC |
| Ariel Investments, LLC |
| Atlanta Capital Management Co., LLC |
| Aviva Investors Americas |
| AXA Investment Managers |
| Baillie Gifford International, LLC |
| Baird Advisors |
| Baron Capital Management, Inc. |
| Barrow, Hanley, Mewhinney & Strauss, LLC |
| BlackRock |
| BMO Global Asset Management |
| BNP Paribas Asset Management |
| BNY Mellon Asset Management |
| Boston Partners |
| Brandes Investment Partners, L.P. |
| Brandywine Global Investment Management, LLC |
| BrightSphere Investment Group |
| Brown Brothers Harriman & Company |
| Cambiar Investors, LLC |
| Capital Group |
| Carillon Tower Advisers |
| CastleArk Management, LLC |
| Causeway Capital Management |
| Chartwell Investment Partners |

| Manager Name |
|---|
| ClearBridge Investments, LLC |
| Cohen & Steers Capital Management, Inc. |
| Columbia Threadneedle Investments |
| Columbus Circle Investors |
| Credit Suisse Asset Management |
| DePrince, Race & Zollo, Inc. |
| Diamond Hill Capital Management, Inc. |
| Dimensional Fund Advisors LP |
| Doubleline |
| Duff & Phelps Investment Management Co. |
| DWS |
| EARNEST Partners, LLC |
| Eaton Vance Management |
| Epoch Investment Partners, Inc. |
| Fayez Sarofim & Company |
| Federated Investors |
| Fidelity Institutional Asset Management |
| Fiera Capital Corporation |
| Financial Engines |
| First Hawaiian Bank Wealth Management Division |
| First State Investments |
| Fisher Investments |
| Franklin Templeton |
| Fred Alger Management, Inc. |
| GAM (USA) Inc. |
| Glenmeade Investment Management, LP |
| GlobeFlex Capital, L.P. |
| Goldman Sachs |
| Green Square Capital LLC |
| Guggenheim Investments |
| GW&K Investment Management |
| Harbor Capital Group Trust |
| Hartford Investment Management Co. |
| Heitman LLC |

| Manager Name |
| --- |
| Hotchkis & Wiley Capital Management, LLC |
| HSBC Global Asset Management |
| Income Research + Management, Inc. |
| Insight Investment Management Limited |
| Intech Investment Management, LLC |
| Intercontinental Real Estate Corporation |
| Invesco |
| Investec Asset Management |
| Ivy Investments |
| J.P. Morgan |
| Janus |
| Jennison Associates LLC |
| Jobs Peak Advisors |
| KeyCorp |
| Lazard Asset Management |
| Legal & General Investment Management America |
| Lincoln National Corporation |
| Logan Circle Partners, L.P. |
| Longview Partners |
| Loomis, Sayles & Company, L.P. |
| Lord Abbett & Company |
| Los Angeles Capital Management |
| LSV Asset Management |
| MacKay Shields LLC |
| Macquarie Investment Management (MIM) |
| Manulife Asset Management |
| Marathon Asset Management, L.P. |
| McKinley Capital Management, LLC |
| MFS Investment Management |
| MidFirst Bank |
| Mondrian Investment Partners Limited |
| Montag & Caldwell, LLC |
| Morgan Stanley Investment Management |
| Mountain Lake Investment Management LLC |
| Mountain Pacific Advisors, LLC |
| MUFG Union Bank, N.A. |
| Natixis Investment Managers |
| Neuberger Berman |
| Newton Investment Management |
| Nikko Asset Management Co., Ltd. |
| Northern Trust Asset Management |
| Nuveen |
| OFI Global Asset Management |
| Osterweis Capital Management, LLC |
| P/E Investments |

| Manager Name |
| --- |
| Pacific Investment Management Company |
| Pathway Capital Management |
| Peregrine Capital Management, Inc. |
| Perkins Investment Management |
| PGIM Fixed Income |
| PineBridge Investments |
| PNC Capital Advisors, LLC |
| Principal Global Investors |
| Putnam Investments, LLC |
| QMA LLC |
| RBC Global Asset Management |
| Regions Financial Corporation |
| Robeco Institutional Asset Management, US Inc. |
| Rockefeller Capital Management |
| Rothschild & Co. Asset Management US |
| Russell Investments |
| Schroder Investment Management North America Inc. |
| Smith Graham & Co. Investment Advisors, L.P. |
| Smith Group Asset Management |
| South Texas Money Management, Ltd. |
| State Street Global Advisors |
| Stone Harbor Investment Partners, L.P. |
| Sun Life Investment Management |
| T. Rowe Price Associates, Inc. |
| The Boston Company Asset Management |
| The TCW Group, Inc. |
| Thompson, Siegel & Walmsley LLC |
| Thornburg Investment Management, Inc. |
| Tri-Star Trust Bank |
| UBS Asset Management |
| VanEck |
| Versus Capital Group |
| Victory Capital Management Inc. |
| Virtus Investment Partners, Inc. |
| Vontobel Asset Management, Inc. |
| Voya |
| WCM Investment Management |
| WEDGE Capital Management |
| Wellington Management Company, LLP |
| Wells Fargo Asset Management |
| Western Asset Management Company LLC |
| Westfield Capital Management Company, LP |
| William Blair & Company LLC |

Callan

June 21, 2019

# Tucson Supplemental Retirement System

## Asset Allocation and Liability Study – Additional Information


**Paul Erlendson**
Fund Sponsor Consulting

**Gordie Weightman, CFA**
Fund Sponsor Consulting

**Jay Kloepfer**
Capital Market Research

# Current Funding Policy – Impact on Cash Flows and Funded Status

The TSRS Board adopted a funding policy with a floor rate of 27.5% of payroll employer contribution to help the plan reach 100% funding

Funded status is projected to improve to 100% by 2034, and liquidity needs subside from 5% currently to 3% by 2034. Once the plan reaches full funding, we assume the funding policy reverts to normal cost plus supplemental cost

We show the impact of removing the commitment to funding at 27.5% of payroll, and revert to normal cost plus supplemental

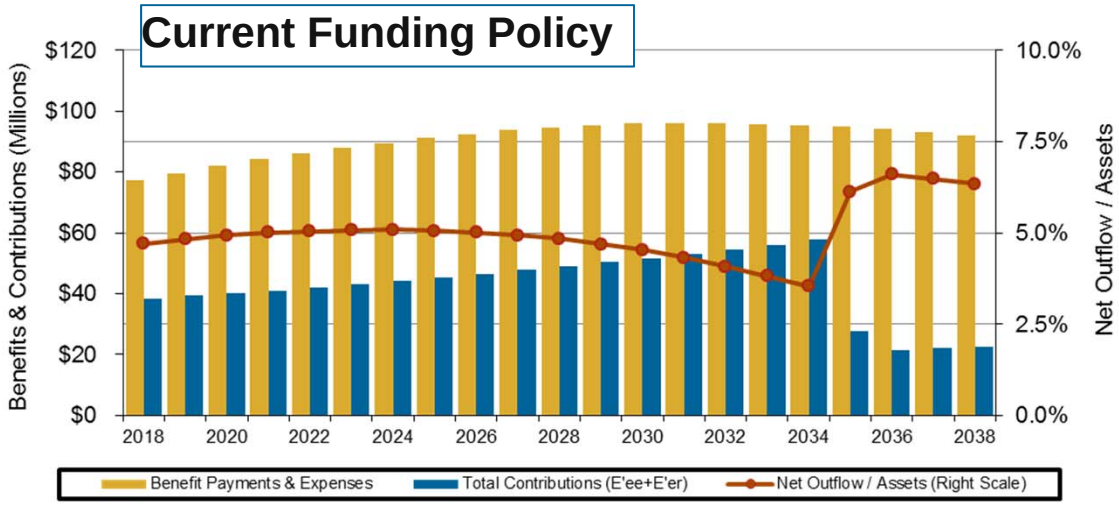
Over the first 10 years of the forecast period, the 27.5% policy results in rising contributions and therefore gradually improving funded status for TSRS; 100% funded status is achieved in 2034

Under Normal Cost + 20-year open amortization of unfunded liability, employer contributions drop from current rate to 23.5% of payroll, then drift down to 15.5% by year 20; funded status remains static near 75% over the 20 year projection period, net outflows rise toward 7% of assets

Under Normal Cost + open amortization of unfunded, contribution rates would respond to adverse market results, dampening impact on funded status.

Under fixed 27.5% contribution rate, all market volatility is absorbed by fund asset values and resulting funded status.

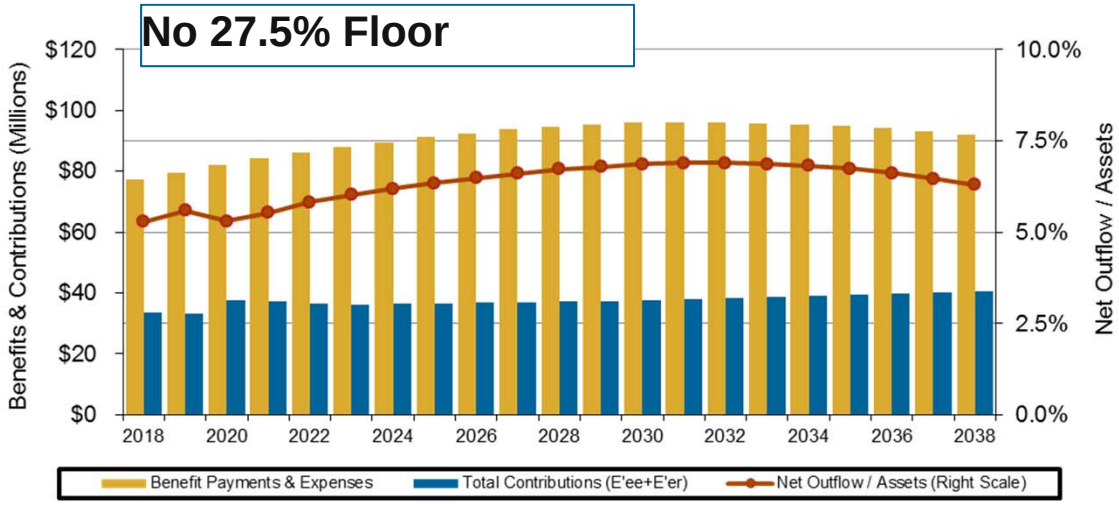
# Plan Liquidity Needs – Compare Funding Policies




Current funding policy – floor of 27.5% of payroll employer contribution rate

Negative cash flows rise slowly through 2024, then reverse and decline toward 3% of assets by year 2034, the consequence of greater contributions after year 5 and particularly year 10.

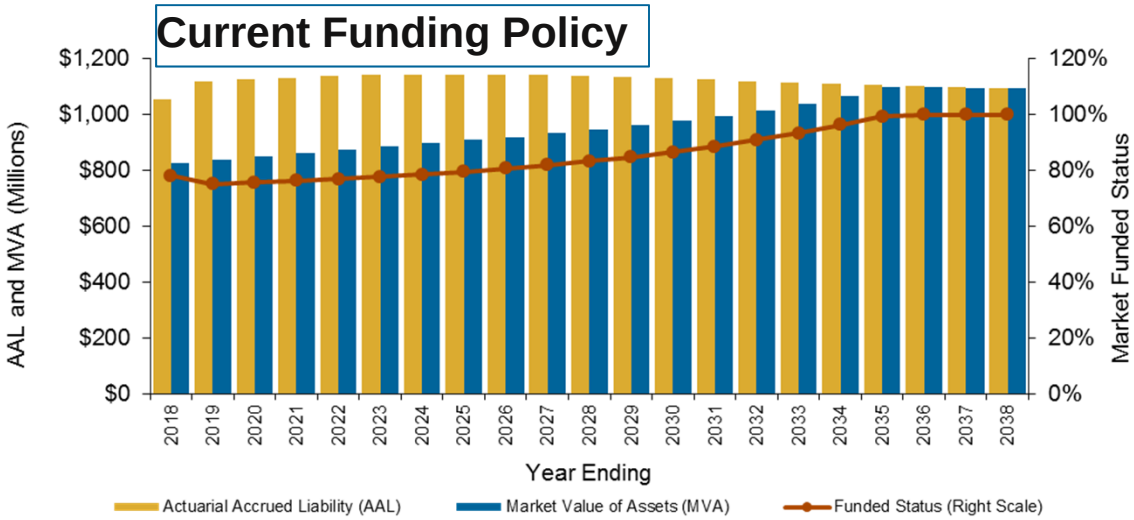
Funding policy reverts to normal after full funding reached in 2034.




Funding policy of normal cost plus supplemental without 27.5% floor results in rising negative cash flows as a percent of assets through 2032

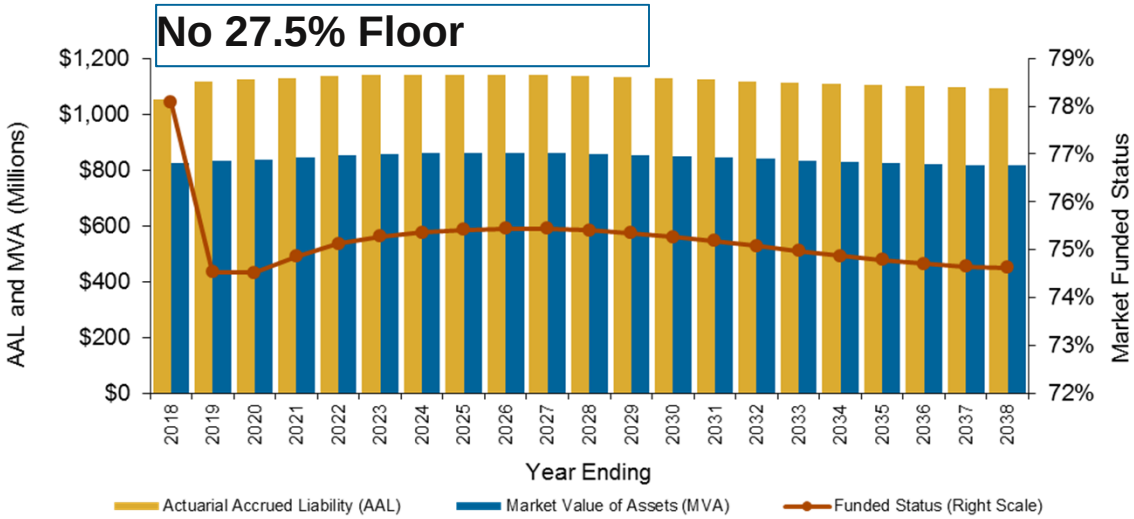
Lower contributions lead to lower asset values and greater relative demand on assets to pay benefits

# Plan Funded Status – Compare Funding Policies




Current funding policy – floor of 27.5% of payroll employer contribution rate

Current funding policy will result in asset growth and funded status that reaches 100% by 2034, with much of the improvement coming after year 10.




Funding policy of normal cost plus supplemental without 27.5% floor results in static funded status around 75%

Lower contributions lead to lower asset values against which to compare liabilities

Dip in status in 2019 comes from required contribution less than 27.5%

# Disclaimers

*This report is for informational purposes only and should not be construed as legal or tax advice on any matter. Any decision you make on the basis of this content is your sole responsibility. You should consult with legal and tax advisers before applying any of this information to your particular situation.*

*This report may consist of statements of opinion, which are made as of the date they are expressed and are not statements of fact.*

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*Past performance is no guarantee of future results.*

*The statements made herein may include forward-looking statements regarding future results. The forward-looking statements herein: (i) are best estimations consistent with the information available as of the date hereof and (ii) involve known and unknown risks and uncertainties such that actual results may differ materially from these statements. There is no obligation to update or alter any forward-looking statement, whether as a result of new information, future events or otherwise. Undue reliance should not be placed on forward-looking statements.*

Callan

May 23, 2019

# Tucson Supplemental Retirement System

## Asset Allocation and Liability Study


**Paul Erlendson**
Fund Sponsor Consulting

**Gordie Weightman, CFA**
Fund Sponsor Consulting

**Jay Kloepfer**
Capital Market Research

# Agenda

Introduction

Asset Allocation and Liability Study Process

Liability Modeling

Asset Modeling

Simulated Financial Condition

Private Infrastructure

Making a Decision

# The Importance of Asset Allocation

## The Number One Task

Asset allocation is the primary determinant of investment return and asset volatility

Asset allocation is the process of determining the optimal allocation of a portfolio among broad asset classes based upon, among other factors:

- Investment goals
- Time horizon
- Liquidity needs
- Capital market expectations
- Liability characteristics
- Risk tolerance

Elements of an appropriate target asset allocation include:

- Identifying asset classes for inclusion (avoid overlaps and minimize gaps)
- Special considerations such as fees, size or capacity constraints, liquidity requirements
- Rebalancing discipline

# What is an Asset-Liability Study?

A technique to evaluate assets and liabilities so that an adequate return may be targeted

- From a fiduciary perspective, it is prudent to review the long-term strategy every 3-5 years

Helps fiduciaries understand the nature of the TSRS Plan they oversee

- Incorporates actuarial assumptions and actuarial valuation process
- Examines the current and projected financial condition of the Plan
  - Funding requirements, funded status, contributions, etc.
- Explores the major risk factors facing the Plan
  - Market risk, inflation risk, interest rate risk, currency risk, demographic risk, etc.
- Sets investment goals and/or objectives to fully fund the obligations over the long-term
- Defines the tolerance for risk, including the need to take risk in order to achieve the objective

Determines the optimal investment (asset allocation) strategy relative to the liabilities

- The expected return on assets should be sufficient to support the desired level of funding of the liabilities
  - For example, the discount rate of 7.0% is the plan's targeted return
- Actuarial assumptions are set over a long time horizon (working life of a participant, typically 20 years +), whereas capital market expectations are formed with a 10-year time horizon

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# Asset Allocation and Liability Study Process

# Interaction of Three Key Policies

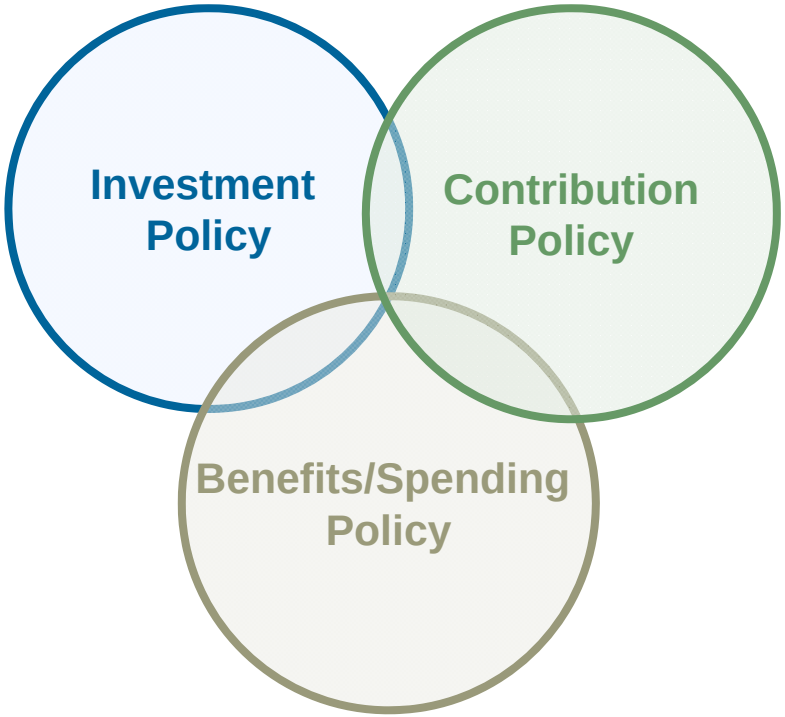
Three strategic policies govern any pool of assets whether it be a pension fund, endowment, or foundation

## Investment Policy

- How will the assets supporting the benefits/spending be invested?
- What risk and return objectives?
- How to manage cash flows?

## Benefits/Spending Policy

- Defined benefit plan design
  - Open, closed, or frozen?
- What type of spending policy?
  - Smoothing method?




## Contribution Policy

- What are expected inflows (contributions, fundraising, bequests, royalties)?

**Contributions + Investment Earnings = Benefits/Spending/Expenses**

# Goal of the Asset-Liability Study

The goal of an asset-liability study is to establish a long-term strategic asset allocation target

Pension plan equation of balance:

Benefits + Expenses = Investment Returns + Contributions

The primary goal of the Fund is to ensure sufficient liquidity to pay the benefits and expenses when due

- How do liquidity needs impact the investment decisions? For example, size of the equity allocation or commitment to illiquid asset classes

The secondary investment goal is to balance the competing objectives of:

- Minimize costs over the long run (long-term goal)
  - How much return generation is necessary to meet actuarial return targets?
  - How much return generation is necessary to lower contributions and/or improve funded status?
- Minimize funded status volatility (short-term goal)
  - How much risk reduction to decrease contribution/funded status volatility?

The strategic asset allocation target should be an optimal balance between sustainable funded status volatility and minimization of contributions over the long run

The strategic asset allocation will vary by unique circumstances

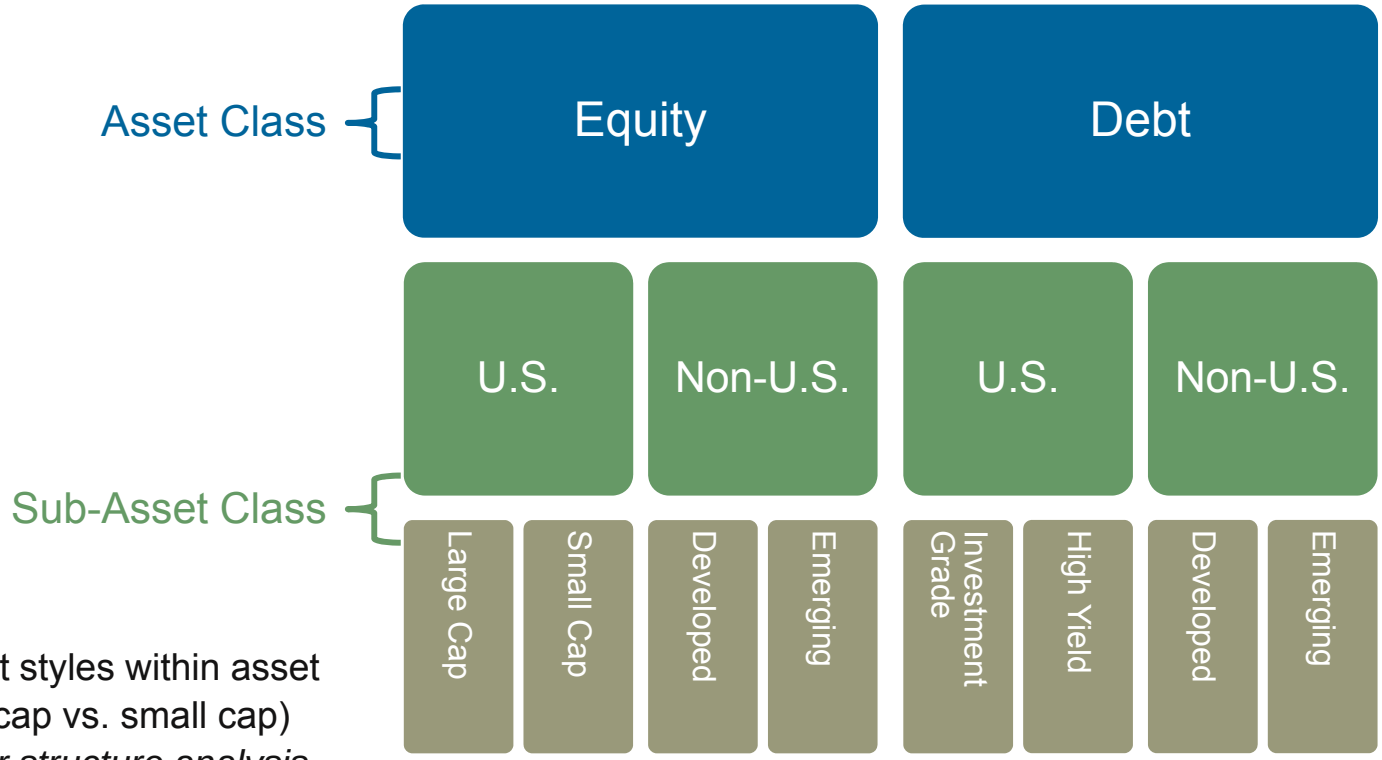
- No “one-size-fits-all” solution exists

# The Focus is on Broad Asset Classes

Primary asset classes and important sub-asset classes include:

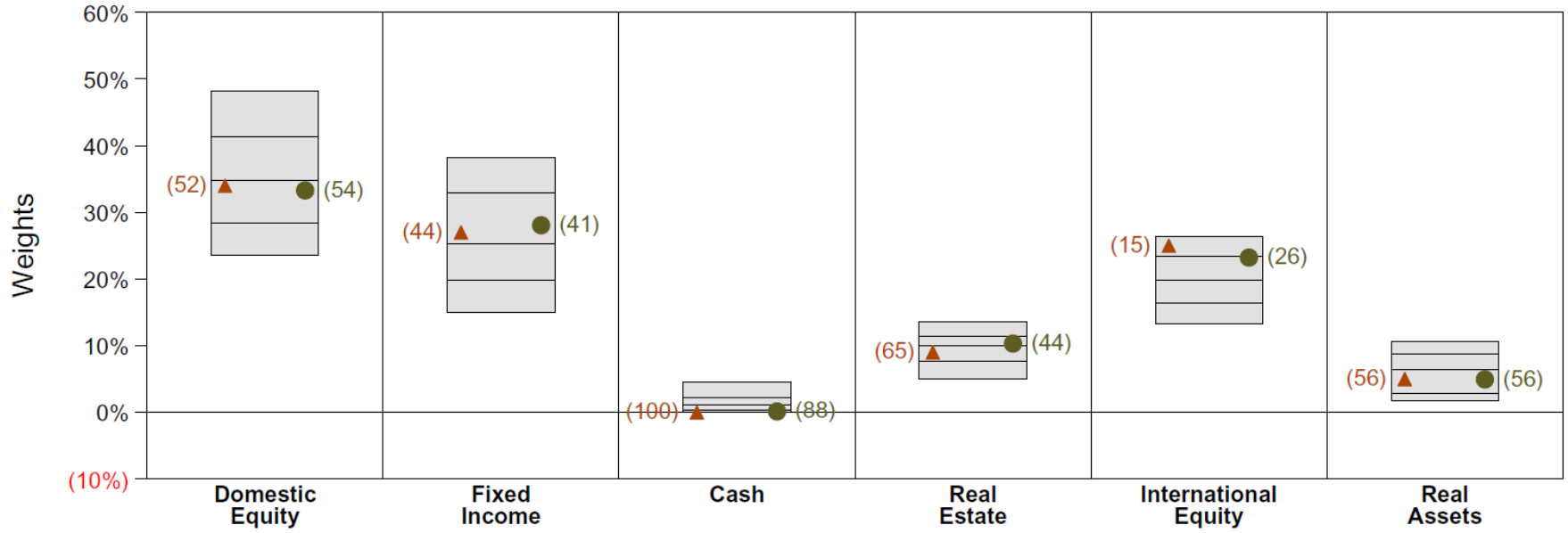
- U.S. Stocks
- U.S. Bonds
- Non-U.S. Stocks
- Non-U.S. Bonds
- Alternative Investments
  - Real Estate
  - Infrastructure
  - Private equity
  - Absolute return
- Cash

Breakdowns between investment styles within asset classes (growth vs. value, large cap vs. small cap) are best addressed in a *manager structure analysis*



# Total Fixed Income Allocations – Callan Peer Groups

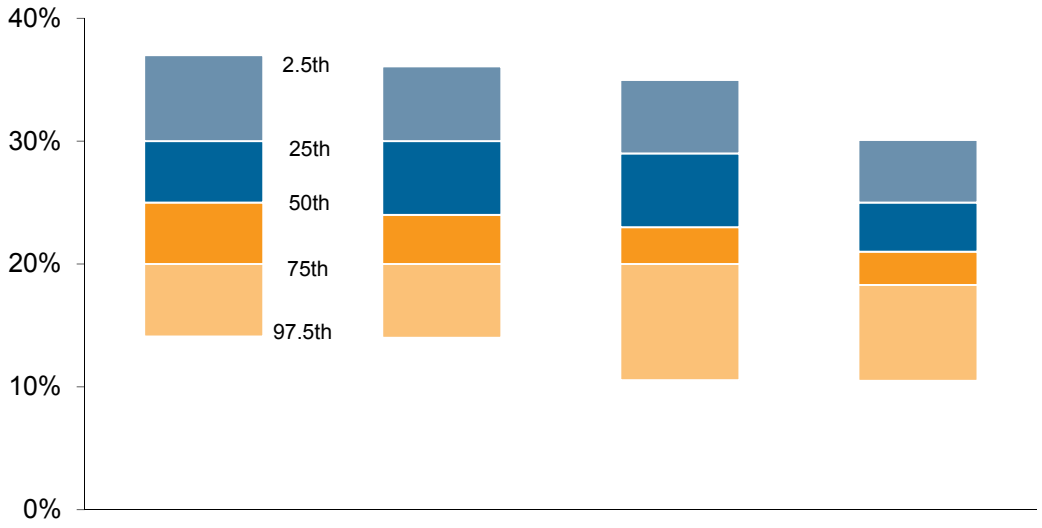
## Asset Class Weights vs Callan Public Fund Sponsor Database




| | Domestic Equity | Fixed Income | Cash | Real Estate | International Equity | Real Assets |
|---|---|---|---|---|---|---|
| 10th Percentile | 48.27 | 38.25 | 4.56 | 13.58 | 26.32 | 10.69 |
| 25th Percentile | 41.33 | 32.95 | 2.22 | 11.35 | 23.39 | 8.70 |
| Median | 34.85 | 25.26 | 1.10 | 9.97 | 19.89 | 6.41 |
| 75th Percentile | 28.42 | 19.86 | 0.40 | 7.68 | 16.37 | 2.82 |
| 90th Percentile | 23.64 | 14.96 | 0.08 | 4.95 | 13.32 | 1.80 |
| **Fund** ● | 33.29 | 28.07 | 0.14 | 10.32 | 23.22 | 4.95 |
| Target ▲ | 34.00 | 27.00 | 0.00 | 9.00 | 25.00 | 5.00 |

- The 27% target allocation to fixed income ranks above median compared to other public plans

# Total Fixed Income Allocations – NASRA




| Percentile | Include Cash | Exclude Cash | Exclude Private Debt | Exclude Private Debt & TIPS |
|---|---|---|---|---|
| 2.5th | 37.0% | 36.1% | 35.0% | 30.1% |
| 25th | 30.0% | 30.0% | 29.0% | 25.0% |
| **50th** | **25.0%** | **24.0%** | **23.0%** | **21.0%** |
| 75th | 20.0% | 20.0% | 20.0% | 18.3% |
| 97.5th | 14.1% | 14.0% | 10.6% | 10.5% |
| % Invested | 100.0% | 100.0% | 100.0% | 100.0% |

Source: NASRA 2017 plan sponsor survey and Callan LLC

Callan recently examined fixed income allocations in public funds using the largest public pension plans (NASRA) using 2017 data.

The observed median fixed income allocation is 25%

- 7.5% median actuarial discount rate

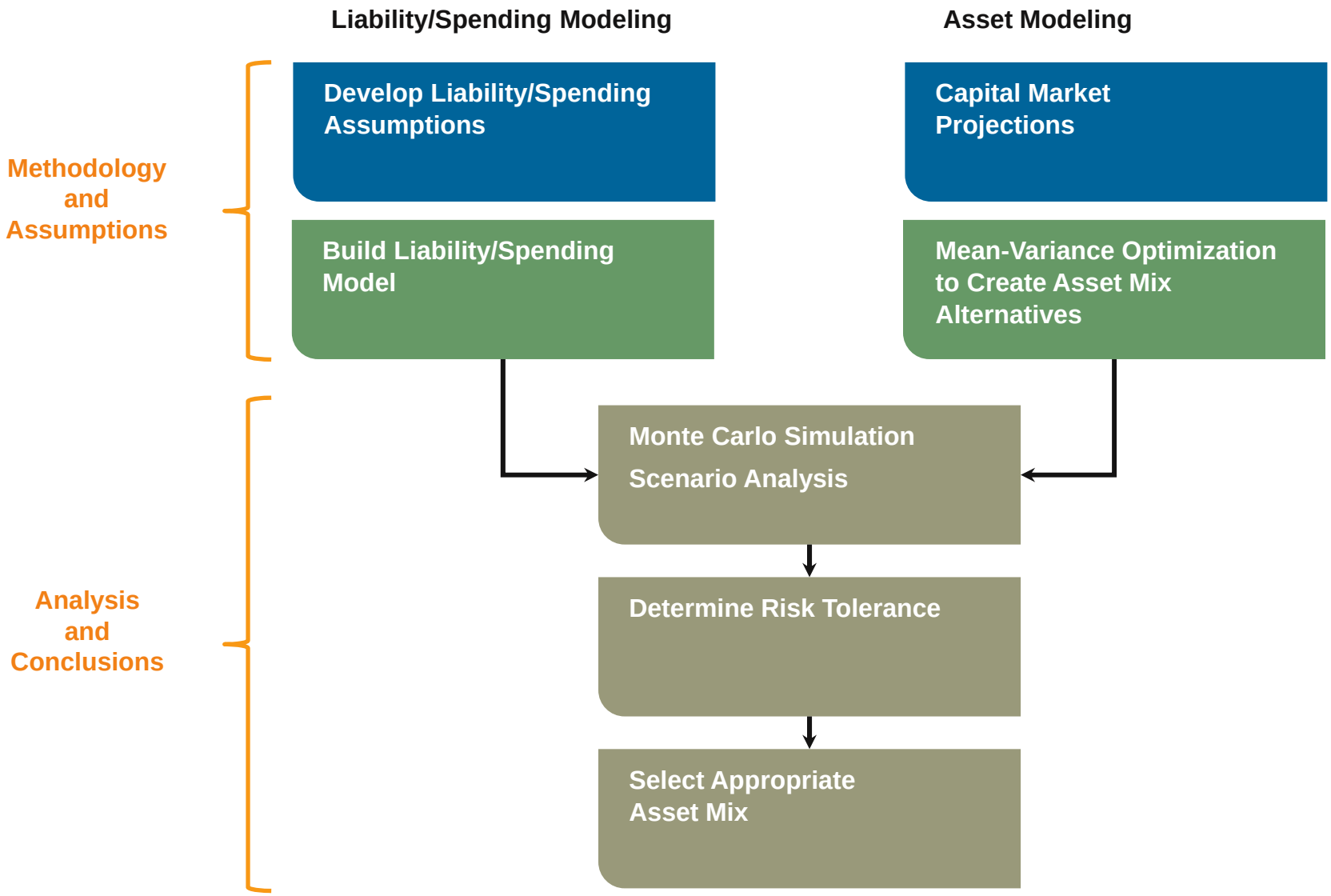
Two standard deviation range of allocation to fixed income is 14% to 37%

- 6.5% to 8.0% range for the actuarial discount rate

Median allocation declines if we exclude certain categories that are treated differently across plans:

- Cash
- Private debt
- TIPS

# Callan Asset-Liability Process



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# Liability Modeling

# Key Components

## Liability Characteristics

Plan document defines the type and level of benefits:

- Final average pay benefits are sensitive to future growth in salaries
- Benefits may increase in retirement to protect against inflation

Actuarial valuation determines the liabilities and indicates sensitivities.

Demographic assumptions:

- Mortality / Longevity
- Termination
- Death
- Disability
- Largest risk is that plan participants live longer than expected

Economic assumptions:

- Discount rate: serves as the plan's targeted return, inflation + real return
- Salary inflation: inflation + productivity + individual merit
- Cost of Living adjustment: adjusts with inflation, or is fixed

# Build Integrated Asset/Liability Model

Incorporate most recent actuarial valuation and experience study to build an integrated model of the Plan:

- Match current valuation
- Project liabilities 10 and 20 years out
- Integrate with assets and project financial condition of the Plan
  - Expected case assumptions built into current actuarial valuation
  - Recommended changes from the experience study incorporated into the model, the projections, and the simulations
- Simulate range of potential outcomes to evaluate tolerance for risk

# TSRS Liability Modeling

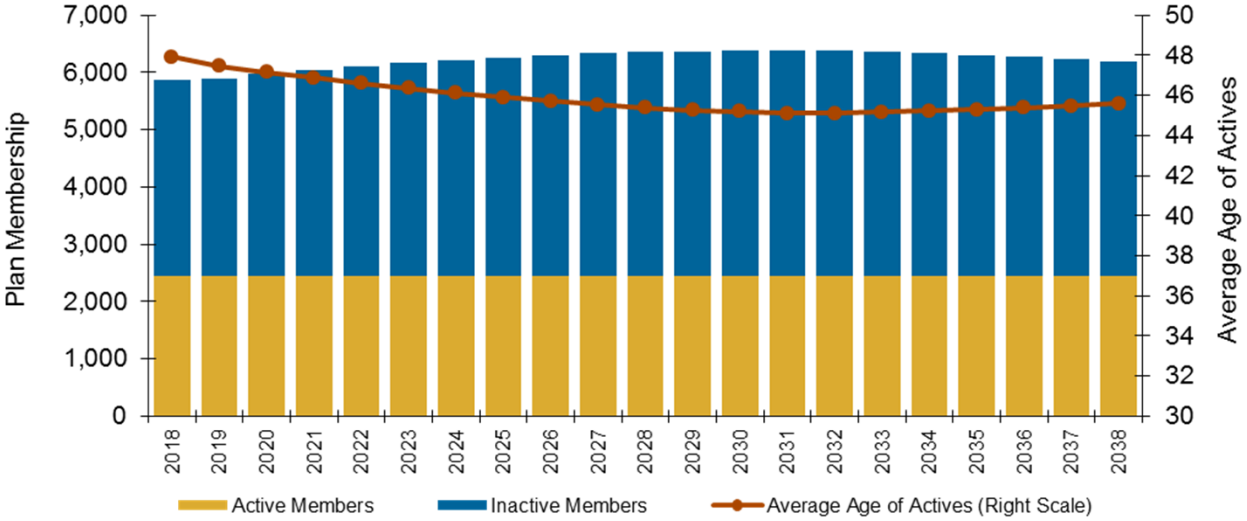
| 6/30/2018 Funded Status | |
|---|---|
| Actuarial Accrued Liability (AL) | $1,054 mm |
| Market Value of Assets (MVA) | $823 mm |
| Actuarial Value of Assets (AVA) | $803 mm |
| Unfunded Actuarial Accrued Liability (AL - AVA) | $251 mm |
| Actuarial Funded Ratio (AVA/AL) | 76.2% |
| Market Funded Ratio (MVA/AL) | 78.1% |

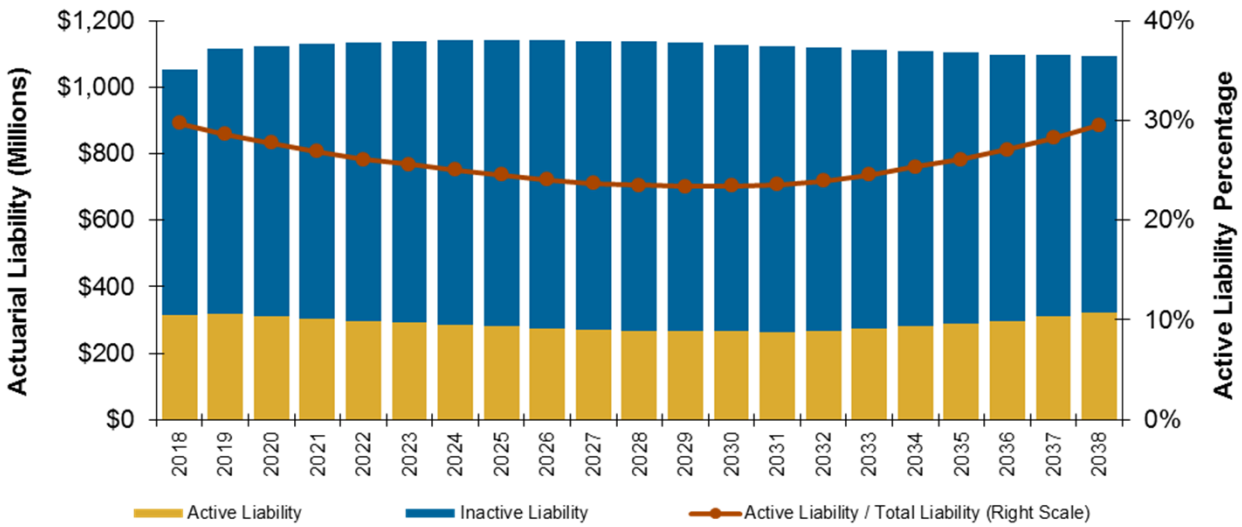
| Key Actuarial Assumption | Assumption |
|---|---|
| Investment Return Rate | 7.0% per year |
| Salary Increase Rates | 3.0% |
| Price Inflation | 3.0% |

For purposes of asset-liability modeling, Callan builds an actuarial liability model which initially matches actuarial liabilities and normal cost within 5%

- Results are then scaled to match the actuarial report exactly
- Liability model is based on the June 30, 2018 actuarial valuation report for TSRS
- Funding policy of 27.5% of pay for employers and 50% of normal cost for select Tier 1 and Tier II employees adopted at the time of the 2014 asset-liability study
  - Funding policy for employers is modeled to revert to normal cost plus amortization of unfunded liability once plan reaches full funding.
- Assumption changes adopted following the January 2019 experience study are incorporated in the projections and the analysis: 3.0 % salary and inflation; return assumption lowered to 7.0% from 7.25%

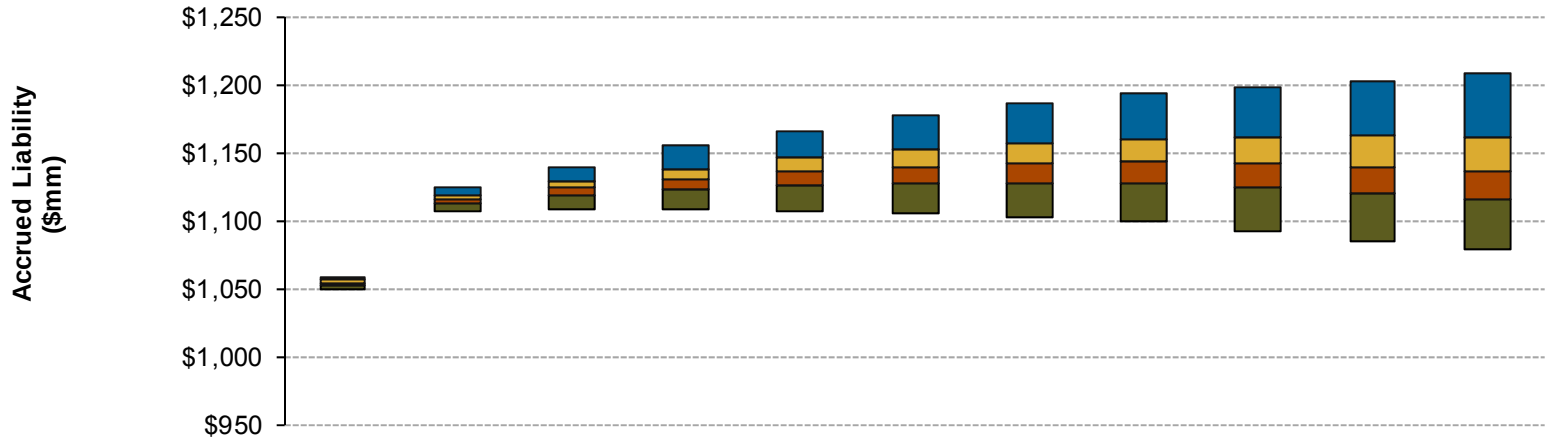
# Baseline Liability Projection




- Assumes 0% workforce growth.
- Future new hires replace future plan exits via retirement, death, disability and withdrawal.
- New entrant demographics are based on recent hires.
- Inactive members – retireds and term-vesteds – are expected to increase significantly over the next 10 years, level off after 2032
- Average age of active employees is decreasing slightly. Population is getting younger as older employees retire.
- Inactive liability is increasing faster than active liability.
- Active liability, as a percentage of total liability, falls from 30% to 23% over the next 10 years.

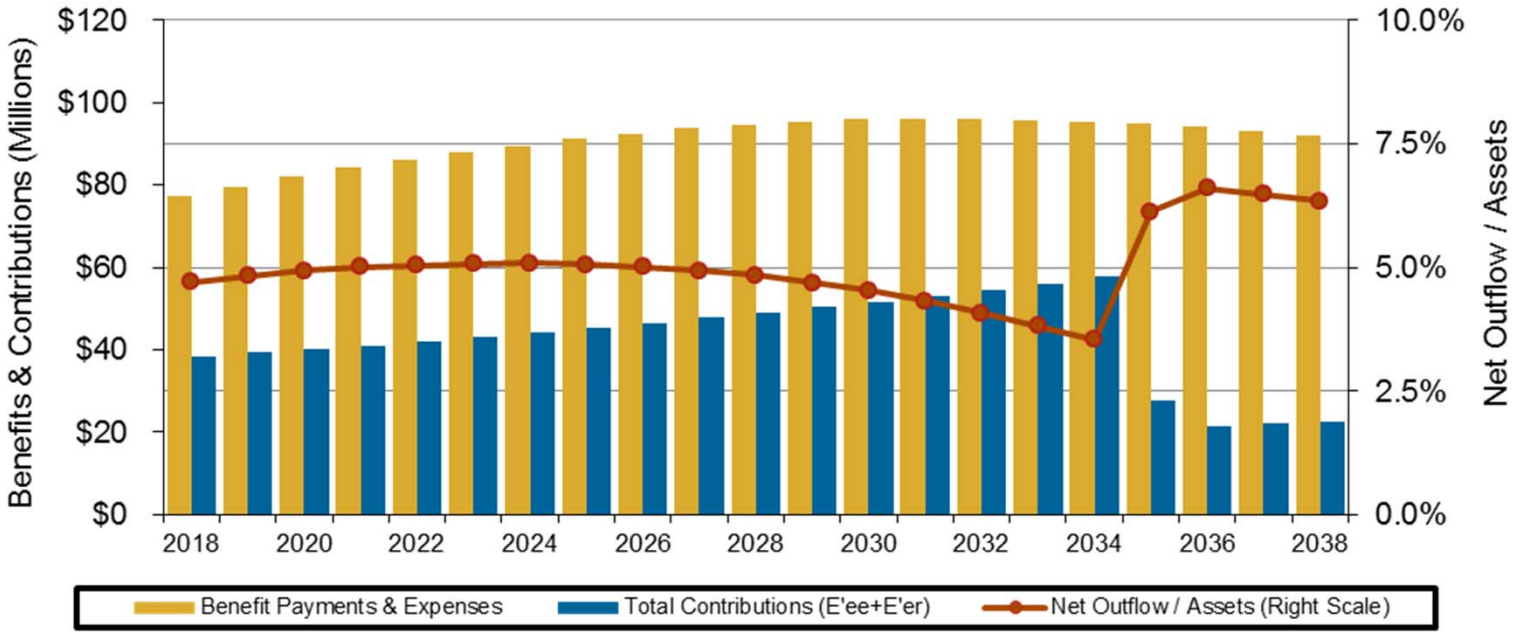
# Simulated Actuarial Liability Projection – TSRS




| Percentile | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 5-Year Growth | 10-Year Growth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **97.5th** | $1,054 | $1,124 | $1,140 | $1,155 | $1,166 | $1,177 | $1,186 | $1,193 | $1,198 | $1,203 | $1,209 | 2.2% | 1.4% |
| **75th** | 1,054 | 1,118 | 1,129 | 1,138 | 1,146 | 1,152 | 1,157 | 1,159 | 1,161 | 1,162 | 1,161 | 1.8% | 1.0% |
| **50th** | 1,054 | 1,115 | 1,124 | 1,130 | 1,135 | 1,139 | 1,142 | 1,143 | 1,142 | 1,139 | 1,137 | 1.6% | 0.8% |
| **25th** | 1,054 | 1,112 | 1,118 | 1,122 | 1,126 | 1,128 | 1,127 | 1,127 | 1,124 | 1,120 | 1,116 | 1.4% | 0.6% |
| **2.5th** | 1,054 | 1,107 | 1,108 | 1,108 | 1,106 | 1,105 | 1,102 | 1,099 | 1,092 | 1,085 | 1,078 | 1.0% | 0.2% |
| **Range** | 0 | 17 | 31 | 46 | 60 | 71 | 83 | 95 | 106 | 118 | 131 | 1.3% | 1.2% |
| **Median Liability Growth** | | 5.79% | 0.77% | 0.61% | 0.45% | 0.35% | 0.23% | 0.06% | -0.08% | -0.21% | -0.26% | | |

- Liabilities increase with interest cost (7.0%) and normal cost; they are reduced by benefit payments
- Median liability growth (net of benefit payments) falls to 0.35% over five years and turns slightly negative by ten years
  - Flat to declining liability growth is unexpected for a typical open plan, but new participants in TSRS are defaulted into Tier II, which offers a less rich benefit and therefore slower growth in liabilities
  - Across the scenarios above, the 10-year annualized liability growth ranges from 1.4% to 0.2%
- Modest volatility stems from inflation uncertainty as it feeds through to future salary growth

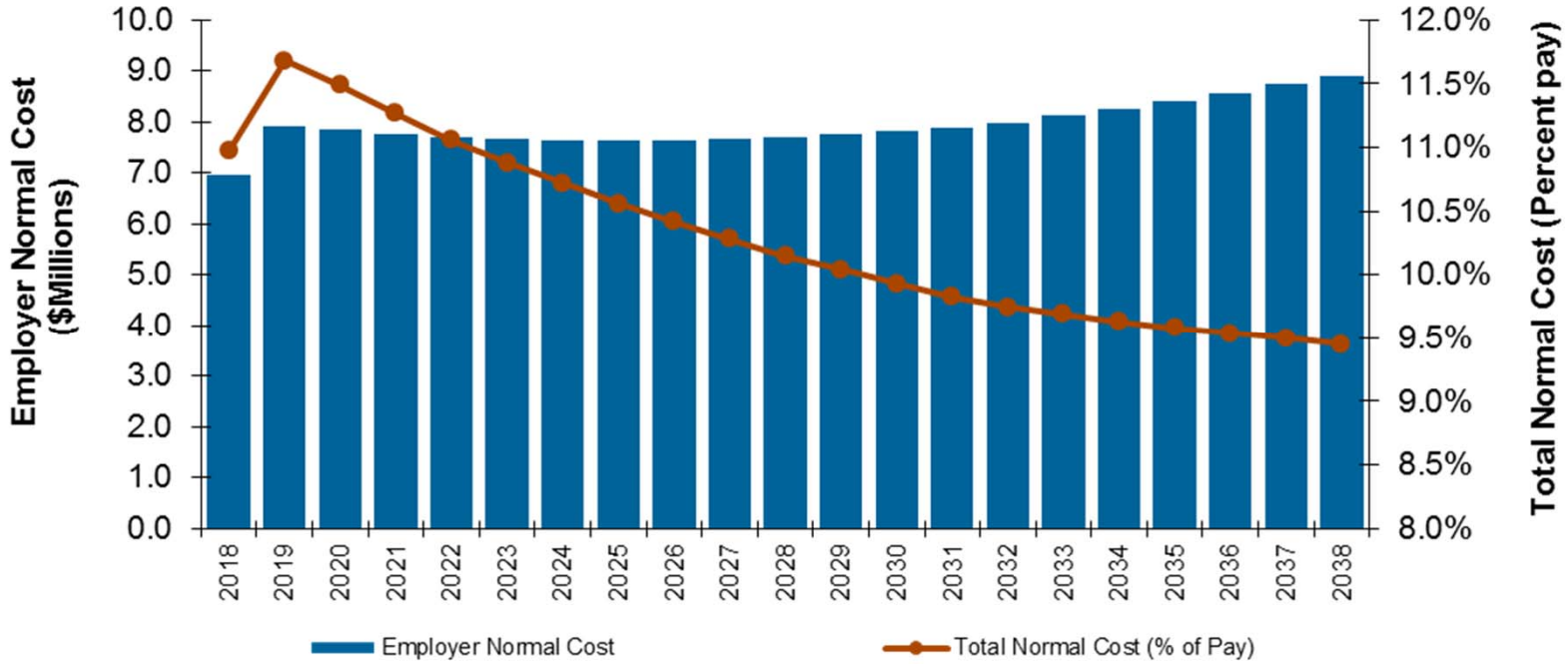
# Liquidity Needs




- Net Cash Outflow = Benefits + administration expenses – employee contributions - employer contributions
  - Net Outflow < 5% of assets , which Callan believes is manageable
  - 5 -10% depends on amount of illiquid investments (currently 14%)
  - Net Outflow rises toward 7% of assets by 2035
- Assumes the plan earns 6.65% return/2.25% inflation (Callan projection) and pursues the current funding policy.
- Negative cash flow projections have been reduced significantly since the last asset-liability study. The adoption of the 27.5% contribution policy improved net cash flows and funded status.
- Kink in the net outflow is the result of employer contributions falling off once plan reaches full funding, and 27.5% fixed contribution rate for employers reverts to normal cost plus amortization of unfunded liability

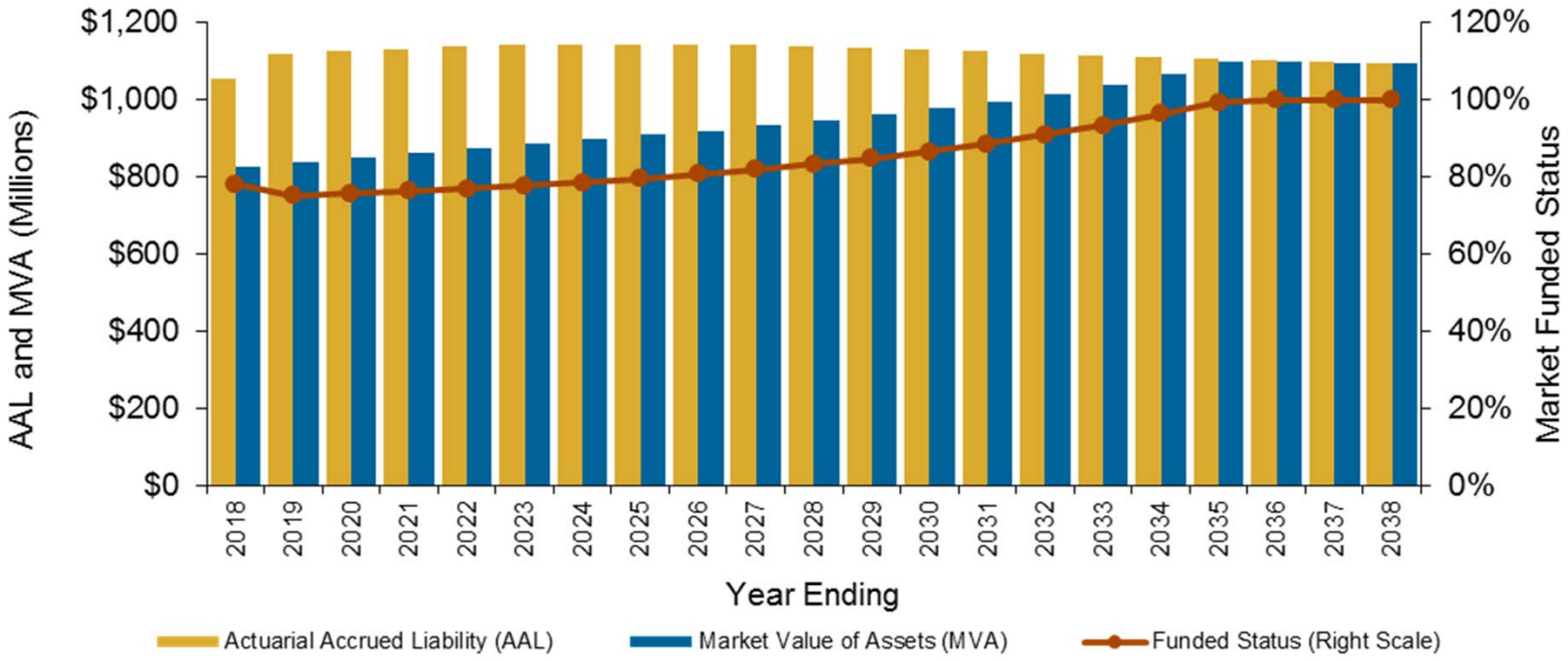
# Normal Cost – Employer ($) and Total (% of Salary)

## Cost of Ongoing Benefit Accruals




- Employer Normal Cost (left axis) is expected to remain level in dollar terms over 20 years, which implies a decline as a % of salary from 6% to 4%
- **Total Normal Cost** rate (employer normal cost plus employee contribution rate – right axis) is expect to fall over the next 20 years as new hires are placed into Tier II, bringing the cost of the plan down
  - Changing demographics also is a factor, to some extent (average age and service are falling over the next 20 years)
  - Normal Cost represents the accrual of each year's additional benefit by participants. Open plans generate Normal Cost; frozen plans do not
  - Normal Cost does NOT include the amortization of any unfunded liability

# TSRS Funded Status – Market Value of Assets




- Current funding policy (employer at 27.5% of pay, employee at half of normal cost) will result in steady improvement in funded status over next 10 and 20 years, from 78.1% to 85% (10 years), reaching 100% in 2035
- Assumes plan earns 6.65% return (Callan capital market projections)
  - If plan earned 7.0% assumed return, funded status would reach 100% earlier (2033)
  - Once the plan reaches 100% funded, assumed funding policy would revert to normal cost plus amortization of any unfunded liability that opens up
- 27.5% funding policy leads to steady reduction in unfunded liability in less than 20 years

Callan

# Asset Modeling

# 2019 Capital Market Projections

## Return and Risk 2019-2028

| Asset Class | Index | PROJECTED RETURN 1-Year Arithmetic | PROJECTED RETURN 10-Year Geometric* | PROJECTED RETURN Real | PROJECTED RISK Standard Deviation | Projected Yield |
|---|---|---|---|---|---|---|
| **Equities** | | | | | | |
| Broad Domestic Equity | Russell 3000 | 8.50% | 7.15% | 4.90% | 17.95% | 2.00% |
| Large Cap | S&P 500 | 8.25% | 7.00% | 4.75% | 17.10% | 2.10% |
| Small/Mid Cap | Russell 2500 | 9.55% | 7.25% | 5.00% | 22.65% | 1.55% |
| Global ex-US Equity | MSCI ACWI ex USA | 9.20% | 7.25% | 5.00% | 21.10% | 3.10% |
| International Equity | MSCI World ex USA | 8.70% | 7.00% | 4.75% | 19.75% | 3.25% |
| Emerging Markets Equity | MSCI Emerging Markets | 10.70% | 7.25% | 5.00% | 27.45% | 2.65% |
| **Fixed Income** | | | | | | |
| Short Duration | Bloomberg Barclays 1-3 Yr G/C | 3.40% | 3.40% | 1.15% | 2.10% | 3.25% |
| Domestic Fixed | Bloomberg Barclays Aggregate | 3.75% | 3.75% | 1.50% | 3.75% | 3.85% |
| TIPS | Bloomberg Barclays TIPS | 3.80% | 3.75% | 1.50% | 5.05% | 3.90% |
| High Yield | Bloomberg Barclays High Yield | 5.75% | 5.35% | 3.10% | 10.35% | 7.75% |
| Non-US Fixed | Bloomberg Barclays Glbl Agg xUSD | 1.80% | 1.40% | -0.85% | 9.20% | 2.35% |
| Emerging Market Debt | EMBI Global Diversified | 5.40% | 5.05% | 2.80% | 9.50% | 6.00% |
| **Other** | | | | | | |
| Real Estate | NCREIF ODCE | 7.30% | 6.25% | 4.00% | 15.70% | 4.75% |
| Timber | NCREIF Timber | 7.10% | 6.20% | 3.95% | 14.55% | 3.90% |
| Farmland | NCREIG Agriculture | 7.20% | 6.25% | 4.00% | 15.00% | 4.50% |
| Private Infrastructure | Cambridge Glbl Priv Infra | 8.15% | 6.75% | 4.50% | 18.00% | 5.00% |
| Private Equity | Cambridge Private Equity | 12.40% | 8.50% | 6.25% | 29.30% | 0.00% |
| Hedge Funds | Callan Hedge FoF Database | 5.75% | 5.50% | 3.25% | 8.85% | 2.50% |
| Commodities | Bloomberg Commodity | 4.75% | 3.20% | 0.95% | 18.00% | 2.50% |
| Cash Equivalents | 90-Day T-Bill | 2.50% | 2.50% | 0.25% | 0.90% | 2.50% |
| **Inflation** | CPI-U | | 2.25% | | 1.50% | |

** Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).*

shaded = current TSRS asset classes

- Note that return projections for public markets assume index returns with no premium for active management
- The 10 year expectations will be used to assess the impact on the funded ratio and contribution rates near term.

* Geometric or compound returns are derived from arithmetic returns and the associated risk (standard deviation).
Source: Callan

# 2019 Callan Capital Market Projections

## Correlation: 2019–2028

| | Correlation Matrix | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Broad Domestic Equity | 1.00 | | | | | | | | | | | | | | | | | | | | |
| 2 | Large Cap | 1.00 | 1.00 | | | | | | | | | | | | | | | | | | | |
| 3 | Small/Mid Cap | 0.96 | 0.93 | 1.00 | | | | | | | | | | | | | | | | | | |
| 4 | Global ex-US Equity | 0.85 | 0.84 | 0.84 | 1.00 | | | | | | | | | | | | | | | | | |
| 5 | International Equity | 0.81 | 0.80 | 0.80 | 0.99 | 1.00 | | | | | | | | | | | | | | | | |
| 6 | Emerging Markets Equity | 0.87 | 0.86 | 0.86 | 0.94 | 0.88 | 1.00 | | | | | | | | | | | | | | | |
| 7 | Short Duration | -0.23 | -0.22 | -0.26 | -0.25 | -0.23 | -0.28 | 1.00 | | | | | | | | | | | | | | |
| 8 | Domestic Fixed | -0.11 | -0.10 | -0.15 | -0.14 | -0.12 | -0.17 | 0.88 | 1.00 | | | | | | | | | | | | | |
| 9 | TIPS | -0.05 | -0.04 | -0.08 | -0.06 | -0.05 | -0.09 | 0.56 | 0.64 | 1.00 | | | | | | | | | | | | |
| 10 | High Yield | 0.64 | 0.63 | 0.62 | 0.63 | 0.61 | 0.62 | -0.13 | 0.02 | 0.06 | 1.00 | | | | | | | | | | | |
| 11 | Non-US Fixed | 0.01 | 0.01 | 0.00 | 0.07 | 0.05 | 0.10 | 0.48 | 0.53 | 0.40 | 0.12 | 1.00 | | | | | | | | | | |
| 12 | EMD | 0.57 | 0.57 | 0.55 | 0.57 | 0.54 | 0.58 | -0.04 | 0.10 | 0.18 | 0.60 | 0.01 | 1.00 | | | | | | | | | |
| 13 | Real Estate | 0.74 | 0.73 | 0.72 | 0.71 | 0.68 | 0.70 | -0.13 | -0.04 | 0.00 | 0.56 | -0.05 | 0.47 | 1.00 | | | | | | | | |
| 14 | Timber | 0.79 | 0.79 | 0.76 | 0.79 | 0.77 | 0.76 | -0.20 | -0.05 | -0.01 | 0.55 | -0.07 | 0.47 | 0.65 | 1.00 | | | | | | | |
| 15 | Farmland | 0.80 | 0.79 | 0.77 | 0.80 | 0.78 | 0.77 | -0.20 | -0.06 | -0.10 | 0.53 | -0.06 | 0.50 | 0.60 | 0.70 | 1.00 | | | | | | |
| 16 | Infrastructure | 0.85 | 0.85 | 0.82 | 0.83 | 0.81 | 0.81 | -0.20 | -0.10 | -0.10 | 0.57 | -0.07 | 0.47 | 0.69 | 0.79 | 0.76 | 1.00 | | | | | |
| 17 | Private Equity | 0.92 | 0.92 | 0.88 | 0.88 | 0.86 | 0.86 | -0.30 | -0.23 | -0.14 | 0.55 | 0.06 | 0.45 | 0.66 | 0.67 | 0.81 | 0.80 | 1.00 | | | | |
| 18 | Hedge Funds | 0.76 | 0.76 | 0.74 | 0.74 | 0.72 | 0.73 | -0.08 | 0.09 | 0.09 | 0.57 | -0.05 | 0.54 | 0.64 | 0.71 | 0.74 | 0.74 | 0.62 | 1.00 | | | |
| 19 | Commodities | 0.15 | 0.15 | 0.15 | 0.16 | 0.16 | 0.16 | -0.22 | -0.10 | 0.12 | 0.10 | 0.15 | 0.19 | 0.20 | 0.25 | 0.20 | 0.18 | 0.18 | 0.21 | 1.00 | | |
| 20 | Cash Equivalents | -0.04 | -0.03 | -0.08 | -0.04 | -0.01 | -0.10 | 0.30 | 0.10 | 0.12 | -0.11 | 0.00 | -0.07 | -0.06 | -0.05 | -0.05 | 0.15 | 0.00 | -0.07 | 0.07 | 1.00 | |
| 21 | Inflation | -0.01 | -0.02 | 0.02 | 0.01 | 0.00 | 0.03 | -0.20 | -0.28 | 0.10 | 0.07 | -0.10 | 0.00 | 0.10 | 0.04 | 0.20 | 0.09 | 0.06 | 0.20 | 0.40 | 0.00 | 1.00 |

- Relationships between asset classes are as important as standard deviation
- To determine portfolio mixes, Callan employs mean-variance optimization
- Return, standard deviation and correlation determine the composition of efficient asset mixes

Source: Callan

# 2019 Capital Market Expectations – Definitions

**Arithmetic mean return**: is the single-period estimate of return, and is inferred as the mean of a distribution of single-period returns (and therefore used in a mean-variance optimization tool)

- The arithmetic mean is the simple average of a sequence of returns

**Geometric return**: compound return, calculated by linking multiple periods and their arithmetic returns

- The compound return is what investors actually experience over time, and reflects the impact of volatility on the investor's results
  - If there is no volatility, then arithmetic = geometric. If there is volatility, then the geometric return is eroded over time relative to the arithmetic average
- The classic example: assume two periods, one where the investor gets a 50% gain, followed by one where the investor suffers a 50% loss; he arithmetic average return is zero, but the compound return is negative 25% (1.5 * 0.5 = 0.75)

**Risk** is defined as the variability of return, and uses standard deviation to articulate the measure of risk. Higher standard deviation = greater risk; defines range of probable returns

- +/- one standard deviation defines 2/3 of expected outcomes; +/- two standard deviations captures 95% of outcomes
- Example: large cap US equity geometric return = 7.0%, standard deviation = 17.1%
  - Range for one standard deviation: -10.1% to 24.1%

# Asset Mixes

## Current Policy Target and Alternative Asset Mixes

| Component | Target | Min | Max | Mix 1 | Mix 2 | Mix 3 | Mix 4 | Mix 5 |
|---|---|---|---|---|---|---|---|---|
| Large Cap | 26% | 0% | 100% | 23% | 25% | 27% | 30% | 32% |
| Small/Mid Cap | 8% | 0% | 100% | 6% | 7% | 7% | 8% | 9% |
| Global ex US Equity | 25% | 0% | 100% | 20% | 22% | 24% | 26% | 27% |
| Domestic Fixed | 27% | 0% | 100% | 35% | 30% | 25% | 20% | 15% |
| Real Estate | 9% | 0% | 12% | 12% | 12% | 12% | 12% | 12% |
| Infrastructure, private | 5% | 0% | 100% | 4% | 4% | 5% | 5% | 5% |
| **Total** | **100%** | | | **100%** | **100%** | **100%** | **100%** | **100%** |
| | | | | | | | | |
| **Total Fixed Income** | **27%** | | | **35%** | **30%** | **25%** | **20%** | **15%** |
| **Total Public Equity** | **59%** | | | **50%** | **54%** | **58%** | **63%** | **68%** |
| **Total Real Assets** | **14%** | | | **15%** | **16%** | **17%** | **17%** | **17%** |
| | | | | | | | | |
| **Asset-Only** | | | | | | | | |
| 10 Year Expected Return | 6.65% | | | 6.38% | 6.53% | 6.68% | 6.82% | 6.94% |
| Standard Deviation | 12.83% | | | 11.17% | 12.05% | 12.97% | 13.89% | 14.82% |
| Sharpe Ratio | 0.315 | | | 0.338 | 0.326 | 0.314 | 0.302 | 0.292 |

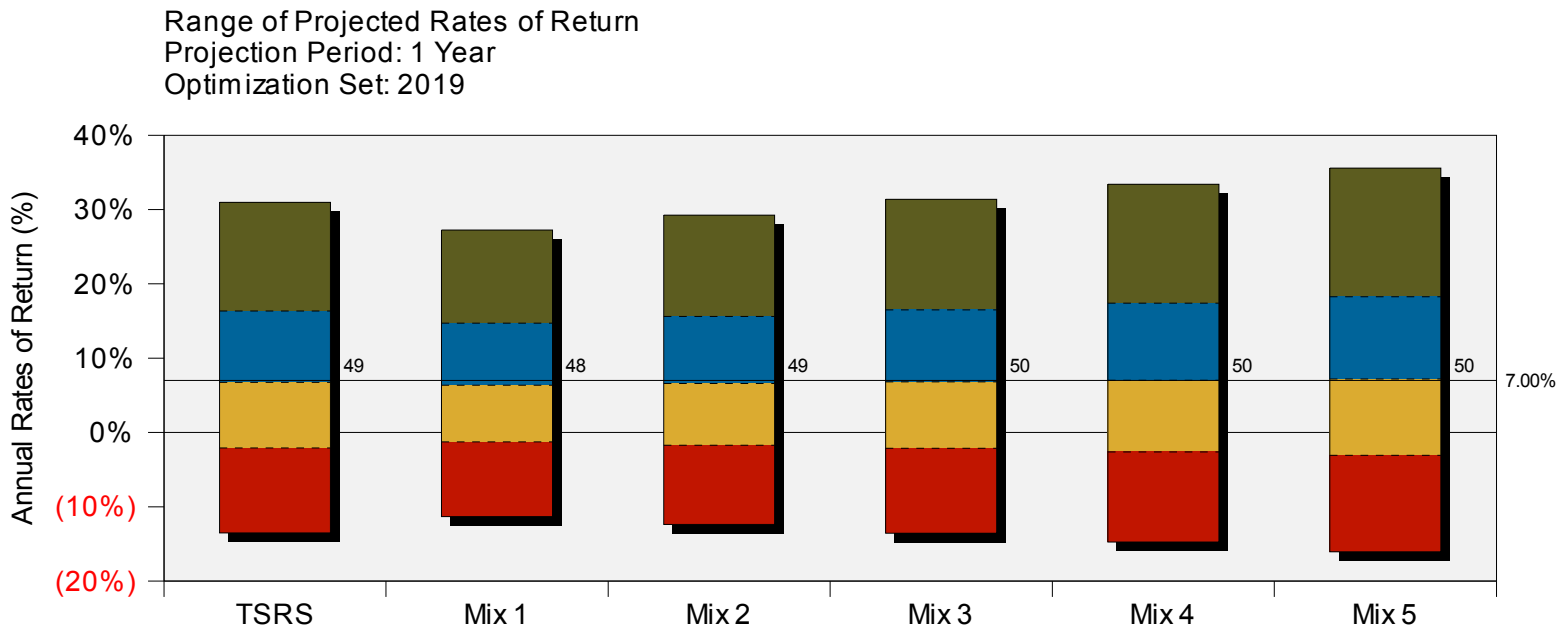
- 10-year expected return = compound (geometric mean) returns, incorporating the impact of volatility and correlation between asset classes
  - Policy objective: 4.0% real return (7% nominal return minus 3% inflation)
  - 10-year expected return for the policy target is 6.65%, in the median case. Standard deviation defines the range of possible outcomes
    - *Callan capital market expectations yield a lower median return than the assumed 7.0% return*
  - Callan expectations do not include any assumption for active management premium. In addition, Callan's inflation assumption is 2.25%, resulting in a real return expectation for the current Target of 4.4%, which is 40 bps ***higher*** than the implied real return in the policy target (7.0% nominal return and 3.0% inflation assumption used in the actuarial valuation).

# Current Asset Classes

- Current policy target is broadly diversified across global equity, fixed income, real estate and infrastructure investments.
- Plan has 25% target to non-US equity, or 42% of total public equity
  - This allocation is in line with our optimization model results, which suggest non-US equity of 40-45% of public equity exposure, just below that of a global equity weighting based on current market capitalization (approximately 50% non-US equity)
- Real estate and infrastructure constitute exposures to real assets, currently at 14% of the total portfolio, just below the exposures suggested by the optimization model
  - Infrastructure offers a return/risk profile that adds diversification within real assets and to the stock and bond exposures in the TSRS portfolio
  - Other strategies considered by investors to diversify the real asset portfolio include additional inflation sensitive investments, such as TIPS, commodities, natural resource and materials equity, MLPs, even agriculture and timber
- Mix 5 shows an allocation that draws fixed income down below 20% in pursuit of return, yet the expected return for Mix 5 is still below the 7.0% return assumption used in the plan valuation
  - Callan is reluctant to recommend or support an asset allocation with fixed income exposure much below that of Mix 4 or Mix 5
  - We believe a total return plan for a public fund like TSRS should have a meaningful exposure to fixed income to provide diversification and downside risk protection in potential bear equity markets
  - The TSRS funding policy of a 27.5% floor heightens the sensitivity of the plan's funded status to capital market variability
- Callan does not believe the risk/return posture of the Plan should be radically changed
  - TSRS will need to retain its current strong orientation toward risk assets (equity) in pursuit of return to achieve its funding goals
  - Whether the plan should pursue more or less exposure to risk assets than the current policy target mix should not be unduly influenced by subdued expectations for the shorter-term 5-10 year horizon. We do not believe investors are likely to be compensated for greater risk taking in the shorter term.

# 2019 Capital Market Expectations

## Range of Projected Returns – One Year

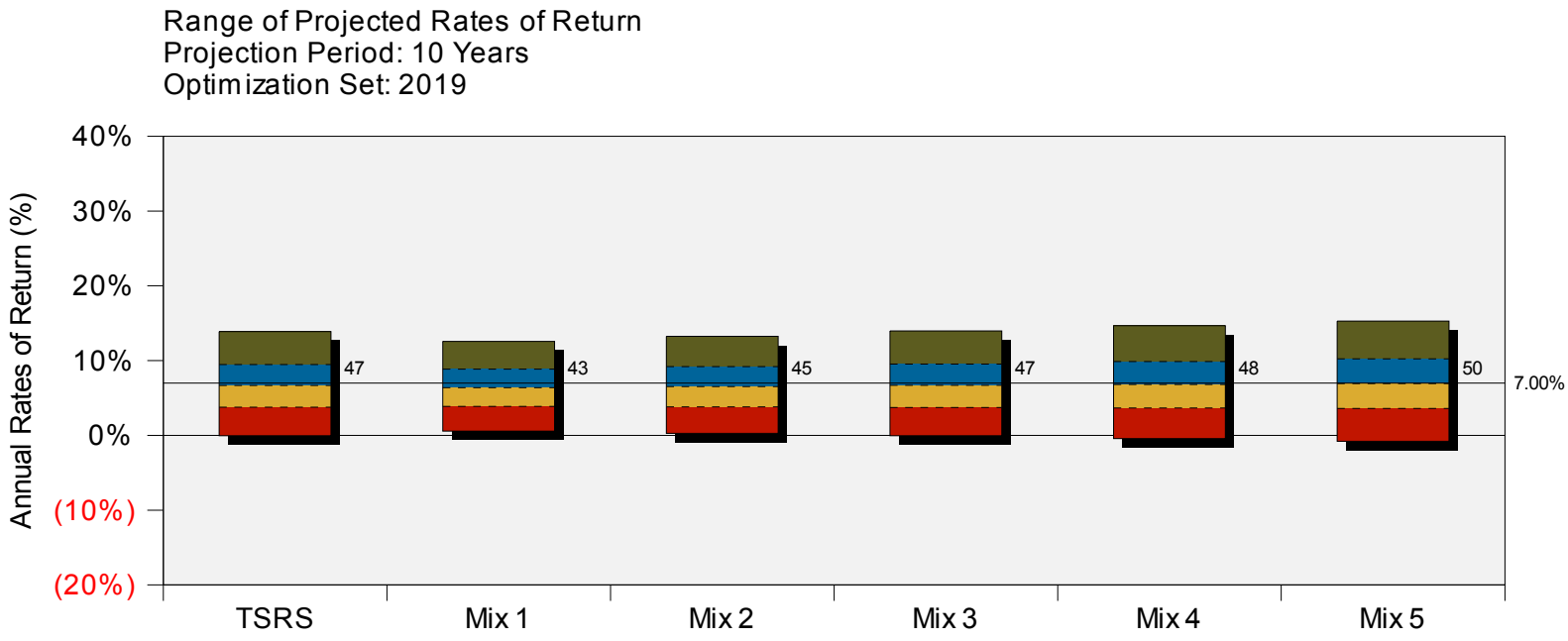



| | TSRS | Mix 1 | Mix 2 | Mix 3 | Mix 4 | Mix 5 |
|---|---|---|---|---|---|---|
| 5th Percentile | 31.0% | 27.3% | 29.3% | 31.4% | 33.4% | 35.6% |
| 25th Percentile | 16.4% | 14.7% | 15.6% | 16.5% | 17.4% | 18.3% |
| Median | 6.7% | 6.4% | 6.6% | 6.8% | 7.0% | 7.2% |
| 75th Percentile | (2.1%) | (1.2%) | (1.7%) | (2.1%) | (2.6%) | (3.1%) |
| 95th Percentile | (13.5%) | (11.3%) | (12.4%) | (13.5%) | (14.7%) | (16.1%) |
| Prob > 7.00% | 49.4% | 47.9% | 48.8% | 49.5% | 50.1% | 50.5% |

Probability of achieving or exceeding the 7.0% return assumption is very similar across asset mixes for one year

# 2019 Capital Market Expectations

## Range of Projected Returns – Ten Years



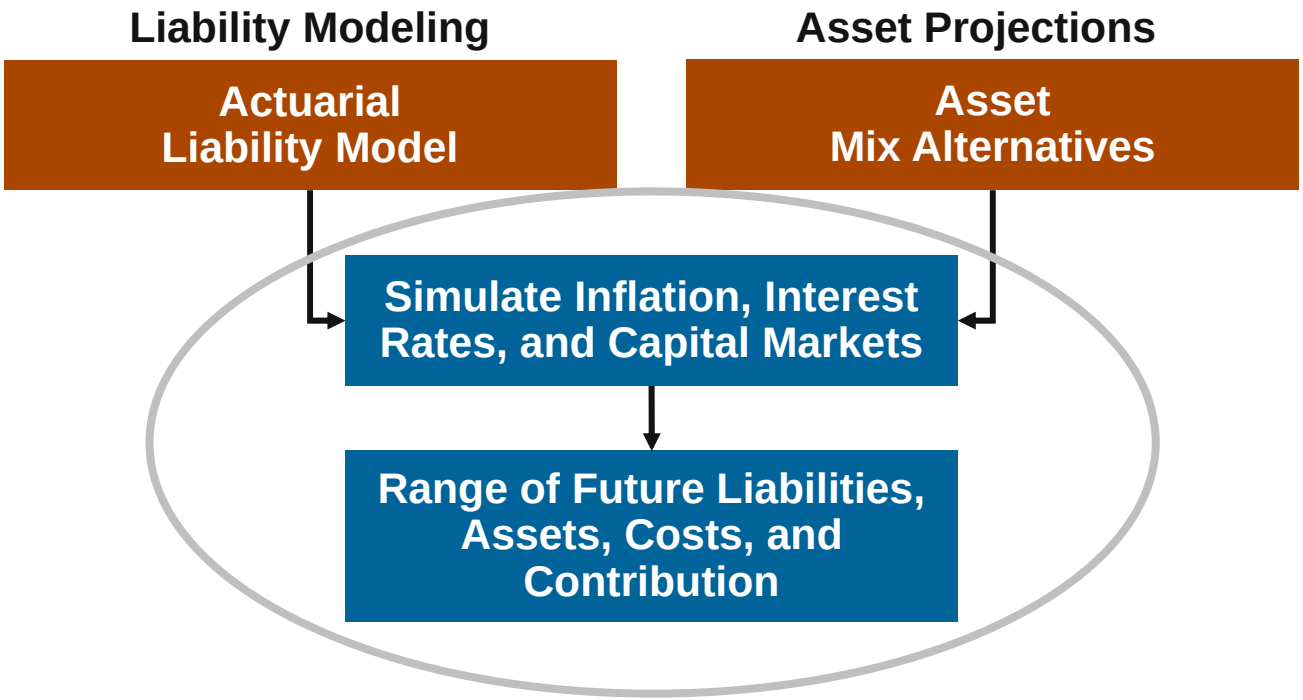

| | TSRS | Mix 1 | Mix 2 | Mix 3 | Mix 4 | Mix 5 |
|---|---|---|---|---|---|---|
| 5th Percentile | 13.9% | 12.6% | 13.3% | 14.0% | 14.7% | 15.3% |
| 25th Percentile | 9.5% | 8.9% | 9.2% | 9.5% | 9.9% | 10.3% |
| Median | 6.7% | 6.4% | 6.5% | 6.7% | 6.8% | 7.0% |
| 75th Percentile | 3.8% | 3.9% | 3.8% | 3.7% | 3.7% | 3.6% |
| 95th Percentile | 0.0% | 0.6% | 0.3% | 0.0% | (0.4%) | (0.8%) |
| Prob > 7.00% | 46.5% | 43.1% | 45.0% | 46.8% | 48.4% | 49.6% |

- Current Target falls short of the 7.0% policy return in the median case, but still stands a reasonable chance (46.5%) of attaining it over 10 years
- Callan expectations do not include any assumption for active management premium

Callan

# Simulated Financial Condition

# Simulate Financial Condition



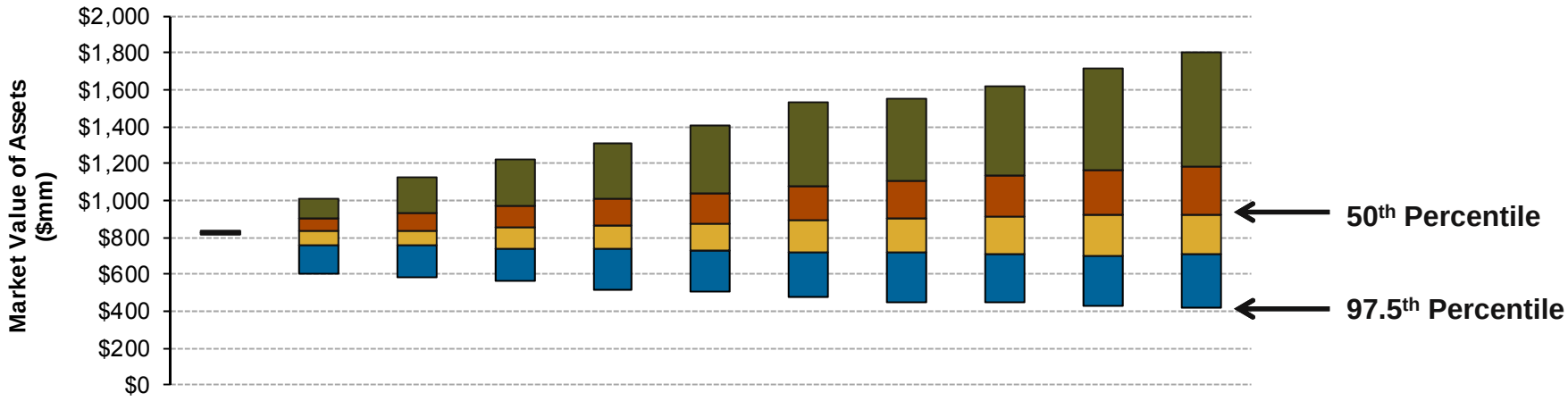

Generate 2,000 simulations per year, per asset mix to capture possible future economic scenarios and their effect on the portfolio

The simulation results are then ranked from highest to lowest to develop probability distributions

Projections are based on ***proposed*** assumptions and methodology

Target Mix and Mixes 1 – 5 are modeled

# Market Value of Assets (Current Target Mix) – TSRS




| Percentile | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.5th | $823 | $1,007 | $1,122 | $1,216 | $1,304 | $1,402 | $1,531 | $1,553 | $1,613 | $1,714 | $1,797 |
| 25th | 823 | 897 | 932 | 972 | 1,004 | 1,032 | 1,080 | 1,105 | 1,130 | 1,165 | 1,180 |
| 50th | 823 | 833 | 837 | 851 | 863 | 874 | 890 | 899 | 909 | 921 | 925 |
| 75th | 823 | 761 | 753 | 734 | 733 | 724 | 721 | 720 | 712 | 702 | 708 |
| 97.5th | 823 | 606 | 582 | 559 | 519 | 503 | 478 | 449 | 446 | 424 | 417 |
| Range | | 401 | 540 | 657 | 785 | 899 | 1,053 | 1,104 | 1,167 | 1,290 | 1,380 |

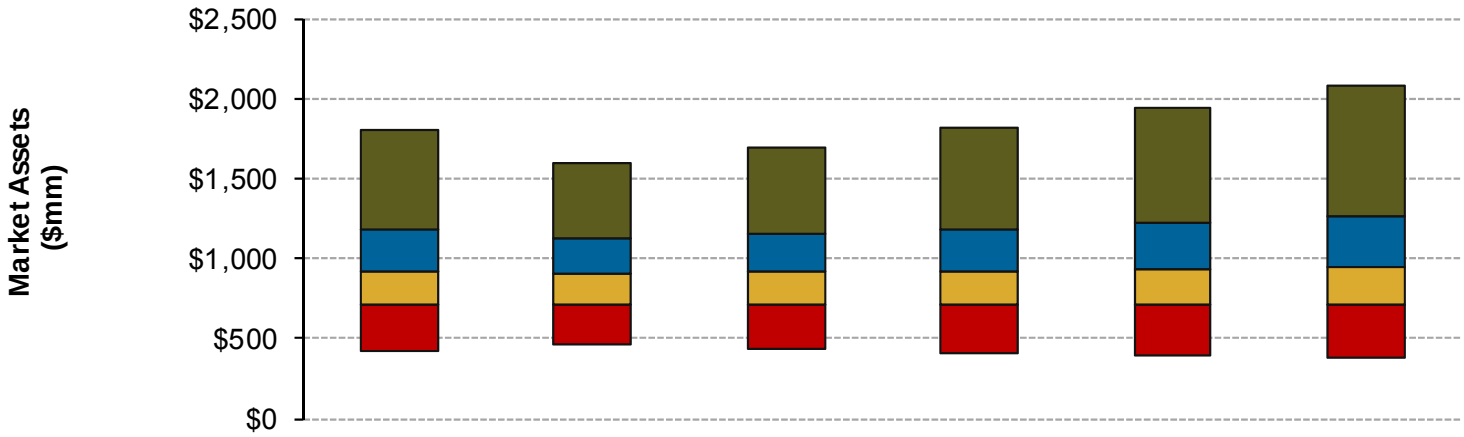
The expected outcome is the 50th percentile.

- There is a 50% chance that asset values will be above the value shown and a 50% chance that asset values will be below the value shown.

The worse-case scenario is the 97.5th percentile; a 1 in 40 chance of occurrence.

- For example, there is a 1-in-40 chance (2.5% probability) that the 6/30/2028 market value of assets will be $417M or less.

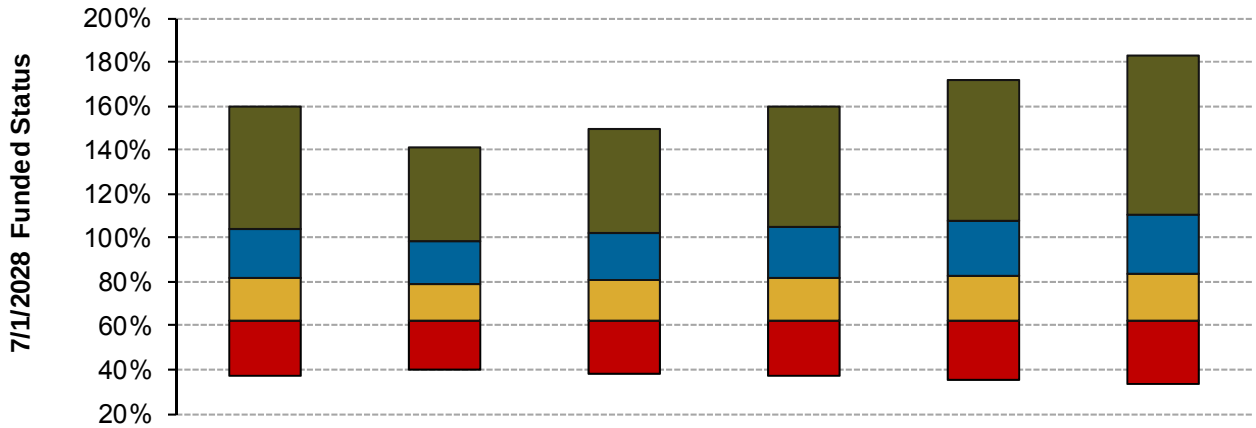
# 10-Year Ending (7/1/2028) Market Value of Assets – TSRS




| Percentile | Target | Mix 1 | Mix 2 | Mix 3 | Mix 4 | Mix 5 |
|---|---|---|---|---|---|---|
| **2.5th** | $1,797 | $1,593 | $1,698 | $1,816 | $1,938 | $2,079 |
| **25th** | 1,180 | 1,122 | 1,152 | 1,188 | 1,222 | 1,258 |
| **50th** | 925 | 898 | 912 | 925 | 938 | 953 |
| **75th** | 708 | 710 | 708 | 709 | 709 | 706 |
| **97.5th** | $417 | $457 | $439 | $412 | $397 | $383 |
| **Range** | 1,380 | 1,136 | 1,259 | 1,403 | 1,541 | 1,696 |
| **Downside** | -508 | -441 | -472 | -513 | -542 | -570 |

- More conservative mixes have lower asset values in the 50th percentile
  - Higher expected returns lead to higher asset values
  - Larger contributions for lower returning mixes can make up some of the difference
- More aggressive mixes generally have lower asset values in the 97.5th percentile
  - Greater volatility means larger losses in down investment markets
  - Larger contributions for poorer performing mixes can make up some of the difference

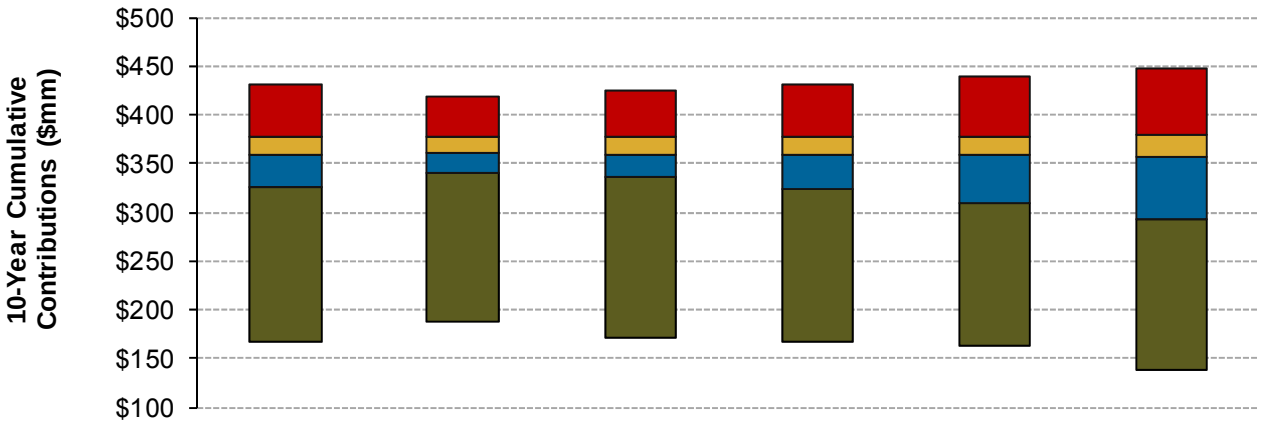
# 10-Year Ending (7/1/2028) Market Funded Status – TSRS




| Percentile | Target | Mix 1 | Mix 2 | Mix 3 | Mix 4 | Mix 5 |
|---|---|---|---|---|---|---|
| **2.5th** | 159% | 141% | 150% | 160% | 172% | 183% |
| **25th** | 104% | 99% | 102% | 105% | 107% | 110% |
| **50th** | 81% | 79% | 80% | 81% | 82% | 84% |
| **75th** | 62% | 62% | 62% | 62% | 62% | 62% |
| **97.5th** | 37% | 40% | 38% | 37% | 35% | 34% |
| **Range** | 123% | 101% | 111% | 123% | 136% | 149% |
| **Downside** | -44% | -39% | -42% | -44% | -47% | -50% |

- Funded Status = Market Value of Assets / Accrued Liability
  - 7/1/2018 Market Funded Status = 78% for the policy target
- Funded Status is expected (50th percentile) to increase from current level of 78% over the next 10 years for all asset mixes.
- More aggressive mixes are expected (50th percentile) to have a higher funded status at the end of 10 years but will have a lower funded status in a worse-case scenario (97.5th percentile).

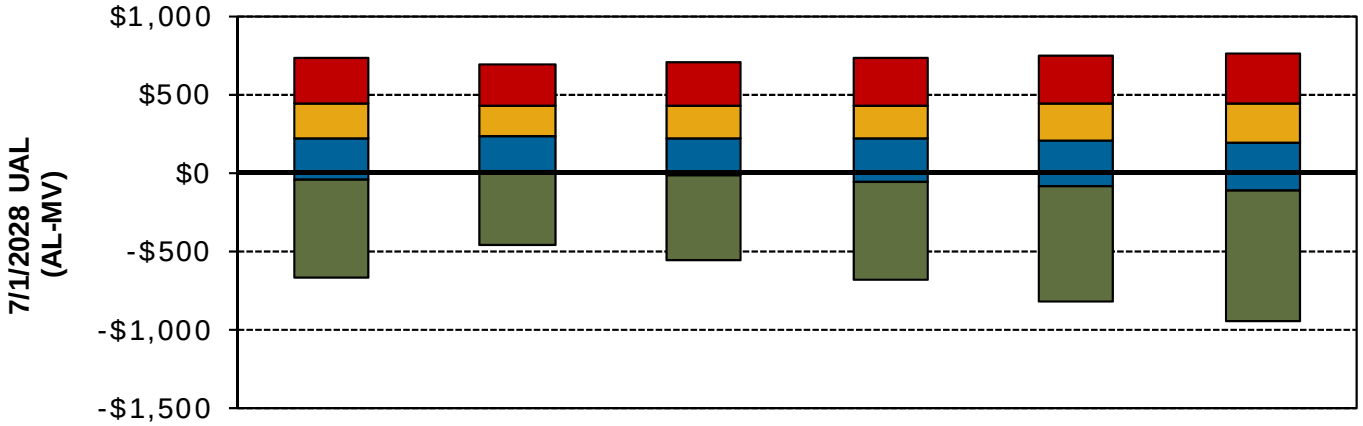
# 2019-2028 Cumulative Employer Contributions – TSRS




| Percentile | Target | Mix 1 | Mix 2 | Mix 3 | Mix 4 | Mix 5 |
|---|---|---|---|---|---|---|
| **97.5th** | $431 | $420 | $425 | $432 | $440 | $447 |
| **75th** | 378 | 378 | 378 | 378 | 378 | 379 |
| **50th** | 359 | 360 | 359 | 358 | 358 | 357 |
| **25th** | 326 | 341 | 336 | 323 | 309 | 293 |
| **2.5th** | 168 | 187 | 172 | 167 | 163 | 139 |
| **Range** | 264 | 233 | 253 | 264 | 276 | 308 |
| **Downside** | 73 | 60 | 66 | 73 | 82 | 90 |

- Contribution rate does vary for TSRS with asset performance, but only under certain circumstances.
- 10-year cumulative contributions are nearly the same for all asset mixes in the expected case, under the funding policy with a 27.5% of salary floor
  - 27.5% rate exceeds the required contribution using normal cost plus amortization of unfunded liability in the expected case outcomes. Higher contributions arise in adverse capital markets; a large unfunded liability pushes the required contribution > 27.5%.
  - The large difference between the positive tails of the distributions (best case outcomes) and the expected case comes from the full funding limit enabled in the model. If good capital market outcomes push the plan to 100% funded, the funding policy shifts from the 27.5% floor to normal cost plus amortization of the unfunded liability.

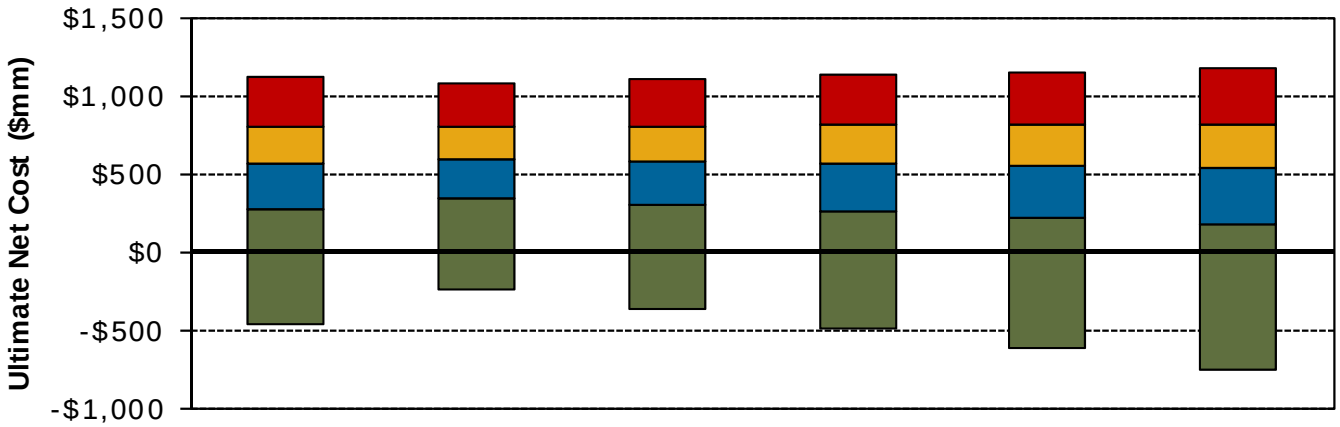
# 7/1/2028 Unfunded Liability




| Percentile | Target | Mix 1 | Mix 2 | Mix 3 | Mix 4 | Mix 5 |
|---|---|---|---|---|---|---|
| **97.5th** | $727 | $693 | $709 | $727 | $744 | $764 |
| **75th** | 434 | 430 | 429 | 433 | 434 | 435 |
| **50th** | 212 | 237 | 224 | 212 | 200 | 187 |
| **25th** | -46 | 15 | -20 | -52 | -83 | -119 |
| **2.5th** | -671 | -468 | -563 | -685 | -817 | -951 |
| **Range** | 1399 | 1160 | 1271 | 1412 | 1561 | 1714 |
| **Downside** | 515 | 455 | 485 | 515 | 544 | 577 |

- Unfunded Liability = Actuarial Accrued Liability – Market Assets
  - 7/1/2018 Unfunded Liability = $231 mm for the current target mix
- More aggressive mixes are better funded in the 50th percentile
  - Higher expected investment returns result in higher asset values given the liabilities
- More aggressive mixes are more poorly funded in the 97.5th percentile
  - Asset losses due to greater volatility leads to more underfunding

# Ultimate Net Cost – TSRS




| Percentile | Target | Mix 1 | Mix 2 | Mix 3 | Mix 4 | Mix 5 |
|---|---|---|---|---|---|---|
| **97.5th** | $1,124 | $1,084 | $1,105 | $1,128 | $1,150 | $1,172 |
| **75th** | 805 | 803 | 806 | 809 | 812 | 814 |
| **50th** | 570 | 599 | 584 | 569 | 551 | 535 |
| **25th** | 275 | 349 | 309 | 266 | 225 | 178 |
| **2.5th** | -466 | -236 | -360 | -484 | -618 | -757 |
| **Range** | 1590 | 1320 | 1465 | 1612 | 1768 | 1929 |
| **Downside** | 554 | 484 | 521 | 559 | 599 | 637 |

- Ultimate Net Cost (UNC) = 10-Year Cumulative Contributions + 7/1/2028 Unfunded Actuarial Liability
  - UNC captures what is expected to be paid over 10 years plus what is owed at the end of the 10 year period
  - Negative numbers indicate the plan is in a surplus position at 7/1/2028
- More aggressive mixes lower UNC in the expected case but result in a greater UNC in a worse case scenario

# Private Infrastructure

# Direct Infrastructure

## Benefits and Considerations

- Callan supports the current 5% allocation to infrastructure at the asset allocation level due to all of the benefits listed below
- TSRS has 14% in illiquid assets, which is reasonable given the plan dynamics
- Implementation is the primary challenge, from our perspective, with infrastructure
  - We like the characteristics of the asset class though they can be hard to capture
- TSRS should examine the available investment vehicles to gain comfort before continuing investment
- If TSRS approves the infrastructure allocation, a decision will need to be made on how to re-invest proceeds as the current closed ended funds mature

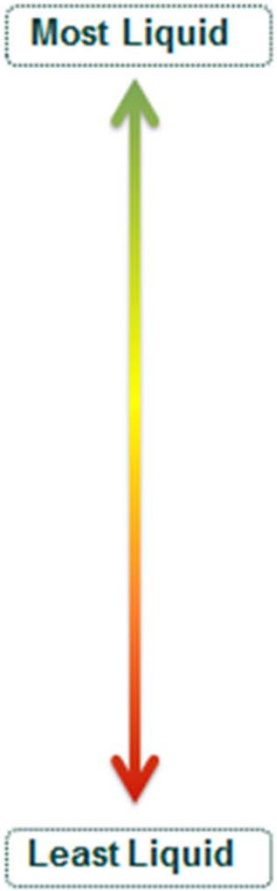
### Benefits

- Low correlation with traditional asset classes
- Stable income return
- Inflation sensitive
- Low observed volatility

### Considerations

- Relatively small investment manager universe
- Illiquidity
- High leverage
- Political—privatization headline news
- Limited availability of investments
- High fees relative to traditional investments

# Vehicles




**Listed Infrastructure**

- Managers who invest in publicly listed infrastructure assets
- Subject to equity market volatility

**Open-End Funds** – Private Market, Perpetual-Life Structure

- Investors register their interest to invest or exit with the Manager
- There may be times when investors have to wait to invest or divest, depending on the market cycle and length of the entrance or exit queue

**Closed-End Funds** – Private Market, Typically an 8-10 Year Structure

- These funds may operate for 10-15 years to source, acquire, execute and divest all assets
- Investors have few options to exit early

Callan

# Making A Decision

# Risk Metrics for TSRS

Simulation generates a range of potential outcomes for the financial condition of the Plan:

- Plan assets
- Liabilities
- Benefit payments
- Annual and cumulative dollar contributions
- Employer contribution rates
- Funded status

Key metric for TSRS:

- Contribution rate for employers: seeks strategies to stabilize financial condition of the plan
  - Probability of maintaining current 27.5% floor rate; reduce volatility of the rate around the current level

# Summary Observations

- The liability and demographic profiles suggest the Plan has a sufficiently long time horizon in which to assume investment risk
  - Plan is open and active. Average age of active employees is decreasing. Population is getting younger as older employees retire.
- Benefit payments are significant, but liquidity needs under the 27.5% funding policy are manageable and should not impact the Plan's asset allocation
  - Net outflow averages 5% over the next 20 years
  - Current allocation to illiquid investments is 14% (real estate and infrastructure)
  - TSRS has potential room for additional illiquid investments
    - *TSRS could maintain up to 15% in real assets exposure to diversify the plan's stocks and bonds, and to provide inflation-sensitive investments*
- Liability growth is moderate and slows over the next 10 years
  - Median liability growth (net of benefit payments) falls to 0.36% over the ten year horizon
  - Normal Cost is expect to fall over the next 20 years as new hires are placed in Tier II, bringing the cost of the plan down
  - Active liability, as a percentage of total liability, falls from 30% to 23% over the next 10 years
  - Liability volatility stems from inflation uncertainty feeding through future salary growth
- The current target is a well-diversified portfolio that includes exposure to stocks, bonds, real estate and infrastructure, and can be retained as a reasonable policy
- Capital market expectations represent passive exposure (beta only) to the capital markets with the exception of private markets where objective benchmarks don't exist.
  - Private real estate and infrastructure have some active management premium (alpha) embedded in the return expectation, which can help with the plan's reach for return.

# Summary Observations, continued

- Current funding policy with a 27.5% floor under employer contributions transmits capital market risk to plan asset values, and therefore funded status volatility
  - Policy allows contributions to adjust to market volatility but only when the market results are extreme
    - *The 27.5% floor is substantially greater than normal cost plus amortization of the unfunded liability*
    - *Positive capital market results that push funded status to 100% revert the funding policy back to normal cost plus amortization of the unfunded liability*
    - *Poor results can increase required funding beyond the 27.5% floor in the very worse case scenarios*
    - *Funded status volatility is higher under the 27.5% policy than under one without a floor, raising the probability of liquidity concerns in the very worse case outcomes*
- TSRS needs to pursue return in concert with the funding policy to maintain progress in closing the funding gap
  - Current target contains an appropriate tilt toward growth assets
  - Greater exposure to growth would increase the potential for return, at the cost of greater volatility. Given the sensitivity of funded status to capital market risk, we would not recommend increasing the exposure to growth assets for TSRS
  - Private equity is one of the few assets that is expected to generate higher return than public equity, and could be considered to diversify public equity. The higher expected return comes with different and higher risks, which could be balanced with a smaller allocation to overall growth assets.
    - *The added illiquidity and long time horizon require substantial education for the Board to understand the investment and to ensure ownership of the allocation.*
- Other strategies to manage risk and enhance risk adjusted return include shifts in the implementation of existing asset classes:
  - More active risk, tilts toward higher returning segments of asset classes such as small cap, emerging markets, core plus fixed income

## Is the Current Risk Posture Appropriate?

| Factor | Description | Supports risk taking? |
|---|---|---|
| **Return Objective** | • Achieve the Investment Return Rate of 7.0% over the long-term | **Yes** |
| **Time Horizon** | • Ongoing Plan – indefinite time horizon | **Yes** |
| **Liability Growth** | • Liabilities grow with normal cost and interest (7.0%)<br>• Interest cost is high but normal cost is declining<br>• Traditional final salary benefits with 2.25% accrual | **Some** |
| **Funded Status** | • Funding gap is narrowing and 10-year funded status is expected to improve under current funding policy and current target mix<br>• 7/1/2018 Market Funded status = 78% | **Some*** |
| **Contribution Risk** | • Funding policy does not reflect impact of poor investment except in extreme scenarios, and over the very long term<br>• Higher returns can pull forward achievement of full funding, when the employer contribution policy reverts to a much lower rate | **Some** |

** Some Plan Sponsors lean on a more aggressive asset allocation to assist with closing a Plan deficit over the long run. Of course, a more aggressive asset allocation can make the financial situation worse, if investment performance is worse than expected.*

# Conclusions

- The current asset allocation is diversified among broad asset classes and built to help TSRS meet liabilities and objectives over the long-term
- TSRS has made substantial progress since the last asset liability study was conducted in 2014
- Funded status has improved primarily from a healthy contribution policy with the goal of reaching full funding.
  - Investment results have been strong versus peers and the target benchmark and nearly achieved the 7.25% rate of return after fees. For five years ended 3/31/19, TSRS returned 7.1% versus the benchmark of 6.6%
- The Board provided responses to several survey questions in advance of the completion of this A/L study. When asked about risk, the Board indicated that funded status risk was the number one concern
- Funded status volatility increases with riskier asset mixes. With a strong contribution policy and a long time horizon is it prudent to take more risk with the assets?
- A challenge is that the expected return of the current asset allocation is 6.7% over the next 10-years, which is below the objective of 7.0%
  - The 6.7% does not include an active management premium, which could make up the difference
  - There is a 47% probability the current asset allocation will meet the return objective
  - The riskiest mix shown has a lower expected return than 7.0%
- When considering risk the key factors TSRS should consider are:
  - What is the expected return in the median case versus the worst case?
  - How does investment volatility impact funded status in the median and worst case?
  - With a strong contribution policy already in place, what are the pros and cons of changing the risk profile of the assets?

# Disclaimers

*This report is for informational purposes only and should not be construed as legal or tax advice on any matter. Any decision you make on the basis of this content is your sole responsibility. You should consult with legal and tax advisers before applying any of this information to your particular situation.*

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# MEMORANDUM

**DATE:** August 12, 2019

**TO:** The Board of Trustees
Tucson Supplemental Retirement System

**FROM:** Art Cuaron
Pension & Benefits Administrator

**SUBJECT: Post Retirement Benefit Increase (PRBI) Research**

This item is for informational purposes only.

Attached to this memo are the various research documents that the Board has requested as a means of further education regarding how other pension plans are dealing with COLA's and "13th check" payments to retired members. The NCPERS Study has pertinent information related to COLA's on pages 14 and 15.

I anticipate further dialog from the Board prior to making a determination as to the Board's desire to continue with the existing PRBI policy.

Attachment: GRS PRBI Research
NASRA Issue Brief – COLAs
NCPERS Public Retirement Systems Study

# PRBI Research Provided by GRS

There is some good information on COLAs on pages 14 and 15 of the 2018 NCPERS Public Retirement Systems Study.

TSRS retirees do have some level of indexing of their retirement benefits because of the increases provided to their Social Security benefits.

We have summarized the COLA being provided by five relatively similar sized plans across the country:

- City of Phoenix ERS **(Funded Ratio 58%)**
    - Tier 1 and 2 (Hired before 1/1/2016) – COLA tied to investment returns in excess of 8% no to exceed the Phoenix Area CPI
    - Tier 3 – (Hired after 1/1/2016) – No COLA
- Denver Employee Retirement Plan **(Funded Ratio 68%)**
    - Given on an ad-hoc basis
    - There have been no cost of living increases since 2002
- Dallas ERS **(Funded Ratio 80%)**
    - Tier A – Tied to the change in CPI limited to 5%
    - Tier B – Tied to the change in CPI limited to 3%
- Seattle ERS **(Funded Ratio 70%)**
    - 1.5% annual COLA
- City of Las Vegas (One of the larger employer's participating in NVPERS) **(Funded Ratio 75%)**
    - Members with an effective date of membership before January 1, 2010 - 2% per year following the third anniversary of the commencement of benefits, 3% per year following the sixth anniversary, 3 ½% per year following the ninth anniversary, 4% per year following the twelfth anniversary and 5% per year following the fourteenth anniversary
    - Members with an effective date of membership on or after January 1, 2010 and prior to July 1, 2015 – Same as above except increases are limited to 4%.
    - members with an effective date of membership on or after July 1, 2015 - 2.0% per year following the third through fifth anniversaries of the commencement of benefits, 2.5% for years six through eight, and CPI increases thereafter.

Compound COLAs tend to be a very expensive benefit. A plan that pays a 3% compound COLA might be around 30-35% more expensive than a plan that pays base benefits. Many plans that had COLAs prior to 2008, removed them because it was the one place that they found legal ability to reduce benefits for current actives and retirees.

Regarding comparative benefit levels, that can be difficult to tease out because there are so many factors that play into it. Benefit multiplier tends to be the most straightforward (but even there you can have tiered multipliers), early and normal retirement eligibility (which is often not a straightforward comparison ), COLAs, etc.

Although not a perfect measure, generally the best way to be able to compare the total benefit package is to compare normal costs. It's still not a perfect measure because each plan has their own assumption set which is more or less conservative, but it's generally the best place to start.

Based on the experience study results, TSRS's normal cost for the most recent tier is around 11%. Phoenix's normal cost for their most recent tier is around 13%. Denver's normal cost is around 10%.

# PRBI Research Provided by GRS

Dallas is up over 20% but recently implemented a new tier. The new tier still does have a 2.5% multiplier and a CPI related COLA so is still a comparatively generous benefit.

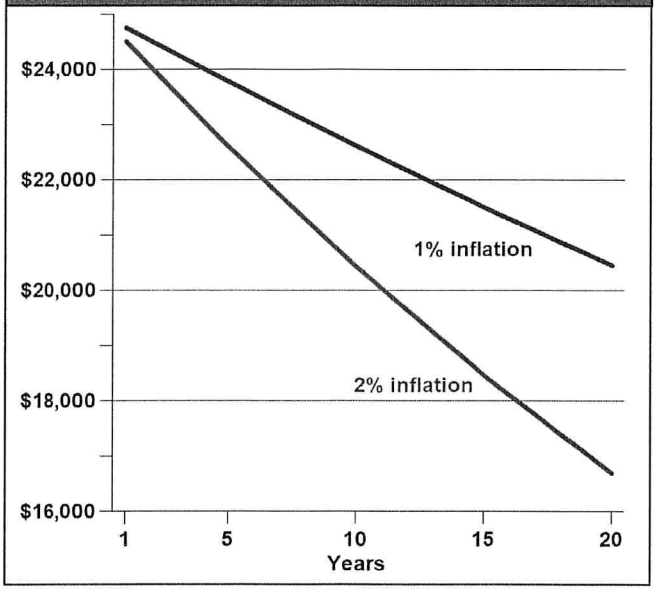
# NASRA Issue Brief:
# Cost-of-Living Adjustments

**December 2018**

NASRA

**Periodic cost-of-living adjustments (COLAs) in some form are provided on most state and local government pensions. The purpose of a COLA is to wholly or partly offset the effect of inflation on retirement income. Considerable variation exists in the way COLAs are designed, and in many cases they are determined or affected by other factors, such as the actual rate of inflation or the financial condition of the plan. COLAs add both value and cost to a pension benefit. Public pension COLAs have received increased attention in recent years as many states look to make adjustments to the cost of benefits amid challenging fiscal conditions and the current low-inflationary environment. This brief presents a discussion about the purpose of COLAs, the different types of COLAs provided by government pension plans, and an overview of recent state changes to COLA provisions.**

Figure 1: Impact of 20 years of inflation on purchasing power of $25,000




## COLA Purpose

A COLA is provided to offset or reduce the effects of inflation, which erodes the purchasing power[1] of retirement income, as illustrated in Figure 1. Using two hypothetical inflation rates, after 20 years, the real (inflation-adjusted) pension benefit in this example of $25,000 falls to $20,488 (82 percent of its original value) or $16,690 (67 percent of its original value), depending upon the actual rate of inflation.

Such depreciation can affect the sufficiency of retirement benefits, particularly for those who are unable to supplement their income due to disability or advanced age. As Social Security beneficiaries receive an annual COLA to maintain recipients' purchasing power, tied to a measure of inflation,[2] many state and local governments also provide an adjustment to their retirees' pension benefit that is intended to offset the effects of inflation. This adjustment is particularly important for those public employees – including nearly half of public school teachers and most public safety workers – who do not participate in Social Security. Unlike Social Security, however, state and local retirement systems typically pre-fund the cost of a COLA over the working life of an employee to be distributed annually over the course of his or her retired lifetime.

## Common COLA Types and Features

The way in which public pension COLAs are calculated and approved varies considerably. Appendix A presents a listing of COLA provisions for many state retirement plans, illustrating the variety that exists in COLA plan designs. In general, COLA types and features are differentiated in the following ways:

### *Automatic vs. Ad hoc*

An overarching distinction among COLAs is whether they are provided automatically or on an ad hoc basis. An ad hoc COLA requires a governing body to actively approve a postretirement benefit increase. By contrast, an automatic COLA

[1] Purchasing power refers to the effect of inflation on the value of currency over time, calculated for the purpose of determining the amount of goods or services a unit of currency can buy at different points in time

[2] Social Security Administration, Latest Cost-of-Living Adjustment, https://www.ssa.gov/OACT/COLA/latestCOLA.html

occurs without action, and is typically predetermined by a set rate or formula. In some cases, ad hoc COLAs are contingent on other factors, such as a maximum unfunded liability amortization period.

### *Simple vs. Compound*

Another distinction between COLA types is whether the increase is applied in a simple or compound manner. Under a simple COLA arrangement, each year's benefit increase is calculated based upon the employee's original benefit at the time of his or her retirement. Under a compound COLA arrangement the annual benefit increase is calculated based upon the original benefit as well as any prior benefit increases. Some COLAs contain both features, i.e., they may be "simple" until the retiree reaches a certain age or year retired, at which point COLA benefits are calculated using a compound method.

### *Inflation-based*

Many state and local governments provide a post-retirement COLA based on a consumer price index (CPI), which is a measure of inflation. Most provisions like this restrict the size of the adjustment, such as by "one-half of the CPI" and/or "not to exceed three percent." The most recognized CPI measures are calculated and published by the U.S. Bureau of Labor Statistics (BLS), and the CPI measures used by most public pension plans are either the CPI-U (based on all urban consumers) and the CPI-W (urban wage earners and clerical workers). Some states use state- or region-specific inflation measures to determine the amount of the COLA.

**Table 1: Select public plans by COLA type**

| | Linked to inflation | Linked to investment or funding condition | Fixed percentage or other factor | Total |
|---|---|---|---|---|
| **Automatic** | 47 | 10 | 15 | 72 |
| **Ad-hoc** | 5 | 0 | 23 | 27 |
| **Total** | 52 | 10 | 38 | 99 |

*Note:* COLAs for some employees of local governments who participate in statewide systems are discretionary based on the decision of individual local government. See Appendix A for more details.

### *Performance-based*

Some public pension plans tie their COLA to the plan's funding level or investment performance. In one statewide system, for example, the COLA falls within a range and is tied to CPI, based on the funding level of the plan. Annuitants with another state system receive a permanent benefit increase tied to their length of service, when the fund's actuarial investment return exceeds the assumed rate of investment return.

### *Delayed-onset or Minimum Age*

Another characteristic contained in some automatic COLAs is to delay its onset, either by a given number of years or until attainment of a designated age. A COLA with this feature may also take on any of the characteristics stated above and will become available to a retiree once he or she meets the designated waiting period or age requirement.

### *Limited Benefit Basis*

Some retirement systems award a COLA calculated on a portion of a retiree's annual benefit, rather than the entire amount. For example, one system provides a COLA of up to three percent applied to only the first $13,000 of benefit. In such cases, the COLA can also be tied to an external indicator, such as CPI, and other factors, such as delayed onset, may also be in place.

### *Self-funded Annuity Option*

Some state retirement plans offer post-retirement benefit increases through an elective process known as a self-funded annuity account. Under this design a member effectively self-funds his or her COLA by choosing to receive a lower monthly benefit in exchange for a fixed rate COLA to be paid annually upon retirement.

### *Reserve Account*

Other public retirement systems pay COLAs from a pre-funded reserve account. This is a variation on the COLA tied to investment performance since the reserve account is funded with excess investment earnings. Under this scenario a COLA is provided from the funds set aside in the reserve account. Sometimes there is a stipulation attached that the fund itself must reach a certain size for any COLA to be granted in a given year.

# 2018 NCPERS
# Public Retirement Systems Study

January 30, 2019

Study conducted by the
National Conference on Public Employee Retirement Systems and
Cobalt Community Research

# Table of Contents

*This study reviews funds' current fiscal condition and steps they are taking to ensure fiscal and operational integrity.*


| | |
|---|---|
| Overview | 3 |
| Who Responded | 5 |
| Fund Confidence | 7 |
| Expenses | 8 |
| Actuarial Assumptions | 10 |
| Trends in Plan Changes | 13 |
| Trends in Retirement Benefits | 14 |
| Cost-of-Living Adjustments | 15 |
| Trends in Business Practices | 16 |
| Trends in Engagement | 17 |
| Trends in Communication | 18 |
| Trends in Oversight Practices | 19 |
| Investment Returns | 20 |
| Investment Asset Allocation | 22 |
| Funding Levels | 24 |
| Sources of Funding | 26 |
| Health Plans | 27 |
| Reducing Liability | 28 |
| Innovations/Best Practices | 31 |
| Appendix A: Other Investments | 34 |
| Appendix B: 2018 Study Instrument | 36 |

# Overview

*Over the last eight years, responding funds have continued to adapt and address the concerns and challenges surrounding public pensions.*

***About Cobalt Community Research***

*Cobalt Community Research is a nonprofit research coalition created to help governments, local schools, and other nonprofit organizations measure, benchmark, and manage their efforts through analysis of demographics, population segmentation, and high-quality, affordable surveys and focus groups. Cobalt is headquartered in Charlotte, Michigan.*

**Executive Summary**

From September to December 2018, the National Conference on Public Employee Retirement Systems (NCPERS) undertook a comprehensive study exploring retirement practices of the public sector. In partnership with Cobalt Community Research, NCPERS has collected and analyzed the most current data available on funds' fiscal condition and steps they are taking to ensure fiscal and operational integrity.

The *2018 NCPERS Public Retirement Systems Study* includes responses from 167 state and local government pension funds with more than 18.7 million active and retired members and assets exceeding $2.5 trillion in actuarial assets and $2.6 trillion in market assets. The majority (62 percent) were local pension funds, while 38 percent were state-wide pension funds.

NCPERS is the largest trade association for public sector pension funds, representing more than 500 funds throughout the United States and Canada. It is a unique, nonprofit network of public trustees, administrators, public officials, and investment professionals who collectively manage $3 trillion in pension assets. Founded in 1941, NCPERS has been the principal trade association working to promote and protect pensions by focusing on advocacy, research, and education for the benefit of public sector pension stakeholders.

To access the interactive *2018 NCPERS Public Retirement Systems Study* dashboard, please contact Amanda Rok, communication and social media manager, at Amanda@NCPERS.org.

To view previous editions of this report, please visit: www.NCPERS.org/surveys.

## 2018 Key Findings

1. Funding levels continue to rise despite more conservative actuarial assumptions. For funds reporting in both 2017 and 2018, the average funded level rose more than 3 percent to 72.2 percent. The average funded level for all funds rose from 71.4 percent to 72.6 percent.

2. The average investment assumption is 7.34 percent compared to 7.49 percent in 2017. About 83 percent of funds that responded in 2018 have reduced their assumption or are considering doing so.

3. The one-year investment returns averaged 13.4 percent for plans reporting in 2018, well above 7.8 percent reported in 2017. The five- and 10-year returns were also higher, and the 20-year returns averaged 7.2 percent.

4. The market value of fund assets continues to exceed the actuarial value of assets for the 2018 respondents, and the one-year, five-year, and 20-year investment returns are near or above investment assumptions.

5. Funds continue to become more conservative in their assumptions. In addition to lower investment return assumptions, amortization periods have shortened from 23.8 years to 22.4 years. In addition, the percentage of plans using a closed/fixed amortization has increased from 62 percent to 73 percent.

6. Despite more conservative assumptions, contribution rates have been stable. Employer contribution rates declined from 21 percent to 20 percent of payroll for those funds that responded in both 2018 and 2017. Employer contribution rates were flat for all funds reporting in both 2018 and 2017.

7. The trend of public funds remaining cost-effective continues. For funds reporting in both 2017 and 2018, the average expense (total of administrative and investment) remained flat at 60 basis points (100 basis points equals 1 percentage point). For all funds, the total expense is 60 basis points, compared with 55 basis points in the prior year. According to the *2018 Investment Company Fact Book*, the average expenses of equity funds average 59 basis points and hybrid funds average 70 basis points. This means public funds with lower expenses provide a higher level of benefit to members for each dollar invested and produce a higher economic impact for the communities those members live in.

8. In 2018, about 46 percent are offering a health plan or subsidy and 54 percent do not. In 2017, only about 40 percent offered a plan and 60 percent did not. There has been an increase in the inclusion of actives and retirees by 6 and 3 percent, respectively; however, inclusion of beneficiaries dropped by 5 percent compared with 2017.

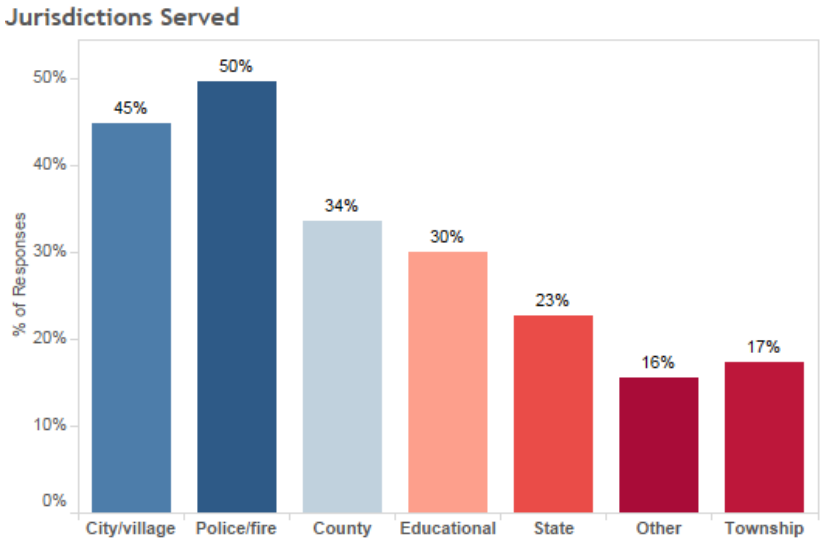
# Who Responded

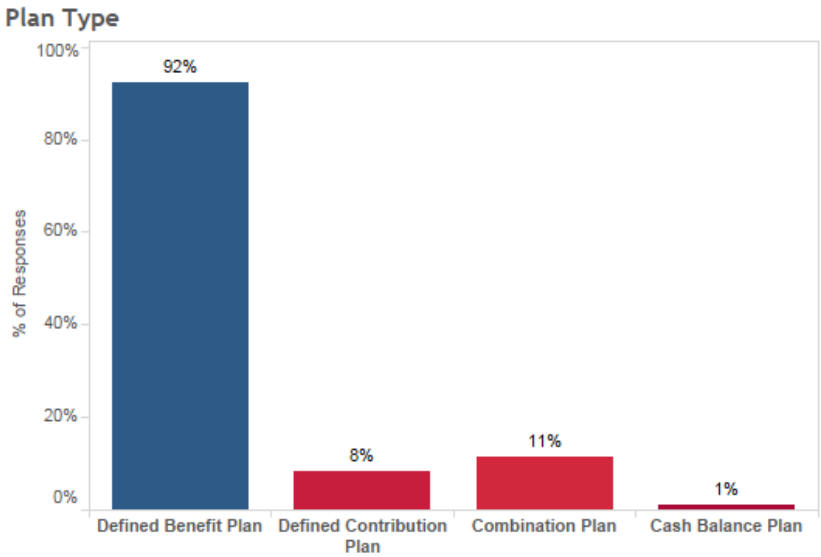
There were 167 public retirement funds that responded to the *2018 NCPERS Public Retirement Systems Study*. There were 163 respondents in 2017.

Of the 167 respondents, 98 also completed the study in 2017.

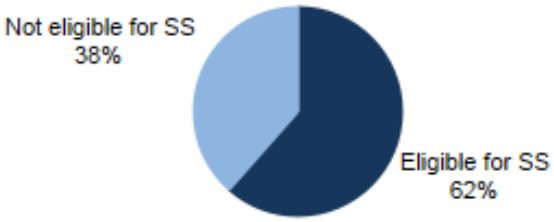
About 45 percent of all 2018 responding funds serve city and village employees and beneficiaries. About 50 percent of the responding funds serve police and fire employees. The top graph shows the distribution of employee types served by the funds. The bottom graph shows response by type of plan provided. Totals may exceed 100 percent because of multiple responses.

The overall distribution of responding funds is similar to prior years; however, there was a 10 percent increase in the number of educational funds and a 6 percent decrease in county funds.



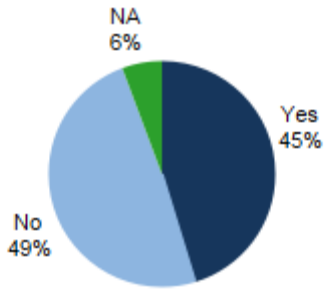
## Members' Social Security Eligibility




About 62 percent of responding funds have members who are eligible for Social Security, and 38 percent are not eligible. In this report, breakdowns are presented for "eligible for Social Security" and for "not eligible for Social Security."

Funds whose members are not eligible for Social Security tend to offer higher levels of benefits to make up for the loss of income typically supplemented by Social Security.

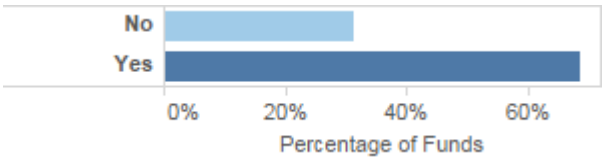
## Includes Overtime in Benefit Calculation



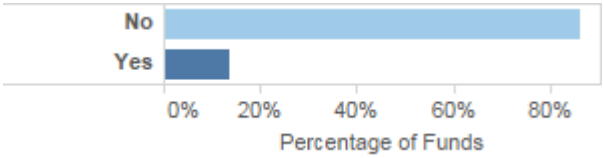

Inclusion of overtime in the calculation of a retirement benefit has been an area of interest to public funds.

According to the 2018 study, 45 percent of respondents include overtime in the benefit calculation, which is the same as last year.

## Call and Vote via Conference Call




## Discussed State Plan for Private Sector




The ability for Board members to participate and vote by phone has grown from 58 percent in 2017 to 69 percent.

The percentage of funds that have been consulted about, been involved in, or had internal discussions about a state-sponsored retirement program for the private sector is about the same as in 2017: 14 percent.

# Fund Confidence

The study asked respondents "How satisfied are you with your readiness to address retirement trends and issues over the next two years?" Respondents provided an overall "confidence" rating of 8.1 on a 10-point scale (very satisfied = 10). This is about the same as the 8.0 reported last year and well above the 7.4 in 2011.

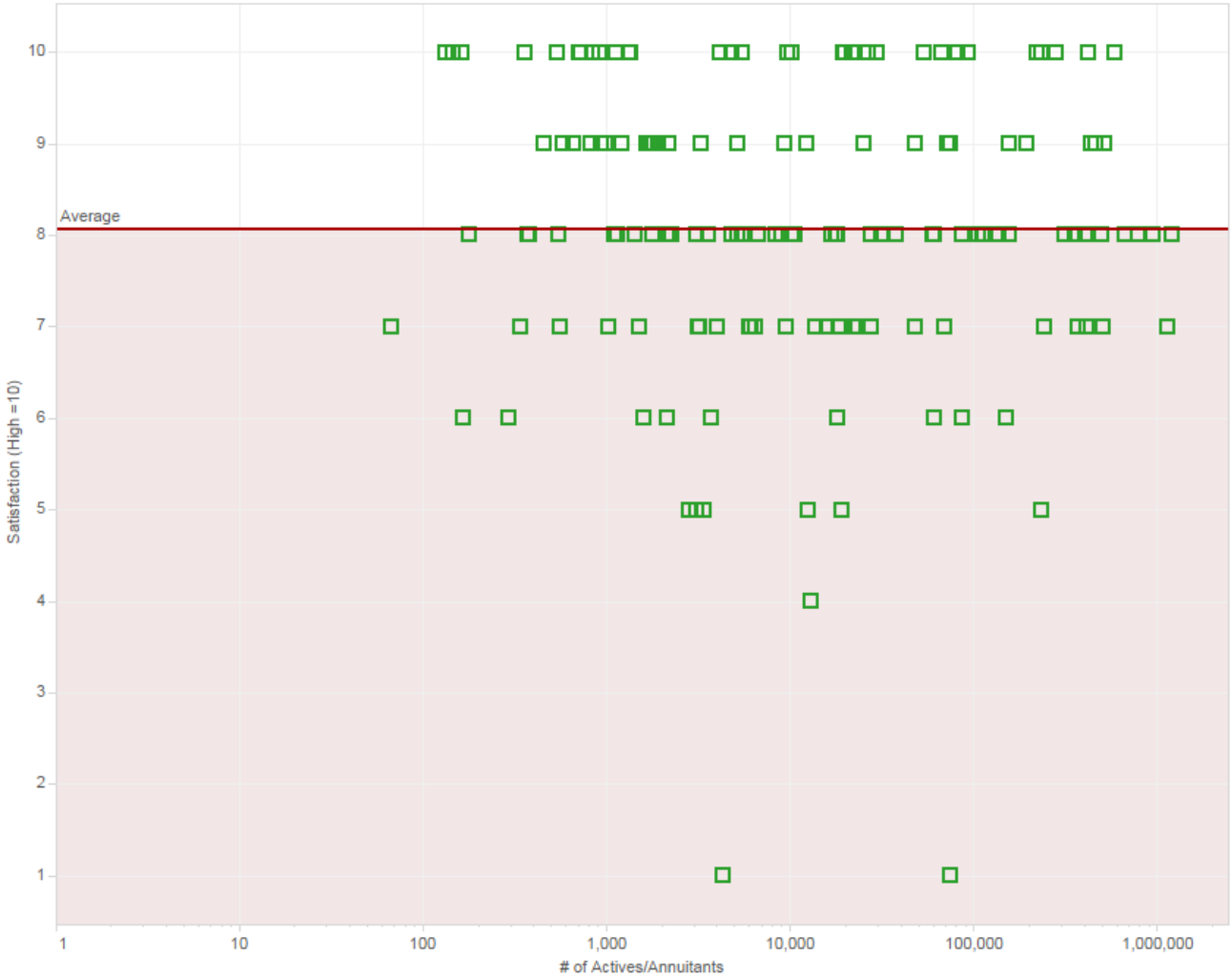
Over the last eight years, responding funds have become increasingly confident in their ability to adapt and address issues in this volatile environment surrounding public pensions.

Responding funds have been proactive in making changes to their plan assumptions and benefits to ensure sustainability.

Social Security eligible and not eligible funds rated this question 8.0 and 8.1, respectively.

**Fund Confidence**

How satisfied are you with your readiness to address retirement trends and issues over the next two years? (Scale 1 to 10)



# Expenses

The overall average expense for all respondents to administer the funds and to pay investment manager fees is 59.7 basis points (100 basis points equals 1 percentage point). This is an increase from 55.3 basis points in the prior year.

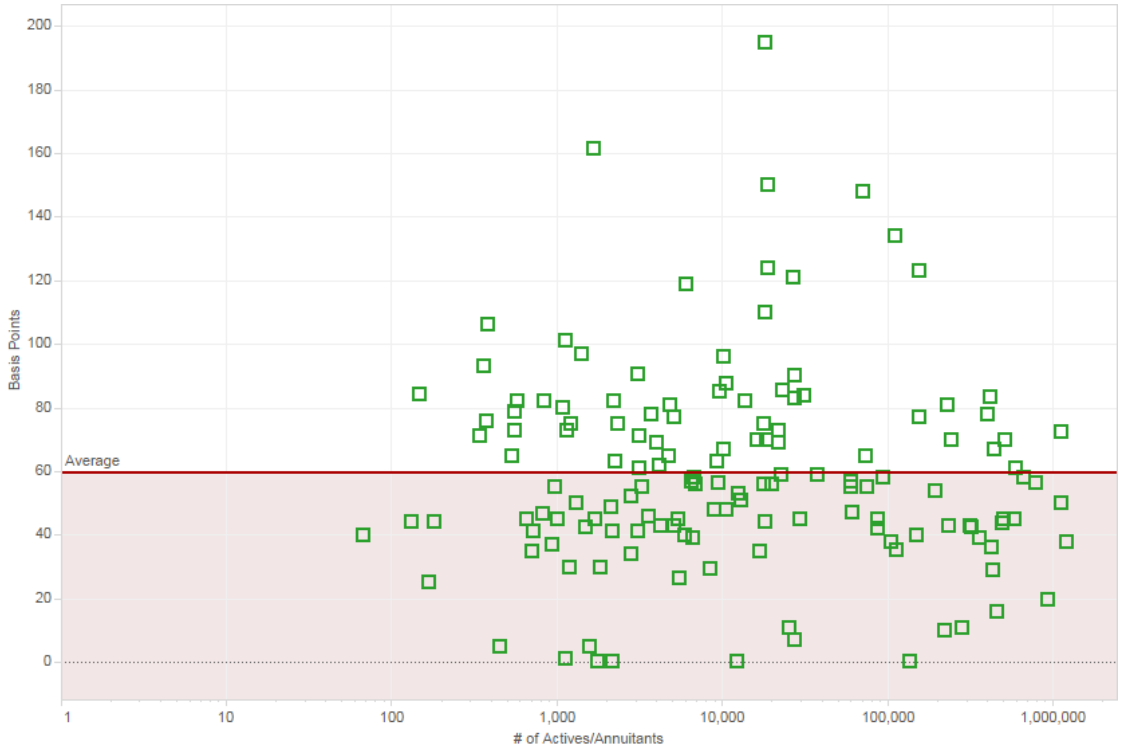
According to the *2018 Investment Company Fact Book*, the average expenses of most equity funds average 59 basis points and hybrid funds average 70 basis points.

Based on the data, funds continue to contain expenses by automating processes, gaining workflow efficiencies, and negotiating fee structures with investment managers.

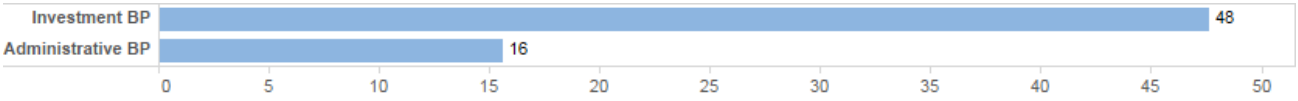
The top graph shows distribution of total expenses (in basis points) on the vertical axis and the size of the fund (by total participants) on the horizontal. The red line represents average expense.

The bottom graph shows average administrative and investment expenses. Note: the averages below do not total the average expense above because not all plans reported both investment and administrative numbers.

**2018 Total Plan Expense by Fund Size**

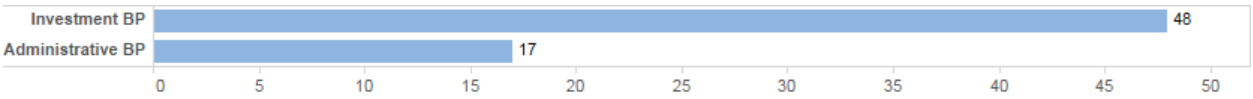



**2018 Study Plan Expenses (Basis Points)**

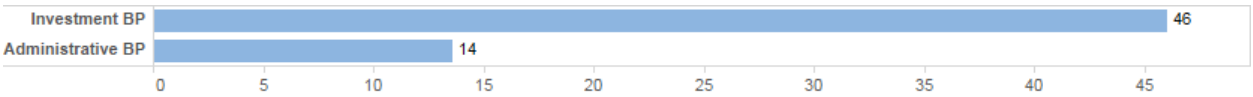


Below are expenses separated by funds eligible for Social Security and not Social Security eligible. Total expenses are 62.3 and 55.8, respectively. Investment expenses were slightly above last year, while administrative expenses were slightly lower.

**Plan Expenses: Social Security Eligible**

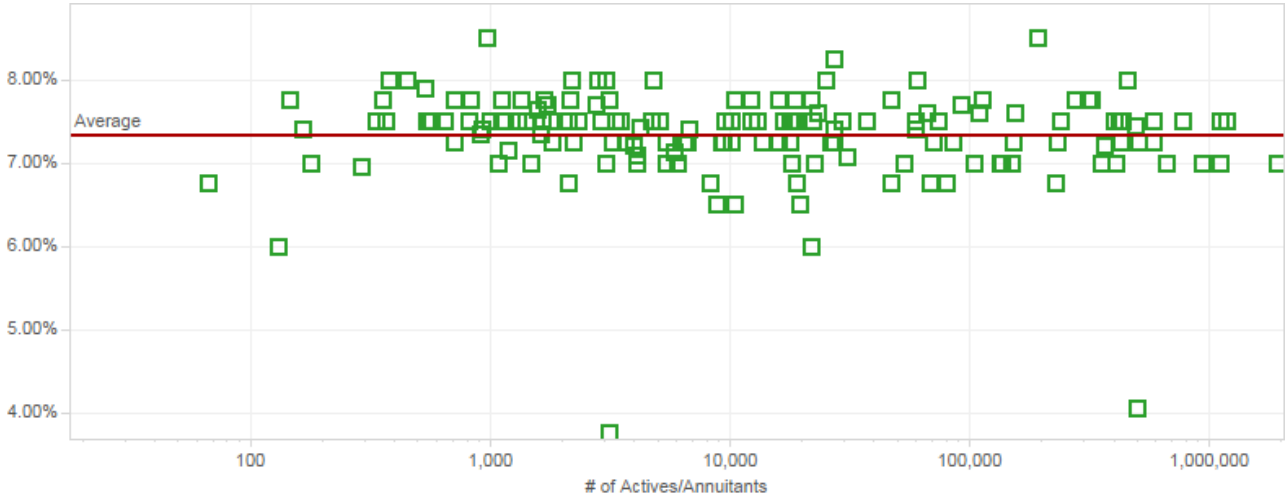



**Plan Expenses: Not Social Security Eligible**



# Actuarial Assumptions

**Investment Assumption**



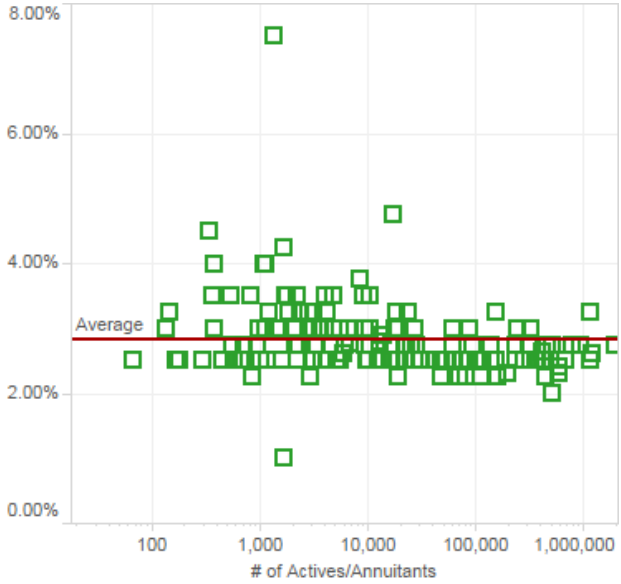

Retirement funds utilize a long-term planning horizon to ensure liabilities are fully funded at the time the liability is due to be paid. To help a fund set contribution rates and measure progress toward meeting its financial obligations, funds make actuarial assumptions to estimate what investment and demographic experience is likely to be over that time horizon.

Such assumptions have powerful effects on the funded level of a plan and what the required contributions will be to pay for future benefits. Assumptions that are overly optimistic (high market returns, lower-than-expected retirement rates) tend to increase a plan's funded level and reduce the contribution rates an employer is obligated to pay today. Conversely, overly pessimistic assumptions reduce the funded level and increase short-term contribution rates.

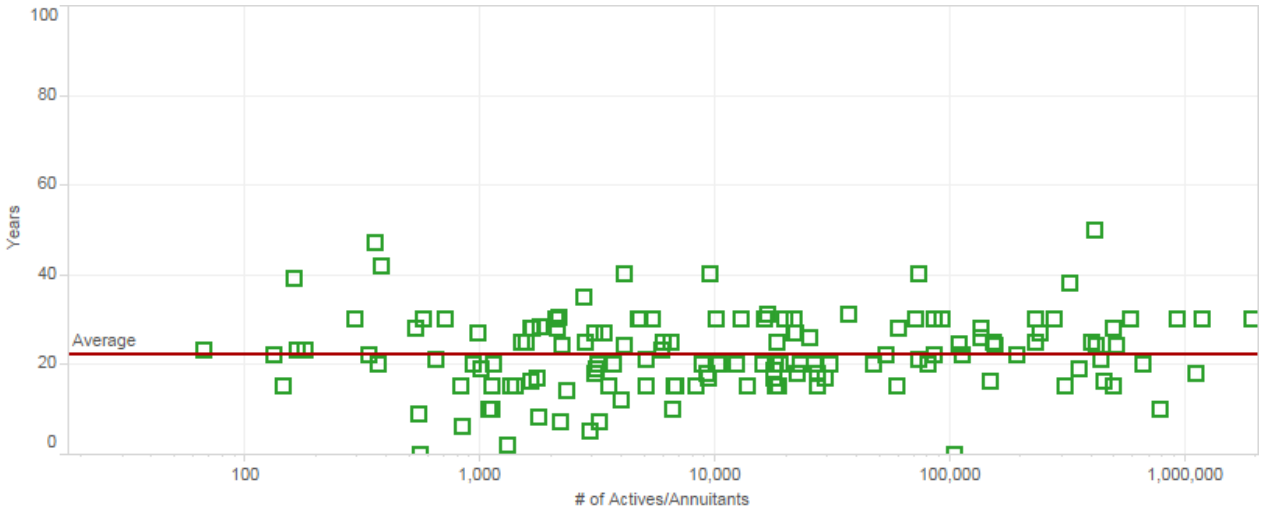
The average investment assumption for responding funds is 7.34 percent compared with 7.47 percent last year. However, about 83 percent of funds that responded in 2018 reduced their assumption or are considering doing so.

The aggregated inflation assumption is 2.8 percent, which is about the same as last year.

**Inflation Assumption**



## Amortization Period




Pension funds are designed to fund liabilities over a period of time, which ensures long-term stability and makes annual budgeting easier through more predictable contribution levels.

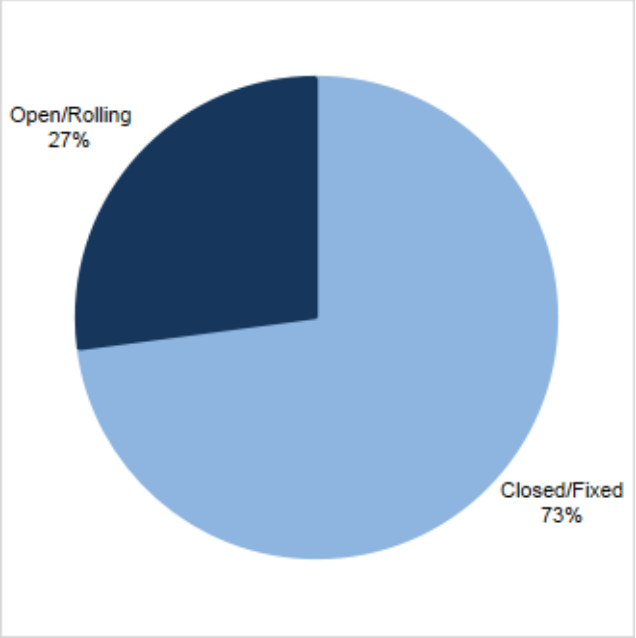
For responding funds, that period of time averages to 22.4 years, which is below the 23.8 years of 2017.

Groups can tighten their amortization period by adjusting the period in years or using a fixed (or closed) method which pays all liabilities in a fixed time frame.

Open (or rolling) amortization periods are used to determine the actuarially required payment, but they are recalculated each year. The same number of years is used in determining the payment each year. The percentage of closed/fixed funds increased from 62 percent to 73 percent.

Seventy-seven percent of Social Security eligible funds have a closed amortization period, while 66 percent of not eligible funds have a closed period.

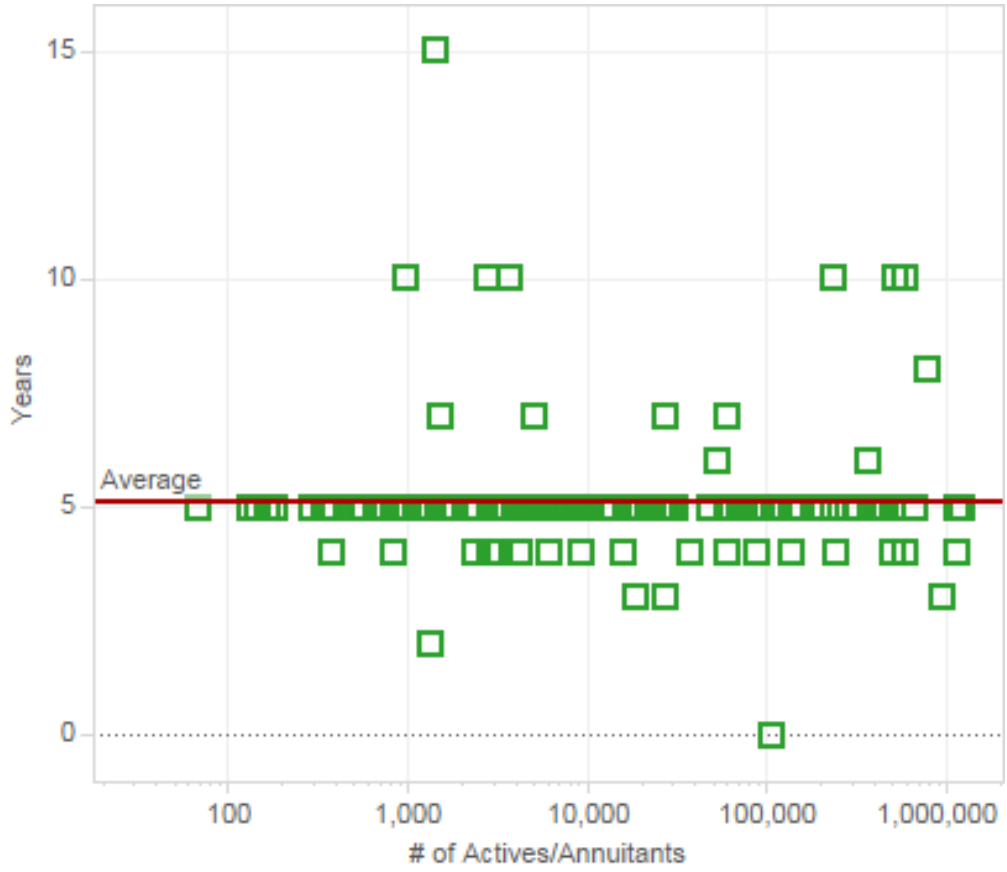
## Type of Amortization Period



The investment-smoothing period is a key factor in calculating the assets currently held by the fund and the contribution levels required to continue moving toward full funding over the amortization period. By smoothing investments, funds are able to dampen sharp changes in short-term investment returns. This helps stabilize contribution levels over time without undermining the long-term integrity of the funding mechanism.

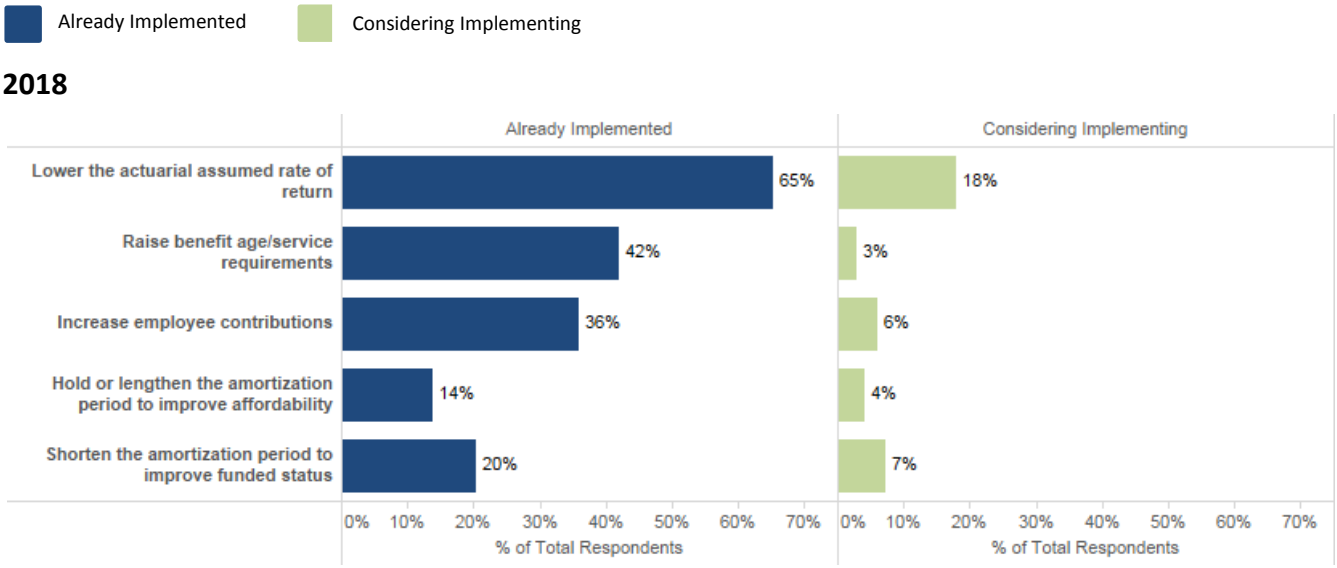
The average investment-smoothing period for respondents is 5.1 years, which is nearly the same as last year's 5.0. The distribution of responding funds on the graph below shows the majority have five-year smoothing periods or fewer. For Social Security eligible funds, the smoothing period averages 5.3 years. Not Social Security eligible plans have an average smoothing period of 4.8 years.

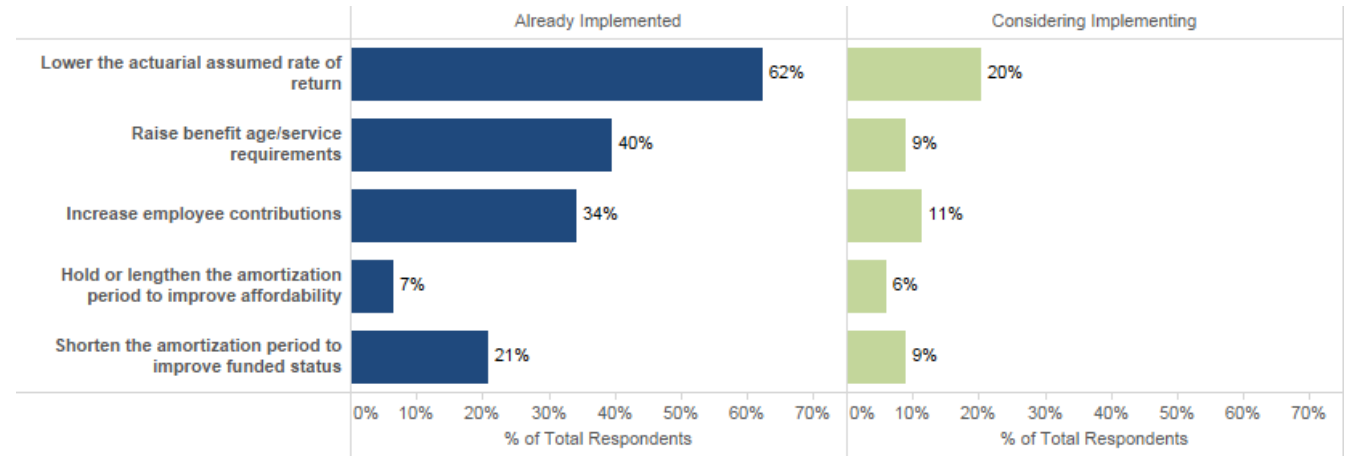
**Investment Smoothing**



# Trends in Plan Changes

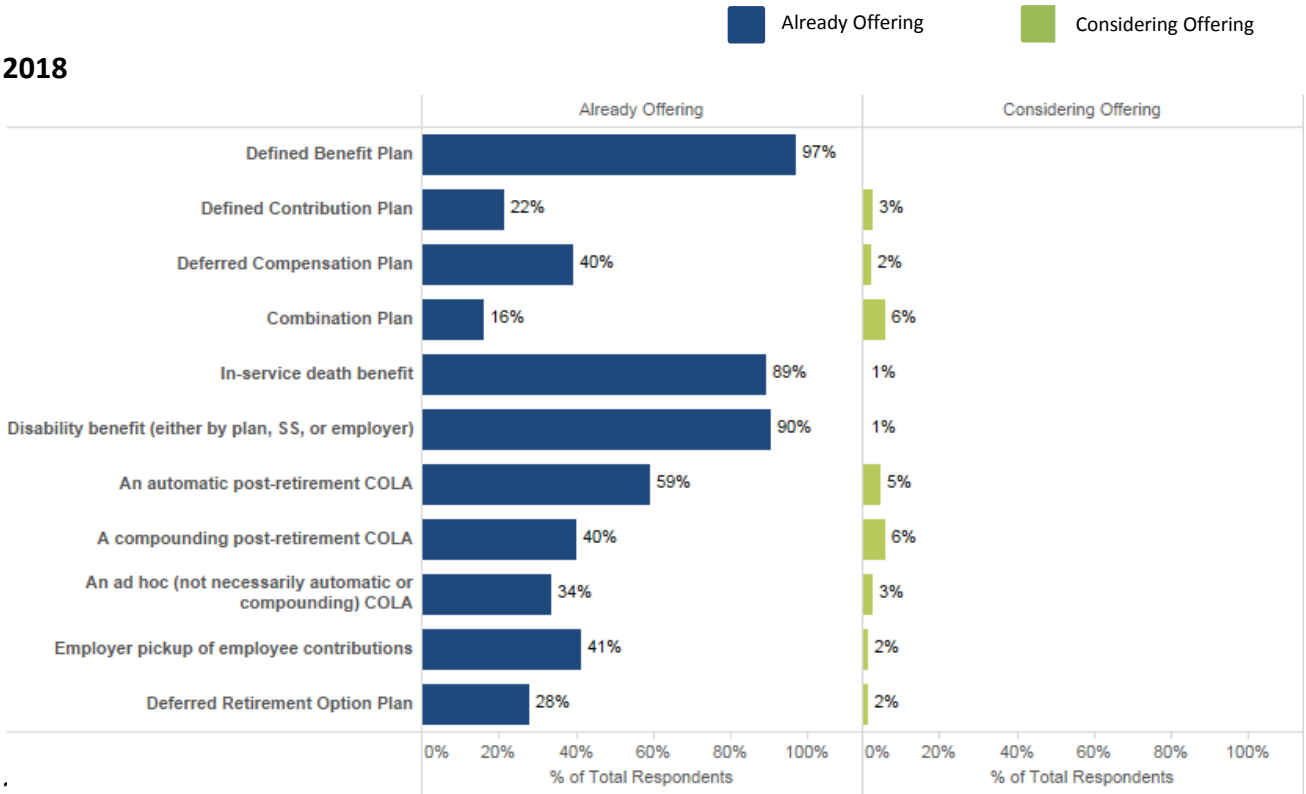
As changes emerge in the political, economic, and demographic landscape, funds are adapting their design and assumptions to respond and to maintain the sustainability of the plans. It is important to note more than 80 percent of all responding funds are considering or have lowered their actuarial assumed rate of return.

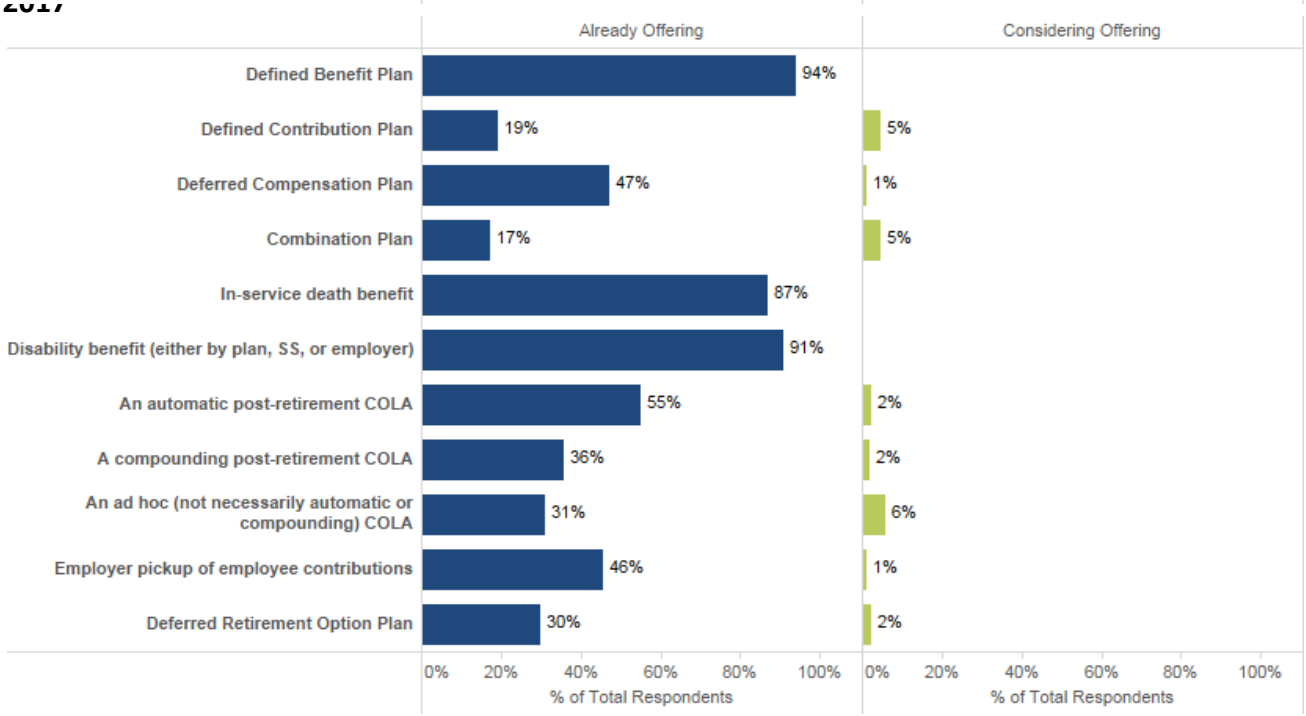


# Trends in Retirement Benefits

There is minimal activity in terms of responding funds considering offering additional benefits to their members. Most funds provide a disability benefit, in-service death benefit, and some variation of a cost-of-living adjustment (COLA).



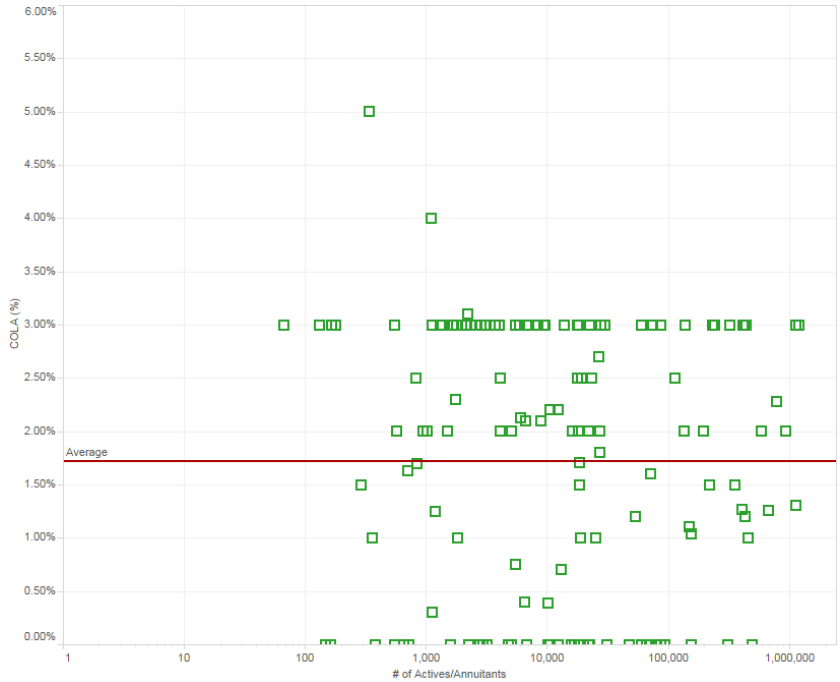



# Cost-of-Living Adjustments

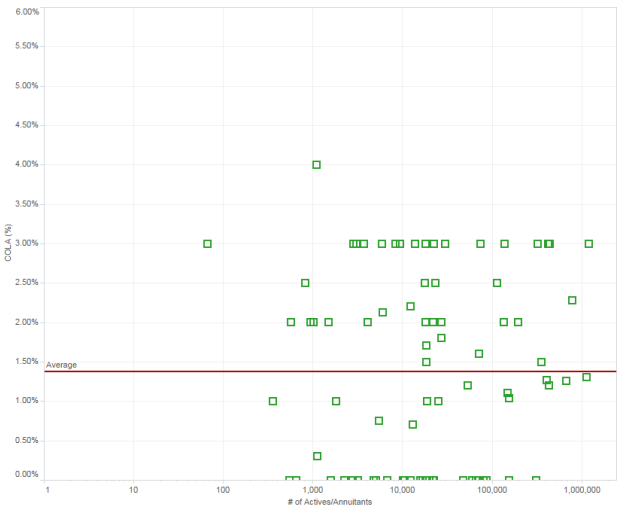
The top chart shows the distribution of funds offering various percentages of cost-of-living adjustments (COLAs). The aggregated average COLA offered to members was 1.7 percent, which is the same as in 2017. Many responding funds did not offer a COLA in the most recent fiscal year.

Funds with members who are not eligible for Social Security tend to offer higher cost-of-living adjustments (2.3 percent) than those with members who are eligible for Social Security (1.4 percent).

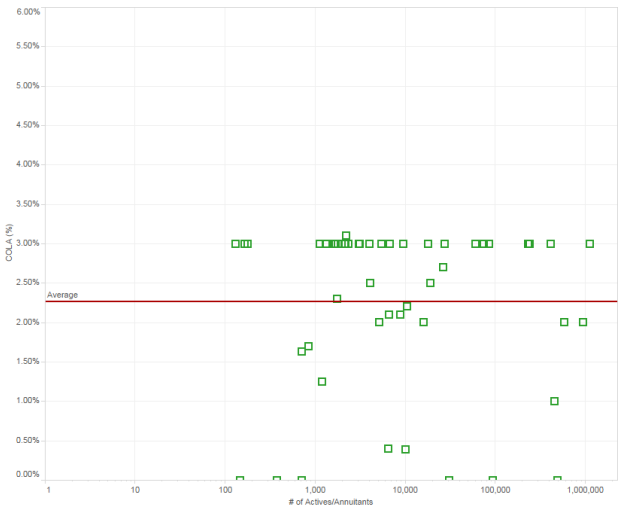
**Overall Cost-of-Living Adjustment Offerings**




**Social Security Eligible**

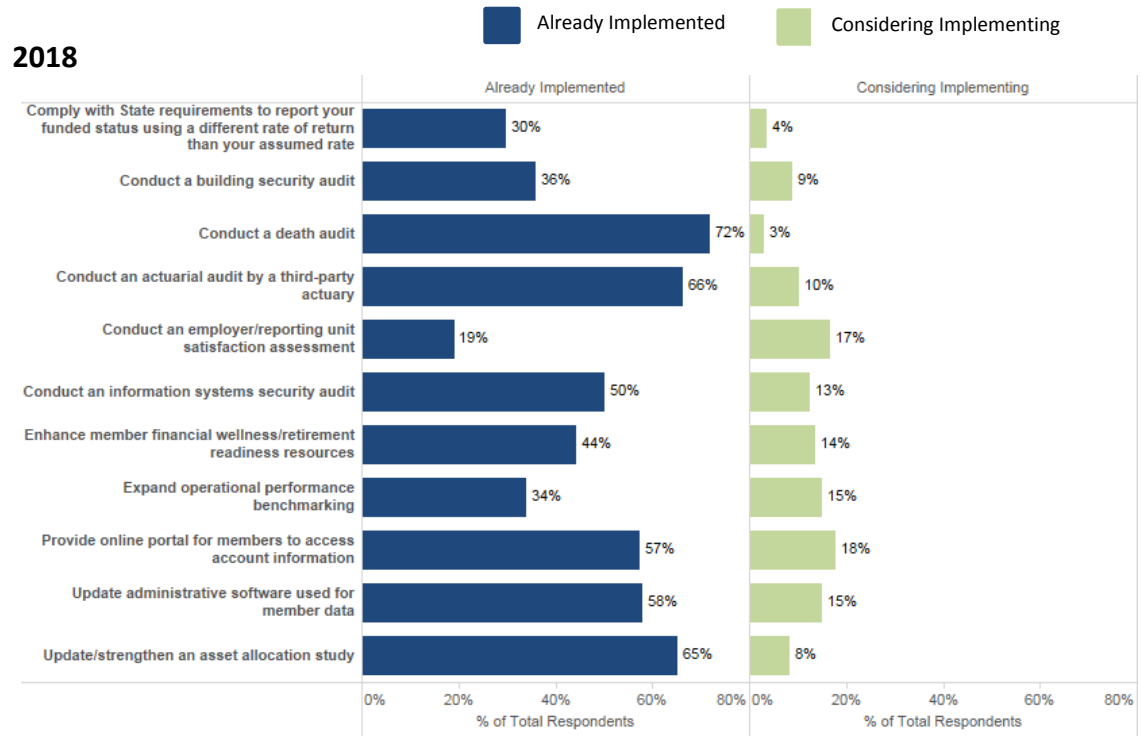


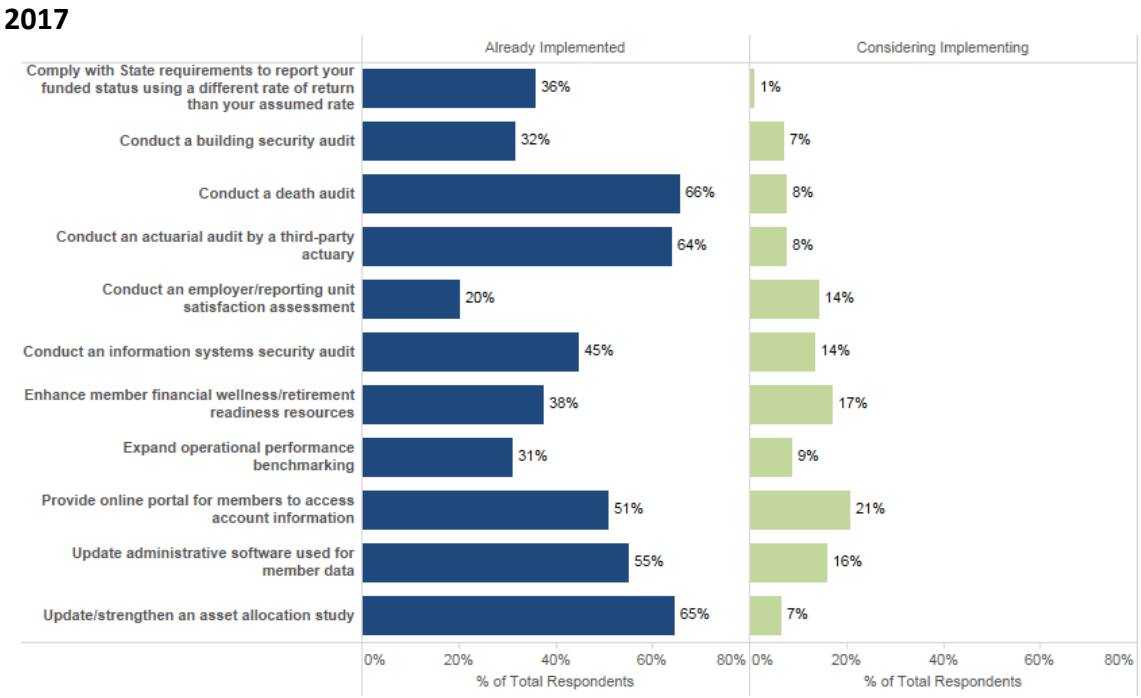

**Not Social Security Eligible**



# Trends in Business Practices

Several areas have seen significant increases in implementation compared to 2017. Conducting a death audit, enhancing member financial wellness/retirement readiness resources, and providing an online portal for members are up 6 percent over a year ago. Conducting an information systems security audit is up 5 percent.

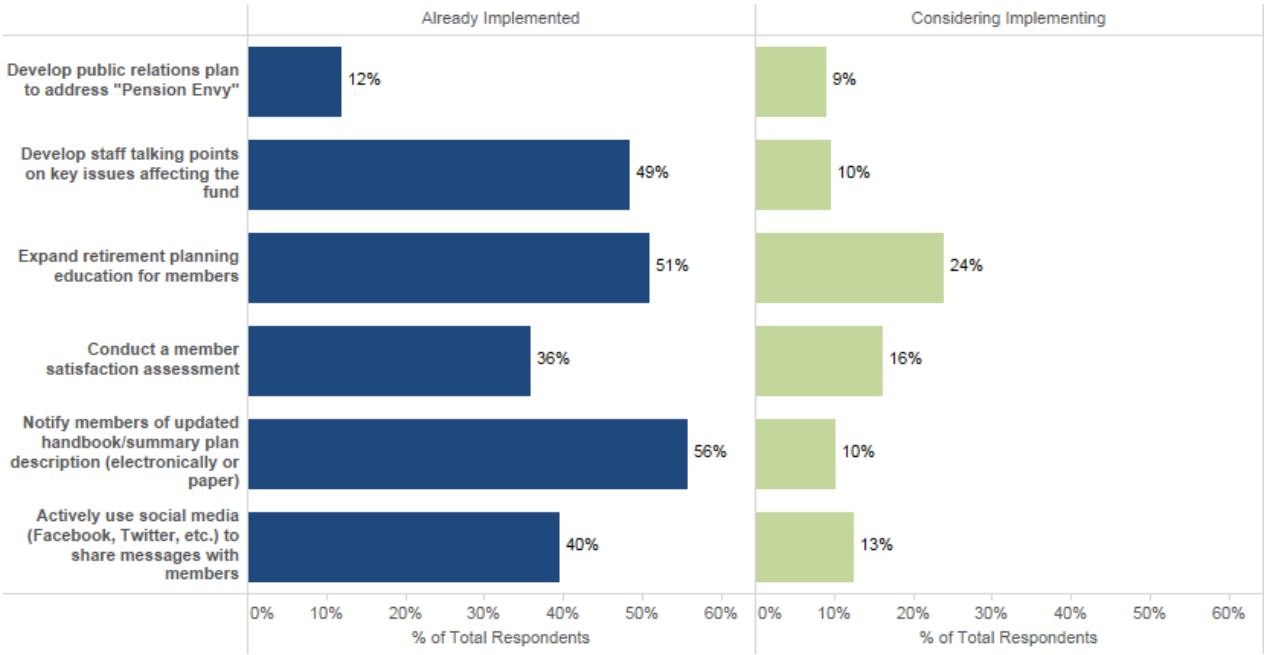


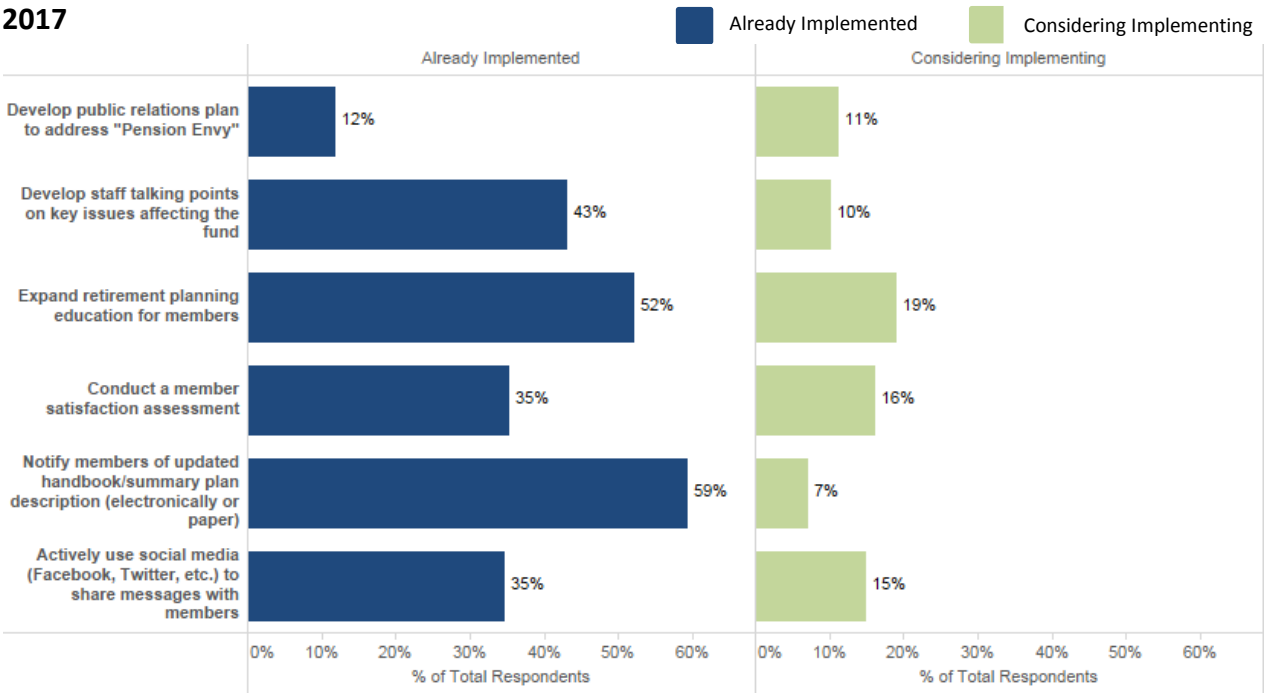
# Trends in Engagement

In 2018, the three largest activities are notification of updated handbook/summary plan descriptions, expanding retirement planning education for members, and developing staff talking points on key issues.

**2018**



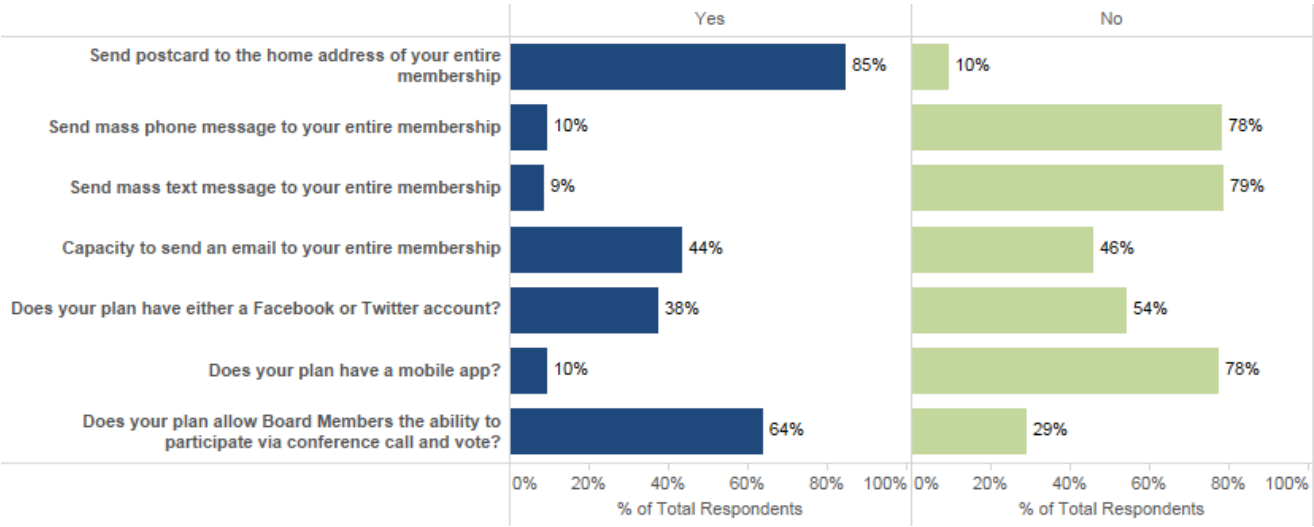

**2017**



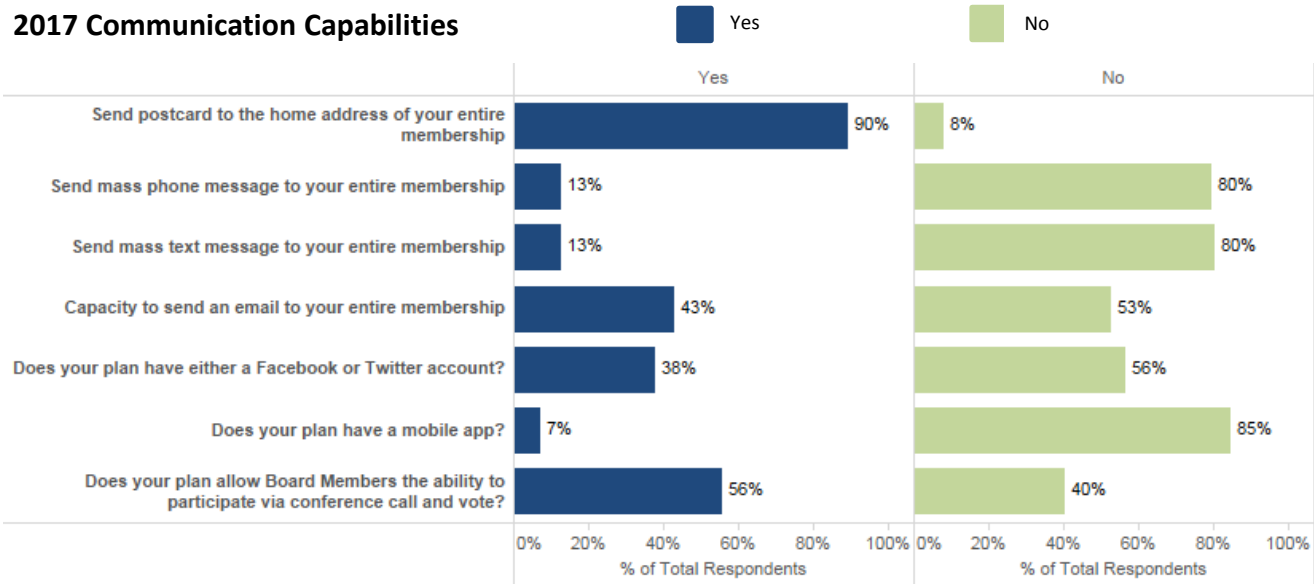
# Trends in Communication

Communication capabilities are very similar to 2018 with a slight decline in sending of postcards to home addresses.

### 2018 Communication Capabilities



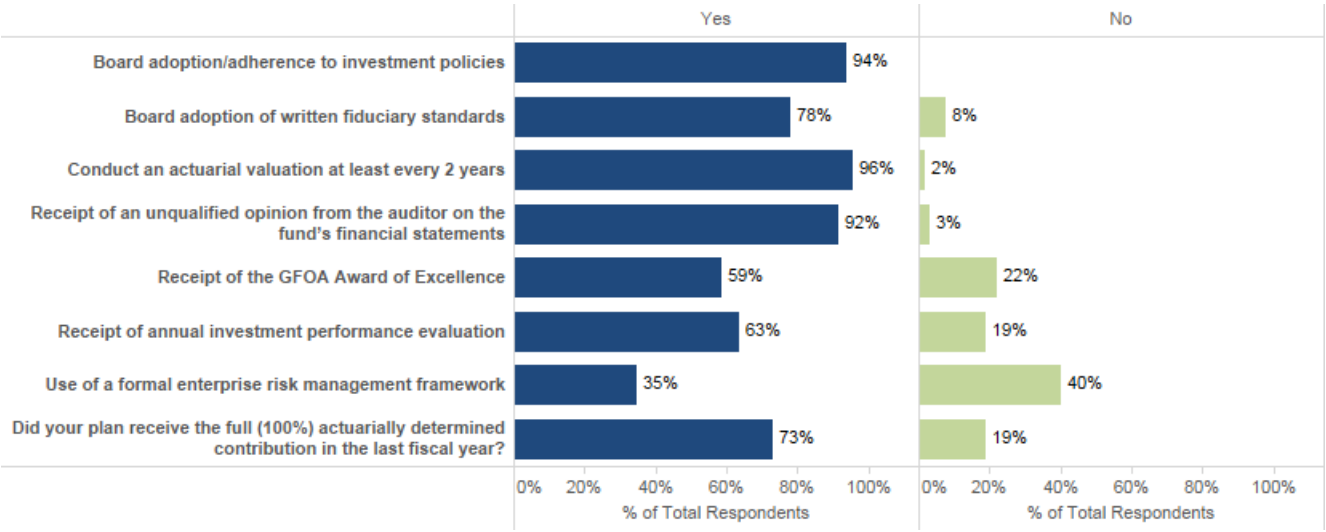

### 2017 Communication Capabilities



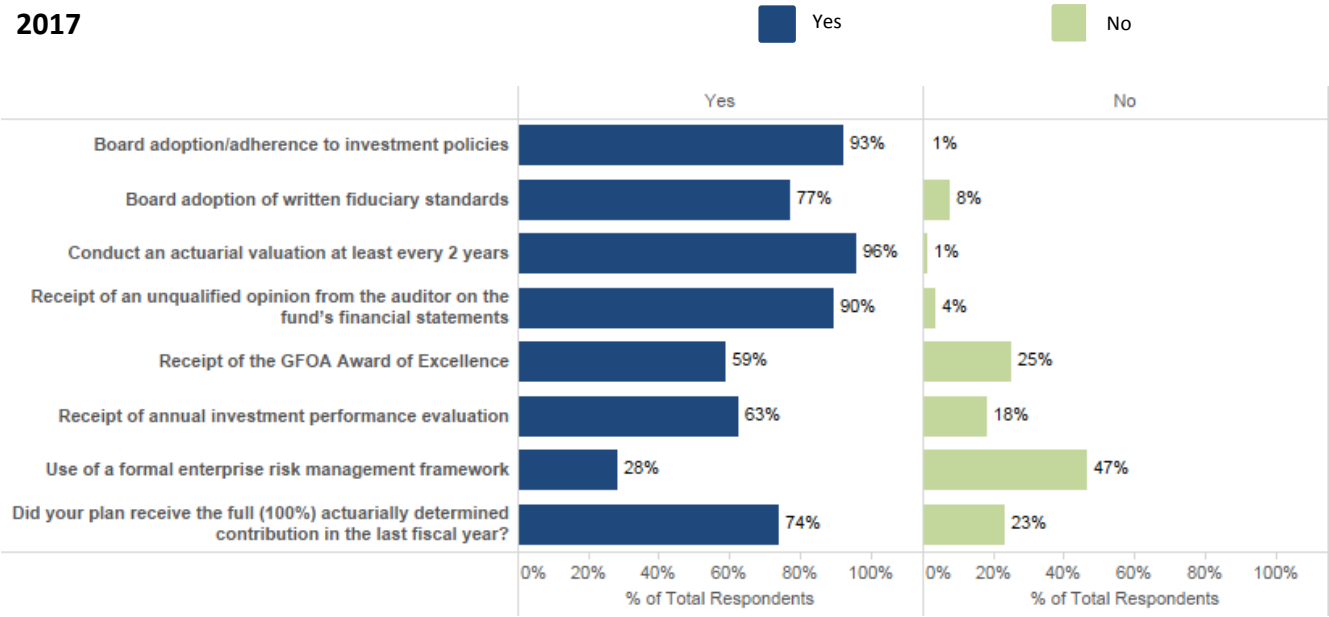
# Trends in Oversight Practices

Most oversight practices saw little fluctuation between the 2017 and 2018 studies. Overall, responding funds showed a modest increase in the use of a formal enterprise risk management framework.

**2018**




**2017**

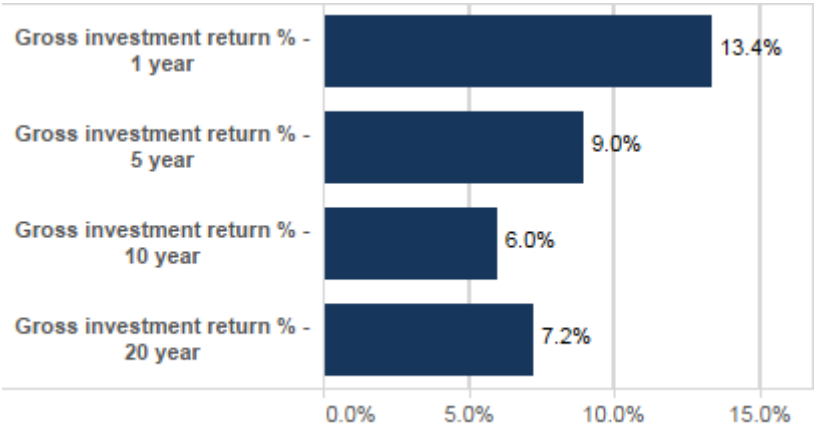


# Investment Returns

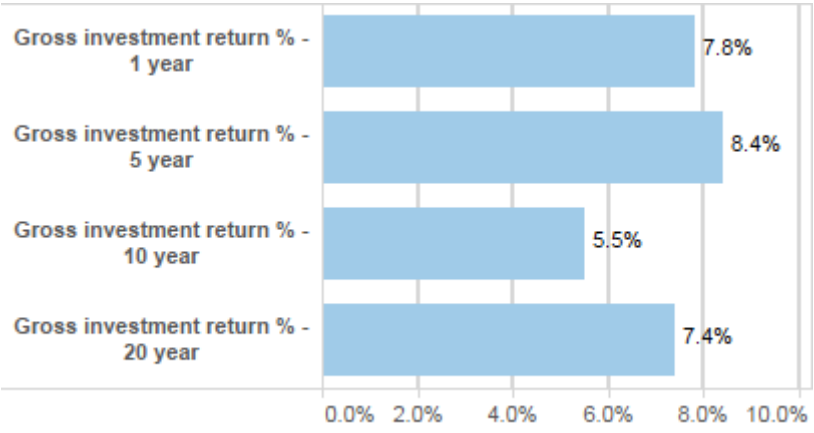
Reporting funds saw, on average, one-year returns around 13.4 percent. The five-year and 20-year average returns also hovered near or above the assumed rate of return.

It is important to note not all responding funds have the same fiscal year-end date. The timing of when a fiscal year ended accounts for significant difference in investment experience between funds. Funds that have a December fiscal year-end date saw one-year returns averaging over 15 percent.

**2018 Study Investment Returns**

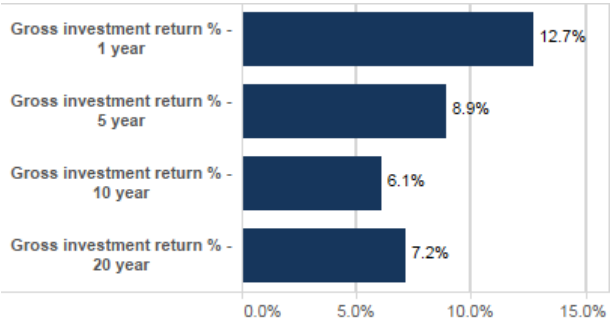



**2017 Study Investment Returns**

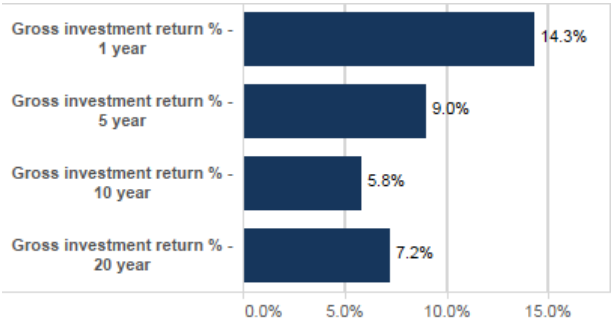


Funds with members who are not Social Security eligible reported slightly higher one-year returns than Social Security eligible funds. However, both experienced similar returns over time.

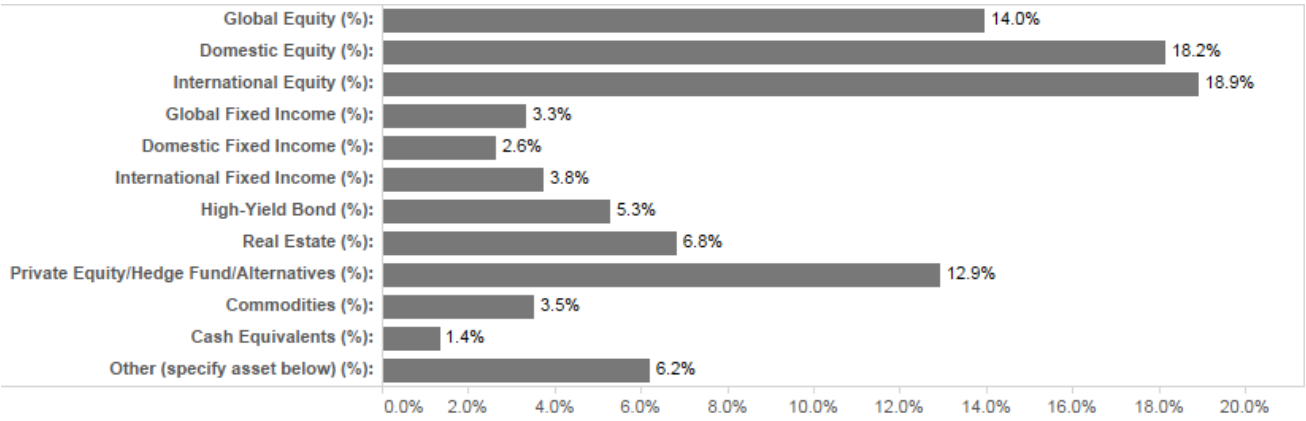
**2018 Returns: Social Security Eligible**




**2018 Returns: Not Social Security Eligible**




The graph below shows the one-year gross investment returns based on the various asset classes in which responding funds are invested. Equity and private equity/hedge fund/alternatives saw the largest returns.

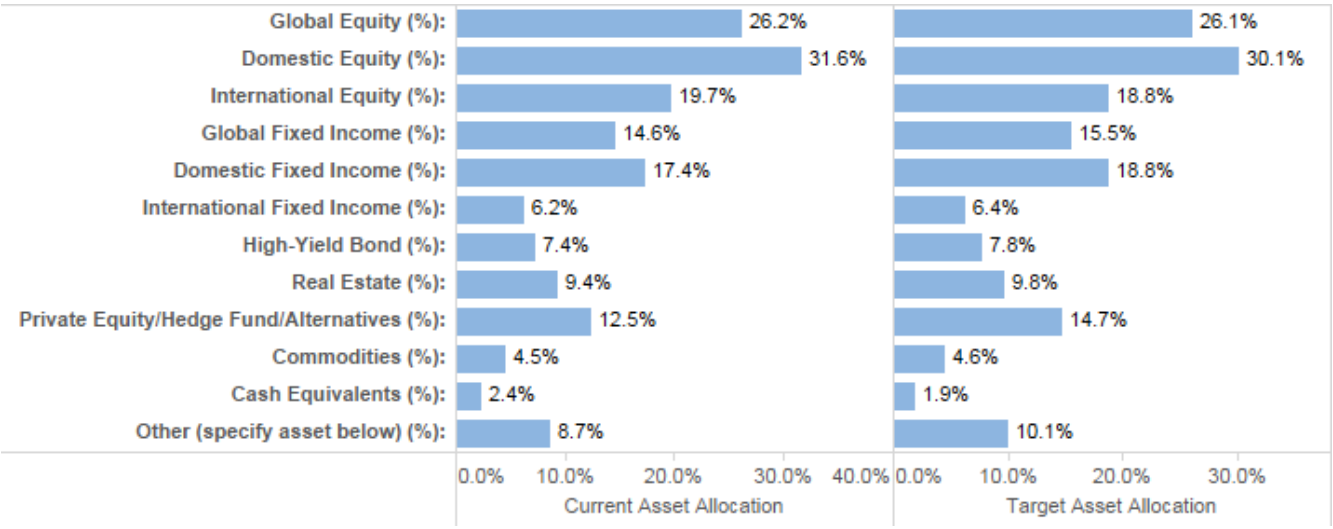


# Investment Asset Allocation

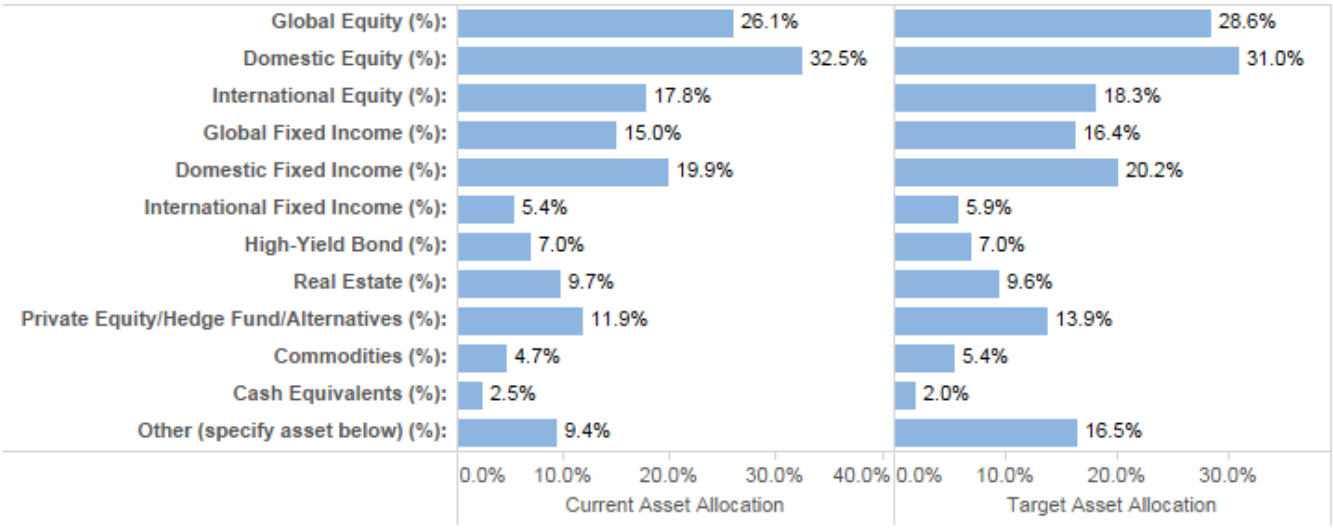
Responding funds had very similar allocations to asset classes as they did in 2017. There was a slight decrease in targeted allocation to global and domestic equities, global fixed income and domestic fixed income. There was a slight increase in targeted allocation to high-yield bond and private equity/alternatives.

Note: Average allocations in each asset class do not total to 100 percent because of how individual allocations were reported.

**2018 Current Investment Asset Allocation** **2018 Target Investment Asset Allocation**



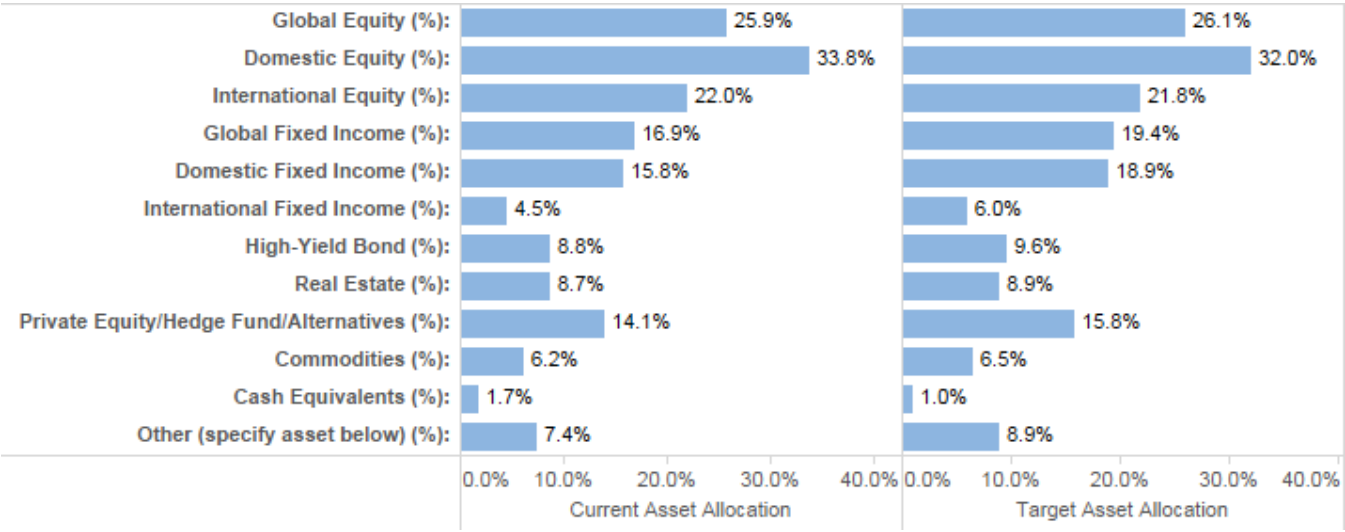

**2017 Current Investment Asset Allocation** **2017 Target Investment Asset Allocation**



## Highest One-Year Return

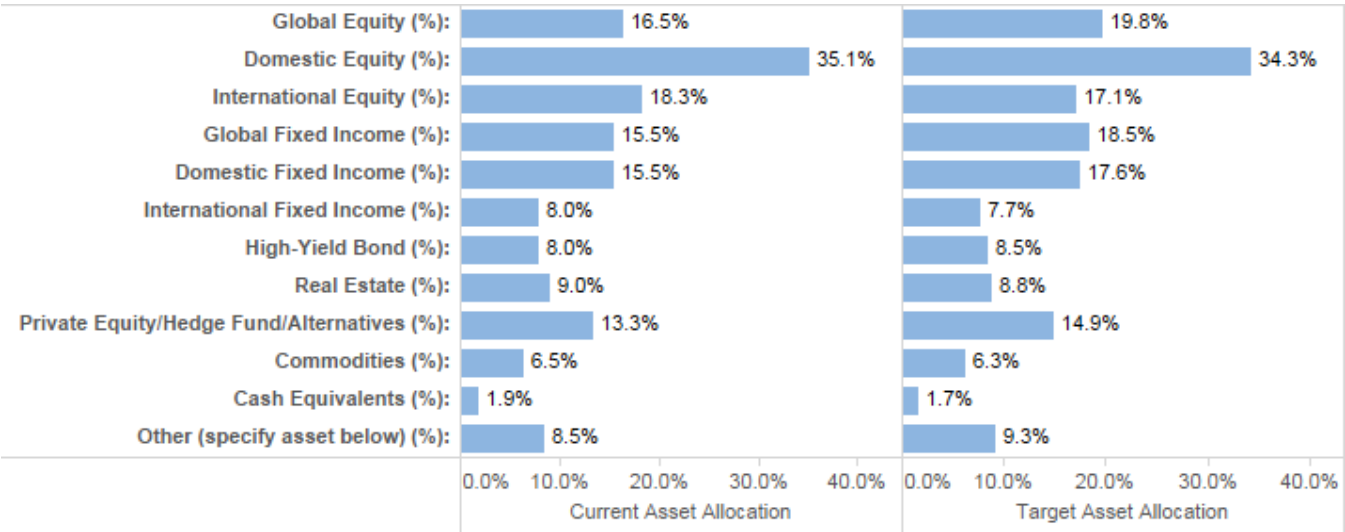
Below are two graphs that show the asset allocations for 20 funds that reported the highest one-year and 10-year investment returns.

Funds with the highest one-year returns had higher allocations to domestic equity, international equity, global fixed income, private equity/alternatives, and commodities. They had lower allocations to domestic fixed income and international fixed income.




## Highest 10-Year Return

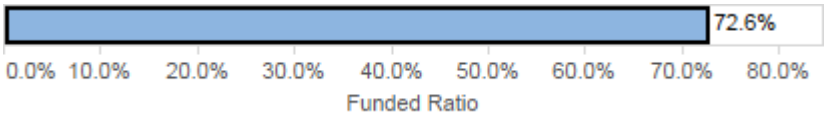
Similarly, funds with the highest 10-year returns had higher allocations to domestic equity, international equity, global fixed income, international fixed income, high-yield bond, private equity/alternatives, and commodities. They had lower allocations to global equity and domestic fixed income.



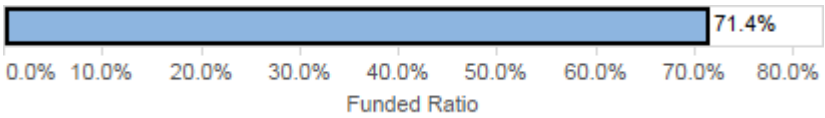
# Funding Levels

The average funded level is 72.6 percent, up from 71.4 percent in 2017. Plans eligible for Social Security tended to have higher funded levels.

**2018 Funded Level**

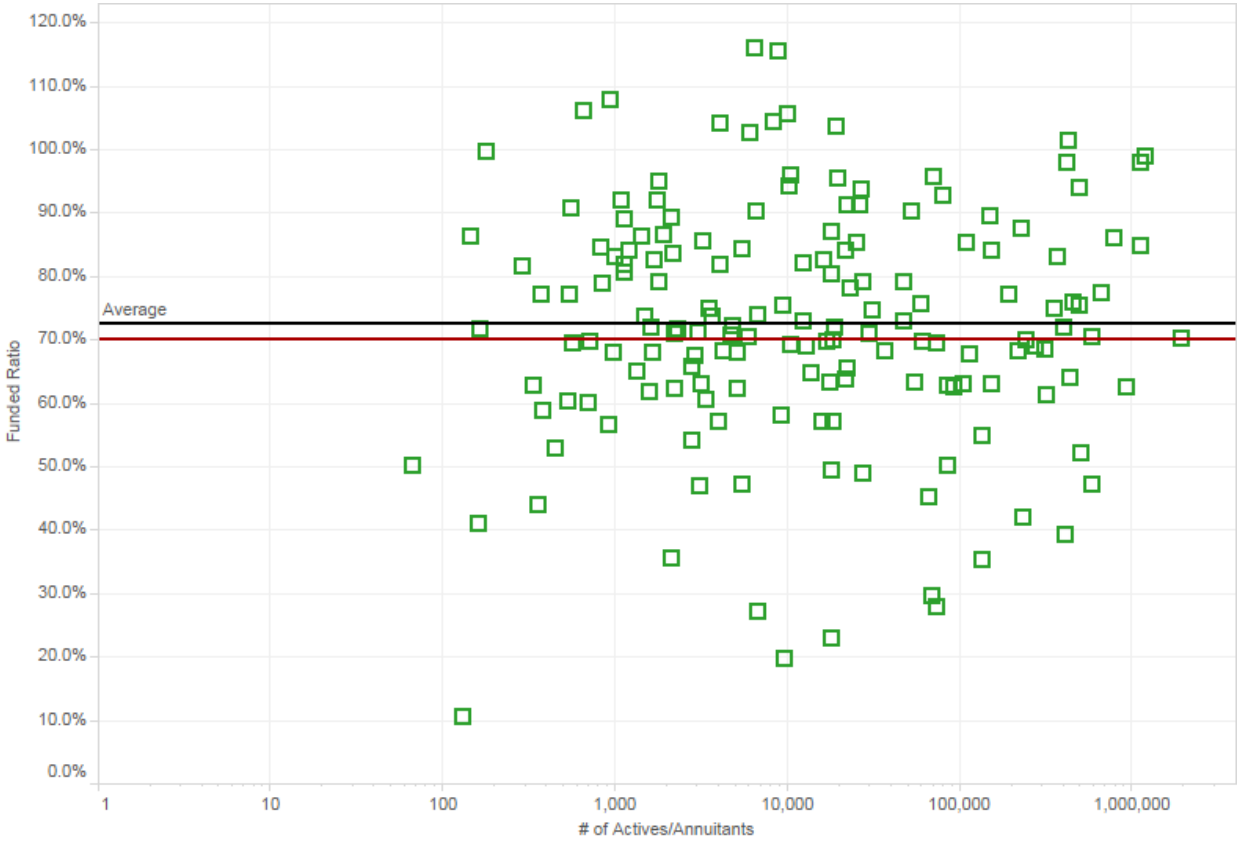



**2017 Funded Level**



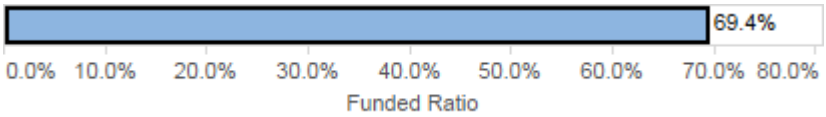

The bottom graph shows the distribution of funded levels and fund size. The vertical axis shows level of funding, and the horizontal axis shows the size of the fund by total active and retired participants.
The black center line denotes the average of 72.6 percent, and the red center line denotes the 70 percent funding target that Fitch Ratings considers to be adequate.

**2018 Funded Level Distribution**



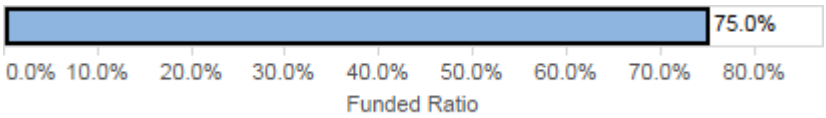
Many funds include members who are not eligible to receive Social Security at the time of retirement. For this reason, such funds often have higher benefit levels to offset the loss of this source of retirement funding. Those funds that include such members report an average funded level of 69.4 percent, which is above the 63.5 percent in the 2017 study.

**Funds Not Eligible for Social Security**



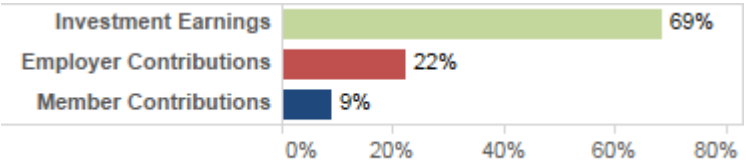

The graph below shows the funded level for those plans that include members who are eligible for Social Security. The average funded level for this group is 75.0 percent, up from 71.4 percent in the 2017 study.

**Funds Eligible for Social Security**

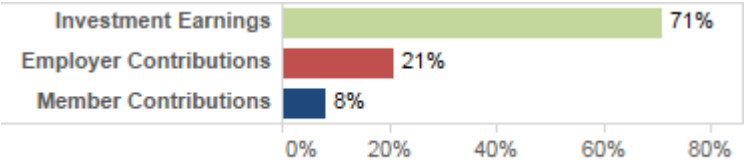


# Sources of Funding

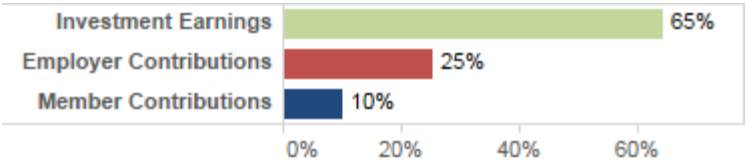
### Overall Sources of Revenue




### Social Security Eligible




### Not Social Security Eligible




Income used to fund pension programs generally comes from three sources: member contributions, employer contributions, and investment returns. The chart to the left shows the proportion of funding provided through each of these sources based on reported data.

Investment returns are by far the most significant source of revenue (69 percent). This is a slightly lower percentage than the 71 percent reported in 2017. Members' share of total revenue stayed the same, but employers' share increased 1 percent.

The graphs to the left also show funds with members who are not eligible for Social Security. Not Social Security eligible funds reported a slightly higher share of revenue from members and employers.

### Contribution Rates as a Percentage of Payroll

| | 2017 | 2018 |
|---|---|---|
| Employer Contributions | 22% | 22% |
| Member Contributions | 8% | 9% |
| Total Contributions | 30% | 31% |

### Contribution Rates – Respondents in Both Years

| | 2017 | 2018 |
|---|---|---|
| Employer Contributions | 21% | 20% |
| Member Contributions | 9% | 9% |
| Total Contributions | 29%* | 29% |

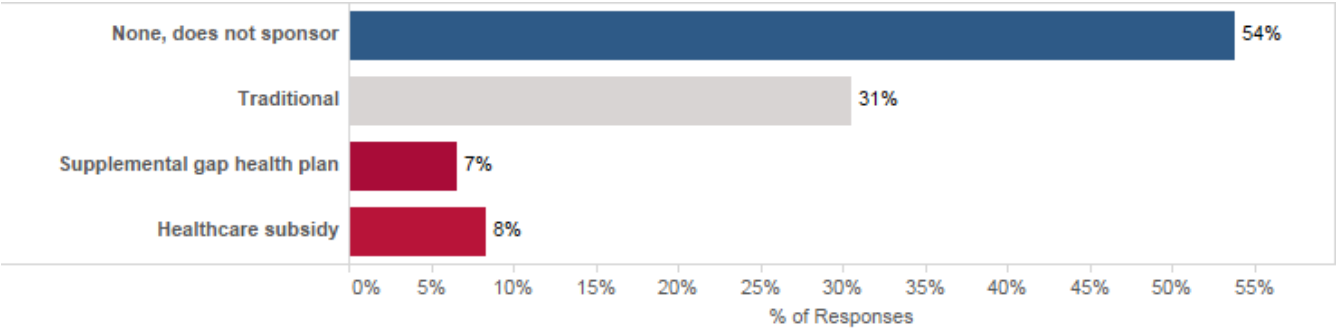
**Does Not Equal 30 Percent Because of Rounding*

Contribution rates as a percentage of payroll were stable, and they declined slightly for employers for those funds that responded both last year and for the current year.

# Health Plans

Responding funds were asked whether or not the plan sponsor offers a health plan. In 2018, about 46 percent are offering a plan or subsidy, while about 54 percent of funds do not sponsor a plan. In 2017, only about 40 percent offered a plan, while about 60 percent did not.

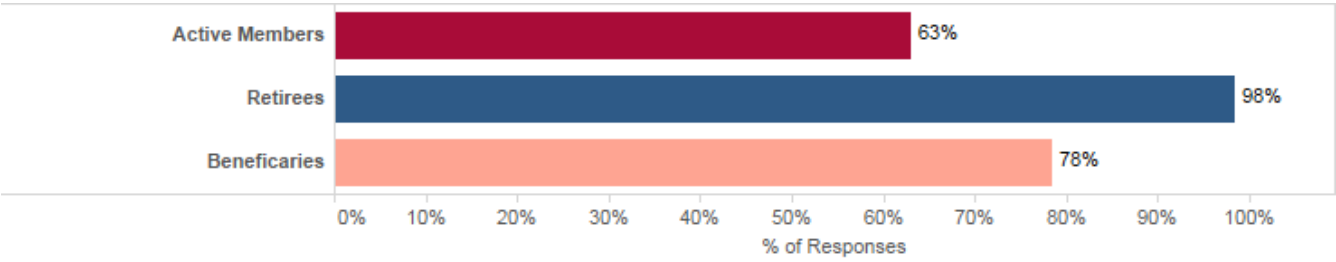
**What type of health plan does your pension plan sponsor?**




The funds that do sponsor a health plan or subsidy were also asked to report which types of members are eligible to participate.

About 63 percent of the sponsors with a health plan or subsidy are also open to the sponsor's active members, 98 percent include retirees, and 78 percent include beneficiaries. When looking at overall responses year over year, inclusion of actives and retirees increased by 6 and 3 percent, respectively; however, inclusion of beneficiaries dropped by 5 percent. The same pattern of increased inclusion for actives and retirees and decreased inclusion of beneficiaries is seen when looking at the population of funds that responded to both of the 2017 and 2018 studies.

**Who is eligible for the health plan?**



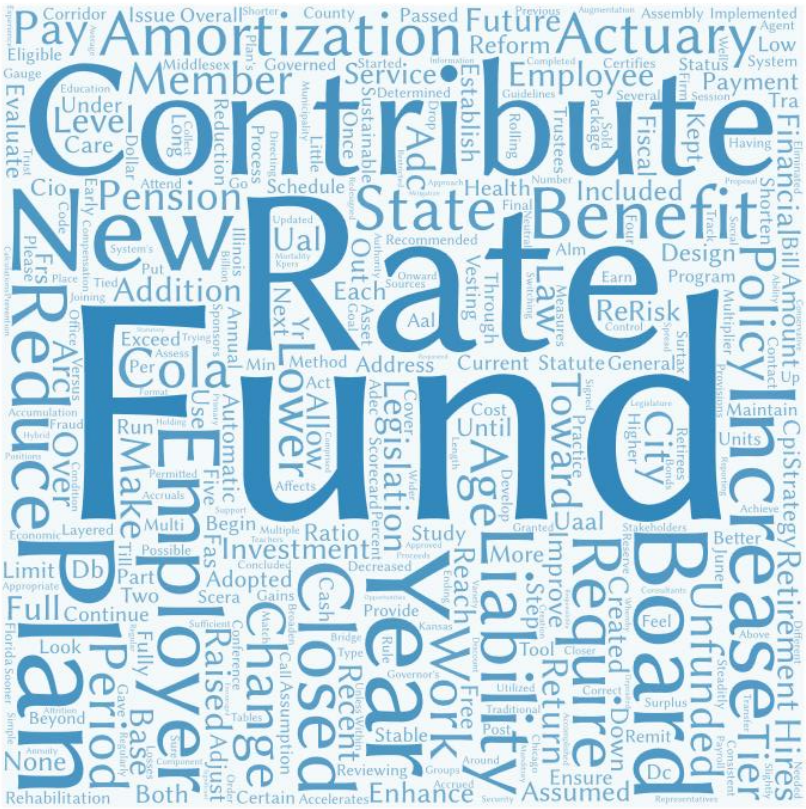
# Reducing Liability

Respondents were asked to share strategies they have put in place to reduce accrued actuarial liabilities beyond traditional amortization. Below is a text cloud showing the words that appear most often in respondents' comments. Larger words appear more often. Below are the themes of the comments surrounding each of the largest, must frequently-used words:

**Rate** - Reduce assumed rate of returns in order to have more realistic projections for future planning

**Board** – Uses its authority to establish funding policy and limit benefit improvements; legislature providing authority to do so

**Contribute** - Employee and employer contributions increased to ensure stable funding for future obligations


Contribute
Rate
Fund
Board
Amortization
Actuary
Employee
Member
Pension
State
Benefit
Policy
Increase
Reduce
Plan
Employer
Liability
Year
Closed
Change
Work
Require
Unfunded
Tier
Hires
Retirement
Strategy
Cpi
Amount
Financial
Payment
Status
Assembly
Implemented
Issue
Overall
Pay
Future
Reform
Passed
County
Governed
Service
Level
Under
Evaluate
Cola
Addition
Ual
Aal
Aaal
Legislation
Investment
Ratio
Study
Reach
Free
Return
Tool
Step
More
Improve
Toward
Lower
Allow
Age
Until
Cost
City
Maintain
Units
Higher
Practice
Current
Statute
General
Address
Method
Each
Out
Recommended
Design
Program
Earn
ReRisk
Vesting
Through
Measures
Alm
Included
Health
Schedule
Once
Sustainable
Establish
Adc
Fiscal
Kept
Shorten
Bill
Tra
Having
Trustees
Rolling
Package
Said
Several
Guidelines
Determined
Drop
Reduction
Process
Long
Collar
Dollar
Care
Eligible
Gauge
Corrector
Middlesex
Started
Certifies
Completed
Information
Augmentation
Previous
Agent
Low
System
Well
Firm
Session
Proposal
Track
Sound
Four
Surtax
Multiplier
Provisions
Contact
Up
Retirees
Bonds
Legislature
Achieve
Stakeholders
Reserve
Better
June
Consultants
Steady
Surplus
Remit
Dc
Above
Different
Needed
Representatives
Security
Accrued
Groups
Around
Post
Traditional
Utilized
Correct
Closer
Down
Feel
Create
Ensure
Assumed
Enhance
Accelerates
Certain
Reviewing
Stable
Recent
Cash
Provide
Kansas
Type
Rule
Governor's
Bridge
Call
Assumption
Adjust
Raised
Base
Gave
Regularly
Fully
Period
Beyond
Both
Rehabilitation
None
Full
Limit
Db
Look
Continue
Two
Part
Adopted
Scera
Gains
Decreased
Proceeds
Approved
Ending
Varies
Discount
Premium
Creation
Decline
Consultants
Coverage
Wheels
Steadily

## - Continued

- Tied age requirement to Social Security. Implemented DC for new hires with mandatory annuity.
- The System has kept contribution rate stable and not decreased them to the ADC each year which allows the fund to improve overall financial health.
- The State of Kansas sold $1.0 billion in bonds in 2015 and deposited the proceeds into the KPERS Trust Fund. This was in additional to regular contributions.
- The only step has been to shorten the amortization period from 30 years to 20 years.
- The City has been paying over the required contribution amount to pay down certain bases of the unfunded liability.
- The Board recently concluded a five-year actuarial study which included several recommendations. The board is reviewing for possible implementation.
- The Board recently adopted a new funding policy to address the System's unfunded actuarial accrued liability.
- The board adopted a funding policy with a scorecard component. The scorecard is a risk tool to gauge the financial and economic status of the plan.
- Steadily reducing the assumed rate of return so our required contributions increase.
- State statutes require certain surplus funds to be appropriate to the UAL. Changes in plan design for new members since 2006 are designed to limit accumulation of UAL.
- State Statute requires employer funding as a level percent of payroll to achieve 90% by 2059.
- State contributions under state law are too low to begin reducing the unfunded liability. The board certifies both the amount required under state law and the amount required under an actuarial process (different cost method, shorter amortization) that does begin reducing the unfunded liability. This approach is needed because our funded status is low.
- Significant plan design changes were put in place through pension reform, including development of the Hybrid Retirement Plan. Statutory requirement to fund the full Board-certified rates (fiscal year 2017 for the State plans and 2018 for the Teachers), shortened amortization period, lowered assumed rate of return, increased employer & employee contribution rates.
- Reducing the amortization by 1 each year until 2026, then switching to a rolling 15-year period.
- Reduce multiplier, reduced COLA, started Employer Contributions.
- Recent pension reform gave Board authority to establish a COLA consistent with the change in CPI-W versus an automatic 3% simple COLA. Previous pension reform included changes to age and length of service requirements. Established a Board-approved funding policy to provide guidelines for funding pension liability and healthcare programs.
- Recent legislation passed to increase employer contribution to cover or exceed ARC.
- Primary employer paying additional contributions towards unfunded liability.
- Plan design changes are accomplished through legislation and assumption changes are adopted by the FRS Assumptions conference comprised of representatives from the Governor's Office and the Florida Legislature.
- Payment of Actuarially Determined Employer Contribution (ADEC) is required including a closed amortization period not to exceed 25 years. Additional employer contributions are permitted to reduce liability.
- Our Plan was new as of 2/1/2013. We are on track to be fully funded within 10 years if not sooner. The City continues to pay 100% of the required contributions.
- New contribution policy based on future pension surtax.
- Multiple employer agent plan; new employers joining regularly with unfunded AAL affects overall plan funded ratio slightly.
- Middlesex County Retirement is a multi-employer retirement system. Some units make additional payments toward their unfunded liability.
- Making annual required contributions, looking at investment funds to look for opportunities to get better return.
- Lower benefit tiers.
- Level dollar method of funding, and use of a CIO to address investment practices.
- Legislation to increase contributions. Legislation to transfer/increase funding.
- Increased member and employer contributions until plan reaches 100% funding; raised benefit eligibility age and service requirements; raised FAS period and vesting requirements.
- Increased employer contributions over 4 years (2017-2020); 2012 New Tier of New Members with: Lower Benefit Multipliers, Higher vesting and age requirements, Higher member contributions, Lower post-retirement benefits, Lower average final compensation, Restricted eligible compensation to base pay.
- Increased employee, employer, and state contributions were part of 2018 legislative package.
- Increase in employee contributions.
- Increase employer contributions.

## *- Continued*

- In 2018, the general assembly lowered COLAs for current and future retirees, raised member and employer contributions, increased age and service requirements for new hires, and created a closed 30-year funding corridor that will automatically adjust COLAs, member, and employer contributions to maintain amortization schedule.
- In 2015 and 2016 the Board redesigned DROP to be actuarially neutral. Also, an experience study is in process to provide better information generally about the plan for the Board to assess what, if any, next steps are in order to improve funding.
- Having municipality contribute a payment out of free cash.
- Funding Rehabilitation Program.
- Funding policy goal is to be 100% funded and Board will not support any benefit enhancements unless the proposal includes funding for the benefit enhancement.
- Funding Plan with government through fiscal responsibility act.
- Fraud prevention measures, measures to ensure correct benefit calculations and payments, enhanced financial reporting, conservative actuarial assumptions.
- Format funding policy in code to fund at actuarially recommended levels.
- Employers are allowed (and encouraged) to pay additional contributions toward their unfunded liability.
- Employer additional payment towards UAAL, Employees contribute towards UAAL -- these are employer strategies, not SCERA strategies.
- Education to members and funding sources as to what creates liability beyond investment returns.
- Contribution Rate Increase for members & employers.
- Continue to work with actuary and investment consultants to make sure plan is funded.
- Continue to evaluate every two years once a re-evaluation is completed.
- Closer control of Liabilities; limit creation of new employee positions, practice employee attrition.
- Closed the amortization schedule and ensure all employers remit the full actuarial required contribution.
- Closed the amortization period to 30-yr closed, reduced assumed rate from 8% to 7.5% for 2019, raised contribution rate for employees to 8%, raised vesting to 8 years for new hires 1-1-2013 & beyond, min age of 50 for Rule of 75 for all new hires 1-1-2016 onward.
- Closed amortization schedule, 18-year layering of annual UAAL changes.
- Closed amortization period, employer makes 100% of ARC.
- Changed retirement eligibility (service/age). Contribution rate increases.
- Broaden the number and type of investment holding trying to spread the risk and enhance the ability to earn over a wider variety of investments. In addition the Board has requested and been granted a four-year implementation of contribution increases at the rate of .25 per year beginning with 2018 and ending in 2021 whereby the contribution rate will be 9% employee/employer match.
- Benefit changes, increase contributions, attend funding conferences, make changes in investments.
- Assembly Bill 1469 was signed into law on June 24, 2014, to fully fund the DB program by 2046.
- Amortization period has reduced from 30 to 20 years since fiscal year 2017 as our funded ratio has reached 72%.
- ALM, Risk Mitigation, Reduction of Discount Rate.
- Adjusted the plan retirement provisions and increased contribution funding.
- Accelerated amortization for closed groups, bridge down future benefit accruals, lowered the assumed rate of return and updated mortality tables.
- 2018 legislation was passed which eliminated augmentation of early retirement benefits. This is a benefit reduction which accelerates the rate of improvement towards full funding.
- 2018 legislation created layered amortization for future losses or gains over a closed, 20-year period.
- 2012 pension reform. Adoption of a funding policy. Asset/Liability Study.
- Currently reviewing COLA; currently directing all contributions to fund pension and none to fund health care.

# Innovations/Best Practices

In the study, respondents were asked to share a success story regarding a best practice or innovation that other plans may like to learn about. Below is a text cloud showing those words that appear most often in respondents' comments. Underneath the text cloud are the verbatim comments. Below are the themes of the comments surrounding each of the largest, must frequently-used words:

**Member** - Increased education for members, online access to retirement accounts, processes to ensure proper payments to member, audit to ensure member is still alive

**Secure** - Increased emphasis on security, increased security for online access

**Process** - Improved online processes, improved investment processes

## Verbatim Comments:

- Weekly death march run to post date of death to database. When an identified retiree has no continuing benefit and the last benefit payment has been issued, the account is automatically closed and a letter to the member's estate automatically generated to confirm no further benefit eligibility.
- We successfully initiated a step towards tying retiree increases to an inflation index. This has not previously been done in Minnesota. Prior to that change, the annual post-retirement increase was dependent on plan funding status.
- We recently overhauled our employer web portal, which streamlined the payroll reporting process. We saw a 114% increase in remitted revenue for April 2018 (when the new portal was launched) vs. April 2017.
- We recently implemented a custom-developed pension administration system, built from the ground up. We used a mixture of consultants and staff on the project.
- We are in the process of launching an online member resource portal called "Ask Rob" (Retirement Options and Benefits). We are excited about this project, as it replaces our annual paper booklet.

## – *Continued*

- VRS's comprehensive financial wellness program is aimed at helping members make informed and educated decisions on everyday financial matters while saving for the future. The program includes interactive courses, personalized action plans and content recommendations based on the member's interests as well as their demographics and history. VRS is in the midst of a multi-year modernization program which is phasing out the legacy system, RIMS, and replacing it with VNAV. VRS continues the final phase of its technology modernization project by developing new technology systems to support interactions with VRS members. The new system allows members to electronically request refunds and initiate a service purchase request, and in the future will allow members to manage beneficiaries and file for retirement online. A redesigned benefit estimator allows members to easily create VRS retirement benefit estimates based on different retirement dates or payout options. VRS introduced a new goal-based retirement planner where members can input a benefit scenario and add other sources of income and expenses, including income taxes, health insurance and living expenses. Based on their individualized retirement goals, the planner helps members project their income and expenses in retirement and take a broader view of life after work.
- Use of "Alive and Well" Letters annually, as databases alone are insufficient to prevent overpayments. Increasing terms of board member service from 2 or 3 years, to 4 years.
- Implementation of Board: Education Policy, Code of Conduct, Code of Ethics Policy. Annual Pension Status mailing, along with annual benefit statement.
- The Plan is exploring advanced investment risk management techniques with the hopes to deploy them in the coming years.
- The MEABF performs an annual Signature Verification process to ensure that Pension Benefits are being sent/used to the intended recipient. This program has retrieved over-payments to non-members and identified fraudulent activity.
- The fund is in the process of enhancing cyber security and data security.
- Started new program that pairs Defined Contribution plan with our supplemental savings program to function as a single, flexible plan with multiple benefits: (1) Employers can require mandatory participation in the DC portion of this plan, (2) Employers can incentive employee savings through matching pre-tax contributions.
- Separate funding mechanism for post-retirement benefit increases.
- STRS Ohio is using Monte Carlo simulations to provide probability analysis of funded ratios and funding periods 10 years in the future.
- Recently developed strategic plan working with Board and staff.
- New closed 30-year amortization funding corridor.
- Modify Investment Allocation to minimize downside risk.
- Middlesex County Retirement System employs a part-time social security consultant to deliver educational programs regarding social security benefits, the Government Pension Offset, and Windfall Elimination Provision. Further, MCRS educates its employer units through Advisory Council meetings, attendance at Boards of Selectmen/Finance Committee meetings, and onsite Employer Training Programs.
- Methods to monitor retiree benefit compliance (i.e., reemployment, disability, children, widows).
- Issue debt certificates to lower or eliminate unfunded liability while interest rates are at historic lows.
- Investments is using Bloomberg Port/Port+ for improved risk management. We are in negotiations with XTP to improve cost transparency. Administration is adopting Concur for expense management and BoardDocs for board agenda and document management. Benefits has contracted for additional death reporting services. We have updated websites for the public and employers.
- In November 2017 NYSTRS began offering members the ability to file for retirement online. By fiscal year-end, more than half of all retirement applications received were filed online. The electronic application is designed to ensure a member cannot inadvertently miss a step or make a mistake that would cause the paper application to be rejected. Also, because electronic filing requires the creation of a secure member account, the percentage of members with an account increased.
- In 2017 IMRF was awarded the ILPEx Gold Award for performance excellence. This qualified us to apply for the Baldrige Award in 2018. Our application has been reviewed and we have been awarded a site visit from Baldrige in Oct. 2018.
- In 2016, we shifted from self-insured health care for the eligible over-65 retirees to a health care exchange market offering connectivity to the exchange via a vendor selected by OPERS. Additionally, we provide an allowance to this group to cover eligible health care costs, including, but not limited to, the premiums on medical plans obtained through the market. Prior to implementation of this plan change, health care costs had grown to approximately $1.8 billion annually. Subsequent to this change, costs have declined annually by approximately $600 million.
- Implemented an immunization program for benefit shortfalls.
- The reserve fund has maintained a stable contribution rate (albeit a high one) so employers have confidence for budgeting and the reserve has further reinforced our funding by holding the rate above where it would be absent the reserve fund.
- Idaho PERSI has recently relocated staff within our main office building in order to free up space to create an on-site member/employer training/education center. We plan for this space to be outfitted for face-to-face educational opportunities, and with the technological capabilities necessary for multi-media presentations and remote (webinar, etc.) participation via the internet. In order to have on-site capabilities, we are in the process of expanding available off-street parking to accommodate future guest populations.
- Hired third-party investment firm to perform an Independent Evaluation study on the Fund's investment performance and strategies.
- Have provided members with online access to their accounts.

## – *Continued*

- Establishment of a formal funding policy.
- Enhance online user security features beyond username and password. Executive Workshops held throughout the state for city officials, with presentations by Trustees and key staff.
- Disaster recovery site and plan. We have staff test the site by working there at least one day per year.
- Created a matched 457 with annuity and life insurance to bridge time between separation and collection of first pension check at Social Security age.
- Contracted with an independent third party to perform a Governance and Asset allocation review.
- Continue to enhance security for member portal. Created two-step process for account setup, which includes sending a time-sensitive PIN to the address we have on file, and requiring stronger passwords for existing accounts.
- Comparing fees with other systems and see if we are being overcharged.
- Communication, by providing and enhancing the employee portal whereby any active member can access their account and see the balance, contributions plus interest, cash out value, and potential monthly benefit as of normal retirement age, (65), and perform their own future dated projection.
- COAERS recently launched a multiasset strategic partnership with BlackRock in order to garner best-in-class insights into asset allocation and risk management.
- CalSTRS administers a three-part hybrid system that includes traditional DB, CB, and voluntary DC plans.
- An Enterprise Risk Management Program has been implemented to assess risks across the plan.
- 1) Oversight -- in 2016 the Board adopted Board Bylaws to better discern the role of ED vs. Board. 2) Investment -- Board just concluded a robust review and selection process for an investment consultant.

# Appendix A: Other Investments

Respondents were asked to specify what "other" asset class they invested in. Below is a text cloud showing those words that appear most often in respondents' comments. The size of the word is based on the frequency of its use. Underneath the text cloud are the verbatim comments.

## Verbatim Comments:

- We are part of the State of MA-PRIT Fund.
- TIPS = 9.31% actual, 10% target. MLPs = 5.35% actual, 5% target. TIPS net of fee return = 1.80%, MLPs net of fee return = -0.22%. Commodities was net of fee as well.
- TIPS = 8.93% current, 10.00% Target; MLPs = 5.21% current, 5.00% target. TIPS net return = 1.80%, MLPs net return = -0.24%; Commodities was a net return.
- Timber, Farmland.
- Timber 2.2% (2.2% actual) and Infrastructure 5.8% (4.7% actual) targets.
- Timber.
- Target Date Fund (OSGP) *Alternatives 11.03%.
- Tangible assets portfolio and Innovation portfolio.
- Strategic Investments.
- Strategic.
- Risk Parity, GTAA, Other Pension Assets, and Rebalancing.
- Risk Parity + MLPs.
- Risk Parity.
- Risk Diversifying, Opportunistic.
- Real return, absolute return, and other real assets.
- Real Return.
- Real Estate Debt (2.0% 1-yr return), Private Debt (13.7% 1-yr return).
- Real Assets 7.5%.
- Real Assets (MLPs and Infrastructure).
- Real Assets.
- Private Credit.
- Preferred/convertible securities.
- Other emerging markets; note domestic equity includes 20% SMID CAP and 29.6%.
- Large CAP; Large CAP returned 29.6% & SMID CAP 20.0%.
- Other: timber and infrastructure.
- OTHER: Column 1 Infrastructure 2.9 and Risk Parity 4.6 OTHER Column 2 Infrastructure 4 Risk Parity 5.
- OTHER Column 3 Infra 5.03 Risk parity 12.35.
- Other is floating-rate debt.
- Opportunity Fund includes timber, tactical, credit, risk-parity, and other opportunistic strategies.
- Natural Resources.
- Natural resources and infrastructure.
- Mutual TIPS 5.31%, Emerging public market equities (7%).
- Multiasset -- GTAA and Risk Parity.
- MLPs.
- MLP 5%, emerging markets 9%.
- Master Limited Partnership.
- Liquid diversifying assets.

## – *Continued*

- Investment-grade credit and mortgage-backed securities.
- Infrastructure, Risk Parity.
- Infrastructure, Multi Asset Strategies.
- Infrastructure, Multi-Asset Funds, Derivative Positions.
- Infrastructure 3.1% current, 3% target; private credit 3.8% current, 8% target; cash held for overlay 2.6%; 1-yr returns: Infrastructure 18.1%; private credit 8.5%.
- Infrastructure 0 for current for end of year 17; we wanted 5%.
- Infrastructure.
- Inflation Sensitive (1.81%, 2.0%, 9.09%); Risk Mitigating Strategies (8.69%, 9.0%, -8.9%); Innovative Strategies (0.21%, 0.0%, 5.91%).
- Inflation Protection.
- Hedge Funds, TIPS, MLPs.
- Hedge Funds classified separately. Private Equity/Alternatives reported separately above.
- GTAA.
- Global Asset Allocation.
- Energy MLPs.
- Emerging Markets, Total Timberland, Total PCS.
- Emerging Markets Bonds (4.5/5/7), Real Return (7.4/8/10.8), Absolute Return (10.9/10/6.4).
- Emerging Equity.
- Dynamic Asset.
- CURRENT/TARGET/RETURN. Real Assets = 9.5%/13.5%/1.74%; Diversifying Strategies = 9.2%/12.5%/9.10%.
- Current: Non-Core FI--16.2%; Real Return--10.2%; Target: Non-Core FI--20%; Real Return--10%; Gross Inv Return: Non-Core--8.06%; Real Return--8.32%.
- Credit--current allocation is 11.3% with target of 14% and one-yr gross of 6.53%; Risk Parity--current allocation is 13% with target of 14% and one-year gross of 13.25%; Crisis Risk Offset--current allocation is 16.7 with a target of 20% and one-year gross return of 3.65%; Private Appreciation--current allocation is 11.4% with target of 12% and a one-year return of 15.14%. Private real estate makes up 7% of the private appreciation class and has been included on the Real Estate line item.
- Credit strategies.
- Credit Fixed Income.
- Convertible Bonds.
- Bond Fund, Inflation Protection Fund, and Socially Responsive. Fund.
- Bank Loans.
- As of 06/30/2018: (Actual) Broad Growth = 74.7%, Principal Protection = 8.3%, Crisis Risk Offset = 12.9%, Real Return = 3.1%, Opportunities = 0.2%, Other = 0.9%. (Target) Broad Growth = 72.0%, Principal Protection = 8.0%, Crisis Risk Offset = 13.0%, Real Return = 7.0%, Opportunities = 0%, Other = 0%.
- Alternative investments include private equity, private real estate, and hedge fund.
- Alternative.
- Absolute Return: 8.5% / 8.0% / 3.73% & Natural Resources/Infrastructure: 3.0% / 4.0% / 5.74%.
- Absolute Return.
- 8% is allocated to commingled funds, 2% is allocated to bank loans.
- 8.6% - 10% Public Real Assets, 2.5% Credit Opportunities.
- 2% Emerging Markets Debt, 8.63% return.
- 1) Other Fixed: Current 4.0; Target 5.0; IRR -.65 2) Multi-asset: Current 4.0; Target 5.0; IRR .81.
- Private Equity return: 18.38; Hedge Fund return: 10.81; Opportunistic return: 21.61.

# Appendix B: 2018 Study Instrument

National Conference on Public Employee Retirement Systems
*The Voice for Public Pensions*

**2018 NCPERS PUBLIC EMPLOYEE RETIREMENT SYSTEMS STUDY**

Please share your feedback so we can continue to provide the most up-to-date data addressing retirement issues for public pension plans across the nation. Your response will remain confidential and will not be shared without your permission.

Your most recent Comprehensive Annual Financial Report will help answer most questions.

If you administer more than one plan, please copy this survey for each and note the name of the fund. If you are a multiple employer plan, you may use aggregate numbers from your CAFR and respond to the questions in the generally applicable way for most of the plans you administer.

Please enter your ID number from the cover email: ☐

Plan name: ☐

What type of plan is this? (**Mark all that apply.**)

- ☐ *Defined Benefit Plan (Traditional Pension Plan)*
- ☐ *Defined Contribution Plan (Mandatory Retirement Account)*
- ☐ *Combination Plan (Blends Defined Benefit & Defined Contribution)*
- ☐ *Cash Balance Plan*

## Plan Statistics

1. **Fund statistics from most recently completed fiscal year** (if applicable). Please do not use commas, dollar signs or percentage marks in the field - it is numeric only.

| | |
|---|---|
| Total number of members (actives + deferred + retirees + beneficiaries): | |
| Total number of staff who administer the fund (full-time equivalent): | |
| Fiscal year of your CAFR referenced for this survey (MM/DD/YYYY): | |
| Market value of plan assets ($ in thousands from actuarial valuation): | |
| Plan fiduciary net position (a) ($ in thousands from actuarial valuation): | |
| Total pension liability (b) ($ in thousands from actuarial valuation): | |
| Current funded ratio (a divided by b) (%): | |
| Cost of Living Adjustment (COLA) offered by plan in last fiscal year (%): | |
| Did your plan receive the full (100%) actuarially determined contribution in the last fiscal year? | ☐ *Yes* ☐ *No* |
| Member contributions as percent of payroll (%): | |
| Employer contributions as percent of payroll (%): | |
| Investment manager expenses (basis points): | |
| Administrative expenses (basis points): | |
| Investment assumption/discount rate (%): | |
| Inflation assumption (%): | |
| Investment smoothing period (years): | |
| Amortization period (years): | |
| Type of amortization period: | ☐ *Open/Rolling* ☐ *Closed/Fixed* |

| | |
|---|---|
| Gross investment return % (1 year): | |
| Gross investment return % (5 year): | |
| Gross investment return % (10 year): | |
| Gross investment return % (20 year): | |

## Current and Target Asset Allocation / Investment Return

2. For each of the asset classes below, please specify your ***CURRENT*** and ***TARGET*** asset allocation and your ***1 YEAR GROSS INVESTMENT RETURN*** (%) for each asset class. Please note: percentages for asset allocation should equal 100%.

| ***CURRENT* asset allocation:** | | ***TARGET* asset allocation:** | | ***Gross investment return % (1 yr):*** | |
|---|---|---|---|---|---|
| Global Equity (%): | | Global Equity (%): | | Global Equity (%): | |
| Domestic Equity (%): | | Domestic Equity (%): | | Domestic Equity (%): | |
| International Equity (%): | | International Equity (%): | | International Equity (%): | |
| Global Fixed Income (%): | | Global Fixed Income (%): | | Global Fixed Income (%): | |
| Domestic Fixed Income (%): | | Domestic Fixed Income (%): | | Domestic Fixed Income (%): | |
| International Fixed Income (%): | | International Fixed Income (%): | | International Fixed Income (%): | |
| High Yield Bond (%): | | High Yield Bond (%): | | High Yield Bond (%): | |
| Real Estate (%): | | Real Estate (%): | | Real Estate (%): | |
| Private Equity/Hedge Fund/ Alternatives (%): | | Private Equity/Hedge Fund/ Alternatives (%): | | Private Equity/Hedge Fund/ Alternatives (%): | |
| Commodities (%): | | Commodities (%): | | Commodities (%): | |
| Cash Equivalents (%): | | Cash Equivalents (%): | | Cash Equivalents (%): | |
| Other (specify asset below) (%): | | Other (specify asset below) (%): | | Other (specify asset below) (%): | |

If you entered an "Other" asset class above, please specify what other class(es) your fund is currently invested?

3. Which ***retirement benefits*** below does your plan offer or is considering offering? Please skip individual items below if not applicable.

| | *Already Offering* | *Considering Offering* |
|---|---|---|
| Defined Benefit Plan (traditional pension plan in which the benefit is defined by a formula based on service and average wages) | ☐ | ☐ |
| Defined Contribution Plan (retirement account such as a 403(b) or 401(k) in which an employer's contribution is specified and employee participation is generally mandatory) | ☐ | ☐ |
| Deferred Compensation Plan (tax-deferred retirement savings account such as a 457 in which employee participation is voluntary) | ☐ | ☐ |
| Combination Plan (blends Defined Benefit and Defined Contribution elements) | ☐ | ☐ |
| In-service death benefit | ☐ | ☐ |
| Disability benefit provided either within the plan, by Social Security or by employer | ☐ | ☐ |
| An automatic post-retirement adjustment of payments (e.g. COLA) | ☐ | ☐ |
| A compounding post-retirement adjustment of payments (e.g. COLA) | ☐ | ☐ |
| An ad hoc (not necessarily automatic or compounding) post-retirement adjustment of payments (e.g. COLA) | ☐ | ☐ |
| Employer pick up of employee contributions | ☐ | ☐ |
| Deferred Retirement Option Plan (DROP - in all forms) | ☐ | ☐ |

4. Which ***retirement plan changes*** below have been implemented or are being considered by the plan or plan sponsors? Please skip individual changes below if not applicable.

| | *Already implemented* | *Considering implementing* |
|---|---|---|
| Lower the actuarial assumed rate of return | ☐ | ☐ |
| Raise benefit age/service requirements | ☐ | ☐ |
| Increase employee contributions | ☐ | ☐ |
| Hold or lengthen the amortization period to improve affordability | ☐ | ☐ |
| Shorten the amortization period to improve funded status | ☐ | ☐ |

5. Which ***business practices*** below have been implemented or are being considered by the plan or plan sponsors? Please skip individual items below if not conducted.

| | *Already implemented* | *Considering implementing* |
|---|---|---|
| Conduct a death audit | ☐ | ☐ |
| Conduct an actuarial audit by a third party actuary (includes replication of valuation and opinion on actuarial assumptions) | ☐ | ☐ |
| Conduct an information systems security audit | ☐ | ☐ |
| Conduct a building security audit | ☐ | ☐ |
| Update/strengthen an asset allocation study | ☐ | ☐ |
| Expand operational performance benchmarking | ☐ | ☐ |
| Update or enhance administrative software used for member data | ☐ | ☐ |
| Update or enhance online portal provided for members to access account information | ☐ | ☐ |
| Conduct an employer/reporting unit satisfaction assessment | ☐ | ☐ |
| Comply with new State statutory or regulatory requirements to report your funded status based on a rate of return different from your assumed rate of return | ☐ | ☐ |
| Enhance member financial wellness/retirement readiness resources | ☐ | ☐ |

6. Which ***communications and member engagement practices*** below have been implemented or are under consideration by the plan or plan sponsors? Please skip individual practices below if not conducted.

| | *Already implemented* | *Considering implementing* |
|---|---|---|
| Develop public relations plan to address "Pension Envy" | ☐ | ☐ |
| Develop staff talking points on key issues affecting the fund | ☐ | ☐ |
| Expand retirement planning education for members | ☐ | ☐ |
| Conduct a member satisfaction survey | ☐ | ☐ |
| Notify members of updated handbook/summary plan description (electronically or paper) | ☐ | ☐ |
| Actively use social media (Facebook, Twitter, etc.) to share messages with members | ☐ | ☐ |
| Conduct online educational sessions (webinars) for participants | ☐ | ☐ |

7. Which of the following ***communication methods*** does your plan or plan sponsor have the ability to conduct?

| | *Yes* | *No* |
|---|---|---|
| Capacity to send a postcard to the home address of your entire membership | ☐ | ☐ |
| Capacity to send a mass phone message to your entire membership | ☐ | ☐ |
| Capacity to send a mass text message to your entire membership | ☐ | ☐ |
| Capacity to send an e-mail to your entire membership | ☐ | ☐ |
| Does your plan have a Facebook or Twitter account? | ☐ | ☐ |
| Does your plan have a mobile app? | ☐ | ☐ |

8. Which ***oversight practices*** below have been implemented? Please skip individual practices below if not conducted.

| | Yes | No |
|---|---|---|
| Receipt of the GFOA Award of Excellence for the most recent award cycle | ☐ | ☐ |
| Receipt of an unqualified opinion from the auditor on the fund's financial statements, internal controls, and compliance with applicable laws and regulations | ☐ | ☐ |
| Conduct an actuarial valuation at least every 2 years | ☐ | ☐ |
| Board adoption and adherence to written investment policies | ☐ | ☐ |
| Board adoption of written fiduciary standards | ☐ | ☐ |
| Receipt of annual investment performance evaluation from an outside independent investment review entity | ☐ | ☐ |
| Use of a formal enterprise risk management framework | ☐ | ☐ |

9. How satisfied are you with your plan's readiness to address retirement trends and issues over the next 2 years?

| Very Dissatisfied= 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Very Satisfied= 10 |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

10. If you have an unfunded accrued actuarial liability, what strategies have you put in place to reduce it beyond traditional amortization?

11. Think about best practices. Please share a success story or plan innovation you are considering that other plans may like to learn about:

12. Which categories best describe your innovation or best practice story above? (**Please mark all that apply.**)

☐ *Retirement benefit* ☐ *Business practice* ☐ *Oversight practice*
☐ *Plan change* ☐ *Communication/ engagement practice* ☐ *Investment*

## Questions about your fund (your responses will be confidential)

13. What type of employees/beneficiaries does your fund serve? (**Please mark all that apply.**)

☐ *Township* ☐ *County* ☐ *State* ☐ *Other*
☐ *City/village* ☐ *Police/fire* ☐ *Educational*

14. What type of health plan does your pension plan sponsor? (**Please mark all that apply.**)

☐ *None, does not sponsor (skip to Q16)* ☐ *Supplemental gap health plan*
☐ *Traditional (HMO, PPO, POS, etc.)* ☐ *Healthcare subsidy*

15. Who is eligible for the health plan? (**Please mark all that apply.**) ☐ *Active members* ☐ *Retirees* ☐ *Beneficiaries*

16. Are your members eligible for Social Security coverage? ☐ *Yes* ☐ *No*

17. Are your members eligible for Medicare coverage? ☐ *Yes* ☐ *No*

18. Do you include overtime in the calculation of the retirement benefit? ☐ *Yes* ☐ *No* ☐ *N/A*

19. Does your plan provide retiree health benefits? ☐ *Yes* ☐ *No*

20. Has your plan been consulted, involved, or have had internal discussions about a state-facilitated retirement program for the private sector? ☐ *Yes* ☐ *No*

21. Does your plan allow Board Members the ability to participate via conference call and vote? ☐ *Yes* ☐ *No*

22. Which role(s) best describe your relationship to the fund? (**Please mark all that apply.**)

☐ *Staff* ☐ *Board member/ trustee* ☐ *Plan consultant* ☐ *Other*

23. May we contact you if we have additional questions? ☐ *Yes* ☐ *No*

24. Please provide your name and email so we may provide access to the interactive comparison dashboard.

**This concludes the study. Thank you for your time and cooperation.**

For more information:

National Conference on
Public Employee Retirement Systems (NCPERS)
444 N. Capitol St., NW Suite 630
Washington, D.C. 20001
Tel: 202-624-1456

# Sweeping changes proposed for NM pensions

*Dan McKay | Journal Staff Writer*

**By Dan McKay / Journal Staff Writer**

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SANTA FE – A task force established by Gov. Michelle Lujan Grisham released preliminary recommendations Thursday aimed at wiping out the $6 billion unfunded liability in New Mexico's pension system for municipal, county and state workers.

The complex proposal would require public employees and the agencies they work for to pay more into the retirement system, and it would reduce the cost-of-living adjustments available to retirees over the next three years.

Eventually, the state would abandon the annual 2% raises that retirees now get in their pensions and instead establish a profit-sharing model – with the raises fluctuating each year based on investment returns and the financial health of the retirement system.

The ideas are a preliminary recommendation, and the task force took no action on them Thursday. Legislative approval would be required to change the retirement system.

"This debate is far from over," said Diego Arencón, chairman of the task force and Lujan Grisham's deputy chief of staff. "This is just the beginning."

The governor's task force is focusing on the Public Employees Retirement Association, not the pension system for educators.

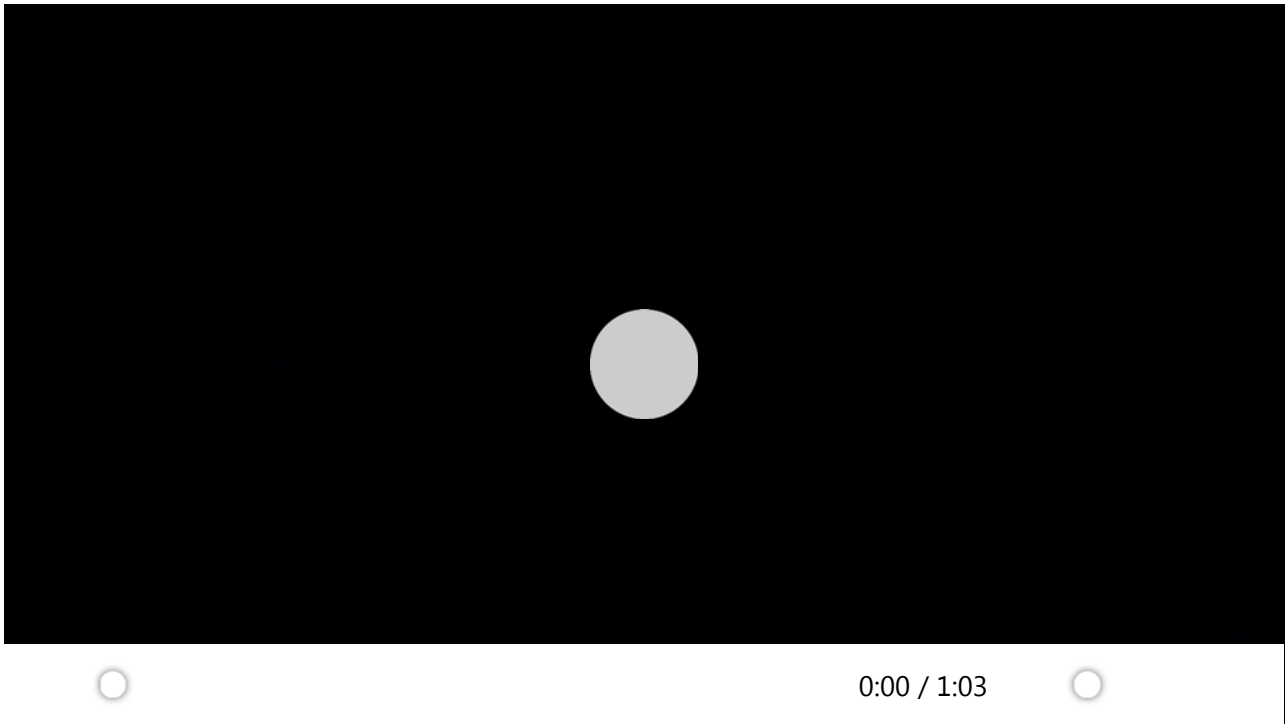
About 40,000 retirees now draw pensions from PERA, and about 50,000 employees are working and paying into the system.

Dozens of retirees packed into a committee room at the Capitol to listen to the presentation. Many slammed the proposal, arguing that they had already given up

some of their pension benefits in 2013 legislation.

Rita Sanchez, a retired city of Albuquerque employee, said retirees depend on their annual cost-of-living increases to keep up with inflation and other price increases.

“To skim from the bottom of the pot, there’s nothing left,” she told the task force. “We don’t make a lot of money – please, leave our cost of living alone.”

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A representative of local governments also expressed concern.

Leandro Cordova, a former Taos County manager who now works for the New

Mexico Association of Counties, said the recommendations for increased employee and employer contributions would reduce the take-home pay of employees and increase costs for taxpayers. Cordova is a member of the task force.

It wasn't clear Thursday how much the increased contributions would cost the state and local governments.

Nevertheless, others at the meeting – including a few firefighters – said the recommendations are a reasonable way to keep the pension fund solvent.

They noted that the pension benefits would be better, in some cases, under the recommendations.

Retirees, for example, would have to wait only two years, not seven, to start receiving their annual cost-of-living adjustments. And if investments were strong and the health of the pension fund improved, the profit-sharing component of the proposal would boost the annual raises above the 2% retirees typically get now.

Employees could also receive increased pension benefits – retiring at their full salary or more – if they worked long enough.

Sen. George Muñoz, a Gallup Democrat and member of the task force, said lawmakers should proceed cautiously on the recommendations, given their complexity and the need to explain the potential changes to retirees and current employees.

But he also said it's unrealistic to expect investment returns alone to generate the revenue needed to turn around the pension system.

"Changing pensions is not any fun," Muñoz said. "It should be a slow, well-thought-out process."

There are a variety of exceptions built into the complex proposal to help lower-income retirees and spare police and correctional officers from some of the changes.

But the new system would put the PERA on track to wipe out its $6.1 billion unfunded liability within 25 years, based on projections by actuaries working for the task force. The unfunded liability represents the difference between assets on hand and future retirement benefits owed.

Under the recommendations, the funded ratio of the retirement system would climb from about 70% this year to about 100% in 2043, based on the median projection by actuaries.

New Mexico has struggled for years with underfunded pension systems – one for educators and another for other public employees.

Pension liabilities, in fact, have already prompted a national credit rating agency to downgrade the state's bond rating.

Lujan Grisham established the task force in February after pension legislation stalled in the legislative session.

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# US yield curve sends strongest recession warning

*Colby Smith, Brendan Greeley*
*Last Updated: Thursday, August 8, 2019, 08:38*

A widely watched bond market indicator sent its strongest recession warning in more th growth outlook dimmed and questions swirled about the Federal Reserve's commitmen US-China trade tensions.

The yield on three-month US Treasury traded as much as 41.23 basis points above that government bond on Wednesday – the widest gap since March 2007. Such an inversion term yields are higher than longer-term ones – has preceded every recession of the last

The difference narrowed by about 10bp later in the day as US stock prices gained grou rally lost steam, but the persistence of the yield curve inversion underscored the anxieti

**Exacerbated**

Analysts said fears about global growth were exacerbated by interest rate cuts by New industrial production report in Germany and the growing likelihood that the UK will le

"The next recession couldn't have been better telegraphed," said Mark Holman at Twe a trade war between the two global superpowers, with both sides digging in their heels, hard Brexit, so it really does make sense to take risk off the table."

> The message that the market appears to be sending is that the Fed is behind the curve and is at risk

Michael de Pass, the global head of US Treasury trading at Citadel Securities, said the traced back to concerns the Fed is moving too slowly to lower rates.

"The message that the market appears to be sending is that the Fed is behind the curve said. "It is too early to say whether it actually is behind the curve, but that line of thinki price action over the last few sessions."

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# Lower Interest Rates Continue to Plague DB Plan Funded Status | PLANSPONSOR

*By Rebecca Moore*

Defined benefit (DB) plan funding ratios decreased throughout the month of July, primarily driven by tightening credit spreads, resulting in a decrease in the discount rate, according to Legal & General Investment Management America (LGIMA). It estimates that the average plan's funding ratio fell 0.8% to 82.3% through July.

LGIMA's Pension Solutions' Monitor report notes that, "The rates market once again took its cues from the central bank. Echoing sentiments other members had voiced in June speeches, Fed Chair Powell's comments before Congress at the Humphrey Hawkins meeting emphasized concerns over trade issues, slowing global growth, and inflation trending below target. This testimony, coupled with the release of the June FOMC minutes, set the groundwork for the first Fed cut since the financial crisis. At the July 31 meeting, the Fed cut interest rates by 25 basis points and ended their balance sheet runoff two months earlier than planned."

LGIMA estimates the discount rate's Treasury component increased by 1 basis point while the credit component tightened 7 basis points, resulting in a net decrease of 6 basis points. The negative impact due to the change in Treasury rates is a function of positive carry of the liabilities. Overall, liabilities for the average plan increased 1.21%, while plan assets with a traditional "60/40" asset allocation increased by approximately 0.28%.

Due to lower interest rates, liability values increased, and were only partially offset by muted asset performance, according to Ned McGuire, managing director and a member of the Investment Management & Research Group of Wilshire Consulting. According to the firm, the aggregate funded ratio for U.S. corporate pension plans decreased by 0.4 percentage points to end the month of July at 85.6%. It says liability values increased 0.7% for the month, while asset values increased 0.3%.

Northern Trust Asset Management (NTAM) also says positive returns in the equity market were not enough to offset higher liabilities which led to lower funded ratios. It estimates the average funded ratio for S&P 500 DB plans slipped in July from 86.5% to 86%. NTAM says global equity market returns were up approximately 0.3% during the month. The average discount rate decreased from 3.06% to 2.99%, leading to higher liabilities.

According to Mercer, the estimated aggregate funding level of pension plans sponsored by S&P 1500 companies decreased by 1% in July to 86%, as a result of a decrease in discount rates. As of July 31, the estimated aggregate deficit of $322 billion increased by $14 billion as compared to $308 billion measured at the end of June. The S&P 500 index increased 1.44% and the MSCI EAFE index decreased 1.26% in July. Typical discount rates for pension plans as measured by the Mercer Yield Curve decreased from 3.44% to 3.38%.

"Plan sponsors should review their risk management toolkit to consider whether their investment policy is aligned with the current market environment and to explore potential risk transfer activity, such as a lump sum window, which may be attractive to pursue before the end of the year," said Scott Jarboe, a partner in Mercer's Wealth Business.

However, River & Mercantile's "Retirement Update – August 2019" calls July "uneventful." "Modest movement in discount rates with generally small equity gains should leave most plans in more or less the same funded position at the end of the month as they were in at the end of June," it says.

October Three reports pension finances dipped slightly in July as long-term corporate bond yields hit record lows. Both model plans it tracks lost a fraction of 1% in July and are basically treading water (Plan A down 1%, Plan B flat) through the first seven months of 2019. Plan A is a traditional plan (duration 12 at 5.5%) with a 60/40 asset allocation, while Plan B is a largely retired plan (duration 9 at 5.5%) with a 20/80 allocation with a greater emphasis on corporate and long-duration bonds.

Brian Donohue, partner at October Three Consulting, says, "Discount rates fell a few basis points last month and have now reached the lowest yields on record. We expect most pension sponsors will use effective discount rates in the 3.2% to 3.7% range to measure pension liabilities right now." He also notes that, "Pension funding relief has reduced required plan funding since 2012, but under current law, this relief will gradually sunset by 2023, increasing funding requirements for pension sponsors that have only made required contributions."

Aon's Pension Risk Tracker shows the S&P 500 aggregate pension funded status decreased slightly in July, from 86.8% to 86.6%. Pension asset returns were positive in July, ending the month with a 0.6% return. The month-end 10-year Treasury rate increased by 2 basis points (bps) relative to the June month-end rate, and credit spreads narrowed by 7 bps. This combination resulted in a decrease in the interest rates used to value pension liabilities from 3.20% to 3.15%.