TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
BOARD OF TRUSTEES

AGENDA

DATE: Friday, November 15th, 2019
TIME: 8:30 am
PLACE: Arizona Inn – (Safari Room) 2200 East Elm Street, Tucson, AZ

Please Note: Legal action may be taken on any item listed on this agenda

Arizona Inn - Telephone: (520) 325-1541, Fax: (520) 881-5830 Directions: heading eastbound on Speedway from the intersection of Speedway and Stone, turn left (north) at Campbell, and continue to Elm Street, taking a right turn (east) onto Elm Street. Located in a residential zone on the right, approximately 3/10th's of a mile from Campbell (parking area will be to your left, directly in front of the Arizona Inn, on the left side of Elm Street).

Note: Breakfast Buffet is available, starting at 7:30am

Morning Agenda (call to order at 8:30am)

1) **Consent Agenda** (5 min)
   a. Approval of September 26th, 2019 TSRS Board Meeting Minutes
   b. Retirement ratifications for October 2019
   c. Retirement ratifications for November 2019[Note 1]
   d. September 2019 TSRS Budget vs Actual Expenses
   e. October 2019 TSRS Budget vs Actual Expenses
   f. TSRS Portfolio Composition, Transactions and Performance Review September 2019[Note 1]
   g. TSRS Portfolio Composition, Transactions and Performance Review October 2019[Note 1]

2) **Capital Markets/Economic Update – Michael Albrecht – JPMorgan** (45 min)

3) **Investment Portfolio Review –** (45 min)
   a. JPMorgan Asset Management – Shawn Parris

Morning Break (estimated at 10:00 a.m.)

4) **TSRS Disability Application and Process Discussion** (60 min)
   a. Dr. Krasner Presentation and Question/Answer Session

5) **Disability Application** (15 min)
   a. Rosario Del Torre

6) **Administrative Discussions** (30 min)
   a. Staff Update
   b. Board Member Election
   c. Approval of 2020 Meeting Schedule

Morning Time: 3 hours, 30 minutes (200 minutes)

Lunch Break (estimated time – 12:00 p.m. to 1:15 p.m.)

Note 1 – this item was unavailable at the time Board packets were distributed but will be provided electronically by November 14, 2019

TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
BOARD OF TRUSTEES
Notice of Regular Meeting / Agenda
DATE: Friday, November 15th, 2019

Reconvene at 1:15 p.m.

7) **Actuary Valuation Report for June 30, 2019 – Gabriel Roeder Smith & Assoc., - Dana Woolfrey and Paul Wood** (60 min)
   a. June 30, 2019 TSRS DRAFT valuation report and discussion
   b. Recommended Contribution Rates for 2021 Plan Year Beginning July 1, 2020, Ending June 30, 2021
   c. Review of TSRS Funding Projections
   d. Acceptance of 06/30/19 Draft Valuation Report, Adoption of FY 2021 Contribution Rates

8) **Education Session – Callan LLC – Paul Erlendson and Gordon Weightman** (60 min)
   a. Fixed Income – Index v Passive Management
   b. Infrastructure Update

Afternoon Break (estimated at 3:15 p.m.)

9) **Investment Activity Report – Callan LLC – Paul Erlendson and Gordon Weightman** (45 min)
   a. TSRS Quarterly Investment Review

10) **Fiduciary Training – Yoder and Langford – Catherine Langford** (45 min)

11) **Articles for Board Member Education / Discussion**
   a. Falling Interest Rates Wreak Havoc in US Pension System
   b. Public Pension Plans Continue to Shift Into U.S. Stocks

12) **Call to Audience**

13) **Future Agenda Items**

14) **Adjournment**

Afternoon Time: 3 hours 30 minutes (210 minutes)

* 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.

MEMORANDUM

DATE: November 8, 2019

TO: The Board of Trustees
Tucson Supplemental Retirement System

FROM: Art Cuaron
Pension & Benefits Administrator

SUBJECT: Expense Question Response

In response to questions from Mr. Wysocki at the meeting held September 26, 2019, I have identified the following explanatory information:

1) It appears that the personnel expenditures will be over budget by year end, but why would this happen if we have a vacant position?
   a. The City pays 26 pay periods in 12 months, which means that for two months there will be an extra pay period. For this fiscal year, the payroll system will run three times in August. Therefore, it posted approximately $27,000 of pay, but in 10 other months it will post only $18,000 of pay. This additional pay cycle is part of the normal course of business and it will occur again later in the fiscal year. We do not anticipate exceeding budget at year-end.

2) There are two negative expenses being posted in August, what do these represent?
   a. When paying invoices, the City matches the date of the service being provided to the timing of the expense. This is the appropriate accounting treatment for this type of expense and we anticipate this occurring again at the conclusion of FY 20.

      In this particular case, our investment consultant and our investment manager provided us service during the second quarter of calendar year 2019 (April – June), submitted invoices, received payment and the City then accrued those expenses back to the appropriate time period as follows:

Date	Vendor Action	City Action
April, May, June of 2019	Performed work for City	
July of 2019	Sent invoice to City	City paid invoice
August of 2019		City used journal entries to reduce expense in August (FY20) and increase expense in June (FY19)

TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
BOARD OF TRUSTEES
MEETING MINUTES

DATE: **Thursday, September 26, 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
Ana Urquijo, HR Director
Mark Rubin, Chairman
James Wysocki, Elected Retiree Representative
Michael Coffey, Elected Representative (arrived at 8:44 am)

Staff Present Art Cuaron, Pension & Benefits Administrator
Tina Gamez, Administrative Assistant

Guests Present Pete Saxton, Pension Manager
Dawn Davis, Lead Pension Analyst
Dave Deibel, Deputy City Attorney
Catherine Langford, Yoder & Langford – TSRS Legal Counsel (via Telephone)

Absent/Excused: Jorge Hernandez, Elected Representative
Kevin Larson, City Manager Appointee

Chairman Mark Rubin called the meeting to order at 8:31 am

A. **Consent Agenda (00:00-01:35)**
1. Retirement Ratifications for September 2019
2. August 2019 TSRS Budget Vs. Actual Expenses
3. August 2019 Board Meeting Minutes
4. TSRS August Investment Measurement Services Monthly Review

A motion to pull item A2 and approve items A1, A3 and A4 of the Consent Agenda was made by Jim Wysocki, 2nd by Joyce Garland, passes unanimously (Jorge Hernandez & Kevin Larson & Michael Coffey absent/excused).

Jim Wysocki asked about the budget to actual report. Art responded that he would research the answer and get back to the Board. A motion to approve item A2 was made by Jim Wysocki, 2nd by Joyce Garland, passes unanimously (Jorge Hernandez & Kevin Larson & Michael Coffey absent/excused).

B. **Call to Audience (01:36-01:46)**

None Heard

C. **Disability Application* (01:47-09:55)**
1. Sheila Osuna

A motion to enter executive session was made by Ana Urquijo, 2nd by Jim Wysocki, and passes unanimously (Jorge Hernandez & Kevin Larson absent/excused).

A motion to return to regular session was made by Joyce Garland, 2nd by Jim Wysocki, and passes unanimously (Jorge Hernandez & Kevin Larson absent/excused).

A motion was made by Jim Wysocki to approve Sheila Osuna Disability Application, 2nd by Joyce Garland. The Disability Application of Ms. Osuna was approved unanimously (Jorge Hernandez & Kevin Larson absent/excused).

D. **Administrative Discussions (09:56-11:10)**
   1. Internal Audit Update

Art Cuaron briefed the Board on the Internal Audit Update. He stated that the staff has continued to work with the appropriate departments and divisions to complete the benefit payment process. Once it's completed he will be bringing back to the Board.

Discussion held, no formal action was taken.

   2. Update on Staff Recruitment **(11:11-13:49)**

Art Cuaron briefed the Board the about the current vacant position for pension assistant. The recruitment was successful; an offer has been made and accepted.

Mark Rubin asked if any staff will attend the retreat.

Art Cuaron stated yes, certain staff does attend the retreat, and the new candidate will be at the retreat and will be supporting the Board.

Discussion held, no formal action taken.

E. **Articles & Readings for Board Member Education / Discussion**
   1. Commentary: Board Composition Drives Performance in Public Plans
   2. GRS Perspectives – Understanding Actuarial Assumptions
   3. Why the Fed Lowered Interest Rates AGAIN

F. **Future Agenda Items (13:50-16:29)**

G. **Adjournment (16:30-17:00)**

A motion to adjourn the meeting was made by Ana Urquijo, 2nd by Joyce Garland, and passed by a vote of 5 to 0.

Adjourned 9:00 am

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

AUDIO RECORDING ON FILE WITH THE CITY CLERK'S OFFICE

Ratification Report for TSRS Board of Trustees

Application Dates: 09/11/19 - 10/10/19 | **Report Date: October 2019**

Name of Applicant	Type	Retirement Date	Age	Credited Service	Estimated calc or Final calc*	Avg Final Monthly Pay	Option	Pension Amount
Christopher E Hale	Deferred Retirement	9/20/2019	62.00	17.59	Final	8,133.45	J&S 100	2,848.67
Sheila R Osuna	Disability Retirement	9/26/2019	56.97	22.41	Estimated	3,585.55	J&S 100	1,722.13
Matthew D Sommers	Normal Retirement	9/28/2019	62.77	22.36	Estimated	3,278.25	Single Life	1,649.12
Chyrll L Meldgaard	Normal Retirement	10/2/2019	62.61	21.65	Estimated	3,356.44	Single Life	1,635.31
Cheryl J Avila	Normal Retirement	10/2/2019	65.44	31.96	Estimated	6,928.05	J&S 100	4,494.63
Thomas Rodriguez	Normal Retirement	10/5/2019	65.40	32.96	Estimated	4,050.37	J&S 75	2,696.12
Wayne J Rossi	Normal Retirement	10/5/2019	65.94	22.52	Estimated	5,410.62	J&S 100	2,477.90
Richard M Byrd	Normal Retirement	10/10/2019	61.07	24.21	Estimated	7,024.65	J&S 100	3,428.17

* 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 Watts

Reviewed By: Pete Sato

Information Not Printed

1.c

Agenda item was not available at the time of distribution and therefore, has not been distributed electronically

A hard copy will be distributed at the meeting

Report ID : FIN-COT-BA-0001
Run Date : 11/07/2019
Run Time : 02:11 PM

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

Parameter Page

Parameters and Prompts

Fiscal Year	2020
Accounting Period	3
Fund	*
Department	900
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: September, 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	5,749,126.19	5,749,126.19	0.00	17,232,090.92	17,232,090.92	71,300,000	54,067,909.08	75.83 %
Total for 100 - PAYROLL CHGS	**0.00**	**5,749,126.19**	**5,749,126.19**	**0.00**	**17,232,090.92**	**17,232,090.92**	**71,300,000**	**54,067,909.08**	**75.83 %**
Total for Unit 9001 - Normal Retiree Benefit	**0.00**	**5,749,126.19**	**5,749,126.19**	**0.00**	**17,232,090.92**	**17,232,090.92**	**71,300,000**	**54,067,909.08**	**75.83 %**

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City of Tucson
Budget vs Actual Expenses
Through: September, 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	375,850.01	375,850.01	0.00	1,131,849.38	1,131,849.38	4,600,000	3,468,150.62	75.39 %
Total for 100 - PAYROLL CHGS	**0.00**	**375,850.01**	**375,850.01**	**0.00**	**1,131,849.38**	**1,131,849.38**	**4,600,000**	**3,468,150.62**	**75.39 %**
Total for Unit 9003 - Normal Retiree Beneficiary Benefit	**0.00**	**375,850.01**	**375,850.01**	**0.00**	**1,131,849.38**	**1,131,849.38**	**4,600,000**	**3,468,150.62**	**75.39 %**

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City of Tucson
Budget vs Actual Expenses
Through: September, 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	163,026.67	163,026.67	0.00	490,952.60	490,952.60	2,100,000	1,609,047.40	76.62 %
Total for 100 - PAYROLL CHGS	**0.00**	**163,026.67**	**163,026.67**	**0.00**	**490,952.60**	**490,952.60**	**2,100,000**	**1,609,047.40**	**76.62 %**
Total for Unit 9020 - Disability Retiree Benefit	**0.00**	**163,026.67**	**163,026.67**	**0.00**	**490,952.60**	**490,952.60**	**2,100,000**	**1,609,047.40**	**76.62 %**

City of Tucson
Budget vs Actual Expenses
Through: September, 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	18,864.00	18,864.00	0.00	59,647.43	59,647.43	300,770	241,122.57	80.17 %
108 - DOWNTOWN ALLOWANCE & DISCOUNTED TRANSIT PASSES	0.00	80.78	80.78	0.00	244.82	244.82	2,700	2,455.18	90.93 %
113 - TSRS PENSION CONTRIBUTION	0.00	5,187.60	5,187.60	0.00	16,226.96	16,226.96	82,720	66,493.04	80.38 %
114 - FICA (SOCIAL SECURITY)	0.00	1,362.64	1,362.64	0.00	4,267.56	4,267.56	21,680	17,412.44	80.32 %
115 - WORKERS COMPENSATION INSURANCE	0.00	145.44	145.44	0.00	1,002.20	1,002.20	6,550	5,547.80	84.70 %
116 - GROUP PLAN INSURANCE	0.00	2,588.18	2,588.18	0.00	8,625.78	8,625.78	34,840	26,214.22	75.24 %
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**	**28,228.64**	**28,228.64**	**0.00**	**90,014.75**	**90,014.75**	**545,260**	**455,245.25**	**83.49 %**
202 - TRAVEL	0.00	1,370.74	1,370.74	0.00	2,480.74	2,480.74	18,000	15,519.26	86.22 %
204 - TRAINING	0.00	2,500.00	2,500.00	0.00	2,830.00	2,830.00	14,000	11,170.00	79.79 %
205 - PARKING SERVICE	0.00	65.00	65.00	0.00	188.00	188.00	500	312.00	62.40 %
212 - CONSULTANTS AND SURVEYS	0.00	11,435.44	11,435.44	0.00	11,435.44	11,435.44	436,000	424,564.56	97.38 %
213 - LEGAL	0.00	0.00	0.00	0.00	9,739.50	9,739.50	50,000	40,260.50	80.52 %
215 - AUDITING AND BANK SERVICES	0.00	3,300.00	3,300.00	0.00	3,300.00	3,300.00	380,000	376,700.00	99.13 %
219 - MISCELLANEOUS PROFESSIONAL SERVICES	0.00	2,180.00	2,180.00	0.00	3,700.00	3,700.00	884,000	880,300.00	99.58 %
221 - INSUR-PUBLIC LIABILITY	0.00	10.39	10.39	0.00	42.53	42.53	2,970	2,927.47	98.57 %
228 - HAZARDOUS WASTE INSURANCE	0.00	178.44	178.44	0.00	432.90	432.90	660	227.10	34.41 %
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: September, 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	38,000.00	38,000.00	99,486.88	38,000.00	137,486.88	51,000	(86,486.88)	#######
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	63,663.83	63,663.83	0.00	302,624.63	302,624.63	3,750,000	3,447,375.37	91.93 %
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	300.00	300.00	1,500	1,200.00	80.00 %
Total for 200 - PROF CHARGES	**0.00**	**122,703.84**	**122,703.84**	**99,486.88**	**375,073.74**	**474,560.62**	**10,153,590**	**9,679,029.38**	**95.33 %**
311 - OFFICE SUPPLIES	0.00	0.00	0.00	0.00	129.73	129.73	9,000	8,870.27	98.56 %
312 - PRINTING,PHOTOGRAPHY,REPRODUCTION	0.00	0.00	0.00	0.00	826.13	826.13	9,000	8,173.87	90.82 %
314 - POSTAGE	0.00	48.95	48.95	0.00	88.27	88.27	12,000	11,911.73	99.26 %
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	0.00	0.00	0.00	92.37	92.37	0	(92.37)	0.00%
Total for 300 - SUPPLIES	**0.00**	**48.95**	**48.95**	**0.00**	**1,136.50**	**1,136.50**	**32,250**	**31,113.50**	**96.48 %**
Total for Unit 9021 - Pension Fund Administration	**0.00**	**150,981.43**	**150,981.43**	**99,486.88**	**466,224.99**	**565,711.87**	**10,731,100**	**10,165,388.13**	**94.73 %**

City of Tucson
Budget vs Actual Expenses
Through: September, 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	34,002.33	34,002.33	0.00	102,738.92	102,738.92	370,000	267,261.08	72.23 %
Total for 100 - PAYROLL CHGS	**0.00**	**34,002.33**	**34,002.33**	**0.00**	**102,738.92**	**102,738.92**	**370,000**	**267,261.08**	**72.23 %**
Total for Unit 9022 - Disability Retiree Beneficiary Bene	**0.00**	**34,002.33**	**34,002.33**	**0.00**	**102,738.92**	**102,738.92**	**370,000**	**267,261.08**	**72.23 %**

City of Tucson
Budget vs Actual Expenses
Through: September, 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	40,651.65	40,651.65	0.00	215,622.40	215,622.40	2,736,000	2,520,377.60	92.12 %
Total for 100 - PAYROLL CHGS	**0.00**	**40,651.65**	**40,651.65**	**0.00**	**215,622.40**	**215,622.40**	**2,736,000**	**2,520,377.60**	**92.12 %**
Total for Unit 9023 - ACTIVE MEMBER REFUNDS-CON	**0.00**	**40,651.65**	**40,651.65**	**0.00**	**215,622.40**	**215,622.40**	**2,736,000**	**2,520,377.60**	**92.12 %**

City of Tucson
Budget vs Actual Expenses
Through: September, 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	85.67	85.67	0.00	570.46	570.46	50,000	49,429.54	98.86 %
Total for 100 - PAYROLL CHGS	**0.00**	**85.67**	**85.67**	**0.00**	**570.46**	**570.46**	**50,000**	**49,429.54**	**98.86 %**
Total for Unit 9025 - INTEREST ON REFUNDS	**0.00**	**85.67**	**85.67**	**0.00**	**570.46**	**570.46**	**50,000**	**49,429.54**	**98.86 %**

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City of Tucson
Budget vs Actual Expenses
Through: September, 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	0.00	0.00	0.00	29,829.21	29,829.21	200,000	170,170.79	85.09 %
Total for 100 - PAYROLL CHGS	**0.00**	**0.00**	**0.00**	**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**	**0.00**	**0.00**	**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**	**6,513,723.95**	**6,513,723.95**	**99,486.88**	**19,669,878.88**	**19,769,365.76**	**92,087,100**	**72,317,734.24**	**78.53 %**
Total for Department 900 - TUCSON SUPPL RETIREME	**0.00**	**6,513,723.95**	**6,513,723.95**	**99,486.88**	**19,669,878.88**	**19,769,365.76**	**92,087,100**	**72,317,734.24**	**78.53 %**
Grand Totals	**0.00**	**6,513,723.95**	**6,513,723.95**	**99,486.88**	**19,669,878.88**	**19,769,365.76**	**92,087,100**	**72,317,734.24**	**78.53 %**

Report ID : FIN-COT-BA-0001
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Run Time : 02:25 PM

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

Parameter Page

Parameters and Prompts

Fiscal Year	2020
Accounting Period	4
Fund	*
Department	900
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: October, 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	5,761,445.17	5,761,445.17	0.00	22,993,536.09	22,993,536.09	71,300,000	48,306,463.91	67.75 %
Total for 100 - PAYROLL CHGS	**0.00**	**5,761,445.17**	**5,761,445.17**	**0.00**	**22,993,536.09**	**22,993,536.09**	**71,300,000**	**48,306,463.91**	**67.75 %**
Total for Unit 9001 - Normal Retiree Benefit	**0.00**	**5,761,445.17**	**5,761,445.17**	**0.00**	**22,993,536.09**	**22,993,536.09**	**71,300,000**	**48,306,463.91**	**67.75 %**

City of Tucson
Budget vs Actual Expenses
Through: October, 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	382,058.87	382,058.87	0.00	1,513,908.25	1,513,908.25	4,600,000	3,086,091.75	67.09 %
Total for 100 - PAYROLL CHGS	**0.00**	**382,058.87**	**382,058.87**	**0.00**	**1,513,908.25**	**1,513,908.25**	**4,600,000**	**3,086,091.75**	**67.09 %**
Total for Unit 9003 - Normal Retiree Beneficiary Benefit	**0.00**	**382,058.87**	**382,058.87**	**0.00**	**1,513,908.25**	**1,513,908.25**	**4,600,000**	**3,086,091.75**	**67.09 %**

City of Tucson
Budget vs Actual Expenses
Through: October, 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	162,046.05	162,046.05	0.00	652,998.65	652,998.65	2,100,000	1,447,001.35	68.90 %
Total for 100 - PAYROLL CHGS	**0.00**	**162,046.05**	**162,046.05**	**0.00**	**652,998.65**	**652,998.65**	**2,100,000**	**1,447,001.35**	**68.90 %**
Total for Unit 9020 - Disability Retiree Benefit	**0.00**	**162,046.05**	**162,046.05**	**0.00**	**652,998.65**	**652,998.65**	**2,100,000**	**1,447,001.35**	**68.90 %**

Report ID : FIN-COT-BA-0001
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City of Tucson
Budget vs Actual Expenses
Through: October, 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	20,428.80	20,428.80	0.00	80,076.23	80,076.23	300,770	220,693.77	73.38 %
108 - DOWNTOWN ALLOWANCE & DISCOUNTED TRANSIT PASSES	0.00	92.32	92.32	0.00	337.14	337.14	2,700	2,362.86	87.51 %
113 - TSRS PENSION CONTRIBUTION	0.00	5,617.92	5,617.92	0.00	21,844.88	21,844.88	82,720	60,875.12	73.59 %
114 - FICA (SOCIAL SECURITY)	0.00	1,483.27	1,483.27	0.00	5,750.83	5,750.83	21,680	15,929.17	73.47 %
115 - WORKERS COMPENSATION INSURANCE	0.00	89.17	89.17	0.00	1,091.37	1,091.37	6,550	5,458.63	83.34 %
116 - GROUP PLAN INSURANCE	0.00	2,588.17	2,588.17	0.00	11,213.95	11,213.95	34,840	23,626.05	67.81 %
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**	**30,299.65**	**30,299.65**	**0.00**	**120,314.40**	**120,314.40**	**545,260**	**424,945.60**	**77.93 %**
202 - TRAVEL	0.00	2,514.42	2,514.42	0.00	4,995.16	4,995.16	18,000	13,004.84	72.25 %
204 - TRAINING	0.00	2,785.00	2,785.00	0.00	5,615.00	5,615.00	14,000	8,385.00	59.89 %
205 - PARKING SERVICE	0.00	77.00	77.00	0.00	265.00	265.00	500	235.00	47.00 %
212 - CONSULTANTS AND SURVEYS	0.00	52,530.00	52,530.00	0.00	63,965.44	63,965.44	436,000	372,034.56	85.33 %
213 - LEGAL	0.00	5,962.00	5,962.00	0.00	15,701.50	15,701.50	50,000	34,298.50	68.60 %
215 - AUDITING AND BANK SERVICES	0.00	0.00	0.00	0.00	3,300.00	3,300.00	380,000	376,700.00	99.13 %
219 - MISCELLANEOUS PROFESSIONAL SERVICES	0.00	10.00	10.00	0.00	3,710.00	3,710.00	884,000	880,290.00	99.58 %
221 - INSUR-PUBLIC LIABILITY	0.00	15.89	15.89	0.00	58.42	58.42	2,970	2,911.58	98.03 %
228 - HAZARDOUS WASTE INSURANCE	0.00	97.21	97.21	0.00	530.11	530.11	660	129.89	19.68 %
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: October, 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	99,486.88	38,000.00	137,486.88	51,000	(86,486.88)	#######
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	344,999.40	344,999.40	0.00	647,624.03	647,624.03	3,750,000	3,102,375.97	82.73 %
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	60.00	60.00	0.00	360.00	360.00	1,500	1,140.00	76.00 %
Total for 200 - PROF CHARGES	**0.00**	**409,050.92**	**409,050.92**	**99,486.88**	**784,124.66**	**883,611.54**	**10,153,590**	**9,269,978.46**	**91.30 %**
311 - OFFICE SUPPLIES	0.00	287.72	287.72	0.00	417.45	417.45	8,500	8,082.55	95.09 %
312 - PRINTING,PHOTOGRAPHY,REPRODUCTION	0.00	1,426.45	1,426.45	0.00	2,252.58	2,252.58	9,000	6,747.42	74.97 %
314 - POSTAGE	0.00	0.00	0.00	0.00	88.27	88.27	12,000	11,911.73	99.26 %
317 - COMPUTER SOFTWARE < $100,000	0.00	0.00	0.00	0.00	0.00	0.00	500	500.00	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	0.00	0.00	0.00	92.37	92.37	0	(92.37)	0.00%
Total for 300 - SUPPLIES	**0.00**	**1,714.17**	**1,714.17**	**0.00**	**2,850.67**	**2,850.67**	**32,250**	**29,399.33**	**91.16 %**
Total for Unit 9021 - Pension Fund Administration	**0.00**	**441,064.74**	**441,064.74**	**99,486.88**	**907,289.73**	**1,006,776.61**	**10,731,100**	**9,724,323.39**	**90.62 %**

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

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

City of Tucson
Budget vs Actual Expenses
Through: October, 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	36,221.60	36,221.60	0.00	138,960.52	138,960.52	370,000	231,039.48	62.44 %
Total for 100 - PAYROLL CHGS	**0.00**	**36,221.60**	**36,221.60**	**0.00**	**138,960.52**	**138,960.52**	**370,000**	**231,039.48**	**62.44 %**
Total for Unit 9022 - Disability Retiree Beneficiary Bene	**0.00**	**36,221.60**	**36,221.60**	**0.00**	**138,960.52**	**138,960.52**	**370,000**	**231,039.48**	**62.44 %**

City of Tucson
Budget vs Actual Expenses
Through: October, 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	212,949.82	212,949.82	0.00	428,572.22	428,572.22	2,736,000	2,307,427.78	84.34 %
Total for 100 - PAYROLL CHGS	**0.00**	**212,949.82**	**212,949.82**	**0.00**	**428,572.22**	**428,572.22**	**2,736,000**	**2,307,427.78**	**84.34 %**
Total for Unit 9023 - ACTIVE MEMBER REFUNDS-CON	**0.00**	**212,949.82**	**212,949.82**	**0.00**	**428,572.22**	**428,572.22**	**2,736,000**	**2,307,427.78**	**84.34 %**

City of Tucson
Budget vs Actual Expenses
Through: October, 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	1,325.64	1,325.64	0.00	1,896.10	1,896.10	50,000	48,103.90	96.21 %
Total for 100 - PAYROLL CHGS	**0.00**	**1,325.64**	**1,325.64**	**0.00**	**1,896.10**	**1,896.10**	**50,000**	**48,103.90**	**96.21 %**
Total for Unit 9025 - INTEREST ON REFUNDS	**0.00**	**1,325.64**	**1,325.64**	**0.00**	**1,896.10**	**1,896.10**	**50,000**	**48,103.90**	**96.21 %**

City of Tucson
Budget vs Actual Expenses
Through: October, 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	0.00	0.00	0.00	29,829.21	29,829.21	200,000	170,170.79	85.09 %
Total for 100 - PAYROLL CHGS	**0.00**	**0.00**	**0.00**	**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**	**0.00**	**0.00**	**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**	**6,997,111.89**	**6,997,111.89**	**99,486.88**	**26,666,990.77**	**26,766,477.65**	**92,087,100**	**65,320,622.35**	**70.93 %**
Total for Department 900 - TUCSON SUPPL RETIREME	**0.00**	**6,997,111.89**	**6,997,111.89**	**99,486.88**	**26,666,990.77**	**26,766,477.65**	**92,087,100**	**65,320,622.35**	**70.93 %**
Grand Totals	**0.00**	**6,997,111.89**	**6,997,111.89**	**99,486.88**	**26,666,990.77**	**26,766,477.65**	**92,087,100**	**65,320,622.35**	**70.93 %**

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Macro and asset allocation outlook

November 2019

Michael Albrecht, CFA
Global Strategist, Multi-Asset Solutions
michael.g.albrecht@jpmorgan.com

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J.P.Morgan
Asset Management

Macro and asset allocation outlook – Outline

- Overview of J.P. Morgan Multi-Asset Solutions
- Tactical asset allocation outlook (12-18 months)
- Long-term capital market assumptions (10-15 years)

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J.P. Morgan Multi-Asset Solutions

Extensive resources dedicated to multi-asset class investing

- Proprietary **Long Term Capital Market Assumptions**
- **Dedicated quantitative, qualitative and manager research**
- Access to **$1.9 trillion** global J.P. Morgan Asset Management platform
  - Over **1,000 investment professionals**
  - **~500 equity, fixed income and alternative strategies**

Portfolios designed to help clients meet their investment goals

- Relationships with some of the **world's largest and most sophisticated investors and platforms**
- Grown to **$252 billion AUM** across **61 multi-asset strategies**
- Suite of multi-asset solutions
  - Outcome Oriented
  - Target Date
  - Balanced
  - Liability-Aware
  - Macro Thematic
  - Convertibles

Consistent risk-adjusted returns over the long term

- Recognized for **leadership and innovation**
  - DC Multi-Asset Fund Manager of the Year — UK Pension Awards[1]
  - Multi-Asset Manager of the Year — Fundmap Institutional Asset Management Awards

88
MULTI-ASSET INVESTMENT PROFESSIONALS

11+
AVERAGE YEARS OF EXPERIENCE

45+
YEARS MANAGING MULTI-ASSET STRATEGIES

$252
BILLION IN ASSETS UNDER MANAGEMENT

TOP
10
RANKED GLOBAL MULTI-ASSET MANAGER

33 MULTI-ASSET
FUNDS RATED **4- OR 5- STARS** BY MORNINGSTAR

See "Additional information" at the back of this presentation for further information. Data as of September 30, 2019.

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Multi-Asset Solutions Team

Co-Heads, AM Solutions
Mike O'Brien and Rob O'Rahilly

38 Portfolio Management

Jeff Geller
CIO, Multi-Asset Solutions Americas
41 years experience
New York

Ove Fladberg
CIO, Investor Funds
19 years experience
Columbus

Construct and manage a broad range of strategies across benchmark aware, total return and outcome-oriented

25 Investment Specialist

Rob Stewart
Head of Global Investment Specialists
25 years experience
Hong Kong

Maddi Dessner
Head of US Investment Specialists
23 years experience
New York

Emily Cao
Head of Defined Contribution Investment Specialists
11 years experience
New York

Work with clients to better understand challenges and design solutions; engage and inform clients in multi-asset strategies

17 Strategy and Research

Qualitative Research

John Bilton
Head of Global Multi-Asset Strategy
24 years experience
London

Develop thematic asset allocation research and insights into business cycle and market dislocations

Quantitative Research

Katherine Santiago
Head of Global Multi-Asset Research
14 years experience
New York

Develop and maintain systematic asset allocation framework and cross-asset class risk/return models

Manager Research

Robert White
Head of Multi-Asset Manager Research
27 years experience
New York

Evaluate investment teams' philosophies/objectives, processes, and performance to gauge alpha generation potential within each asset class

As of March 28, 2019. Team member counts include investment professionals: Vice President and above. There can be no assurance that the professionals currently employed by J.P. Morgan Asset Management (JPMAM) will continue to be employed by JPMAM or that the past performance or success of any such professional serves as an indicator of such professional's future performance or success.

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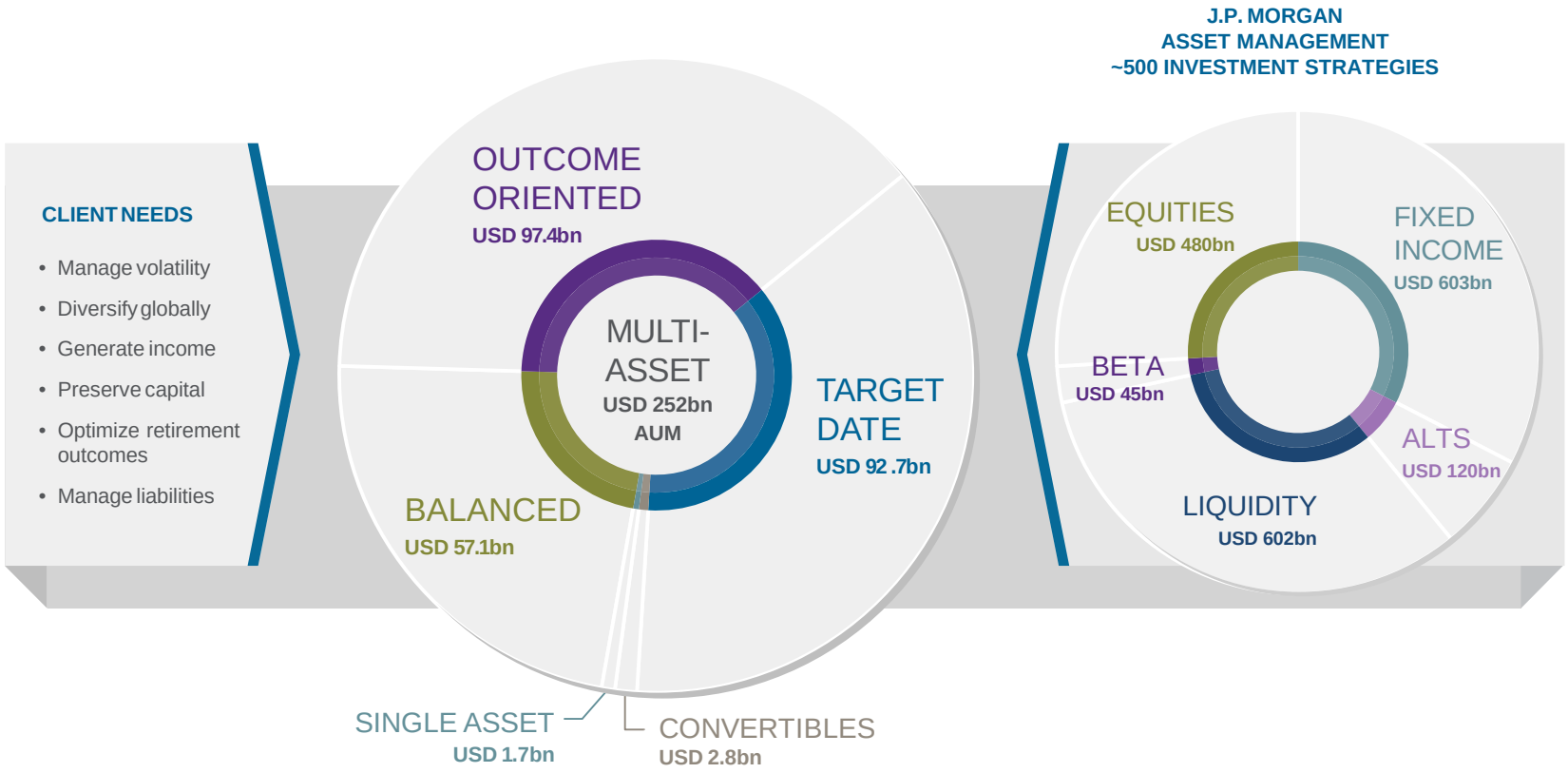
Outcome oriented: Needs-driven solutions harnessing our investment strategies

Building the right investment portfolio



Source: J.P. Morgan Asset Management. AUM is as of September 30, 2019 shown in U.S. dollars. Figures do not include custom glidepath and retail advisory assets.

Tactical asset allocation outlook (12-18 months)

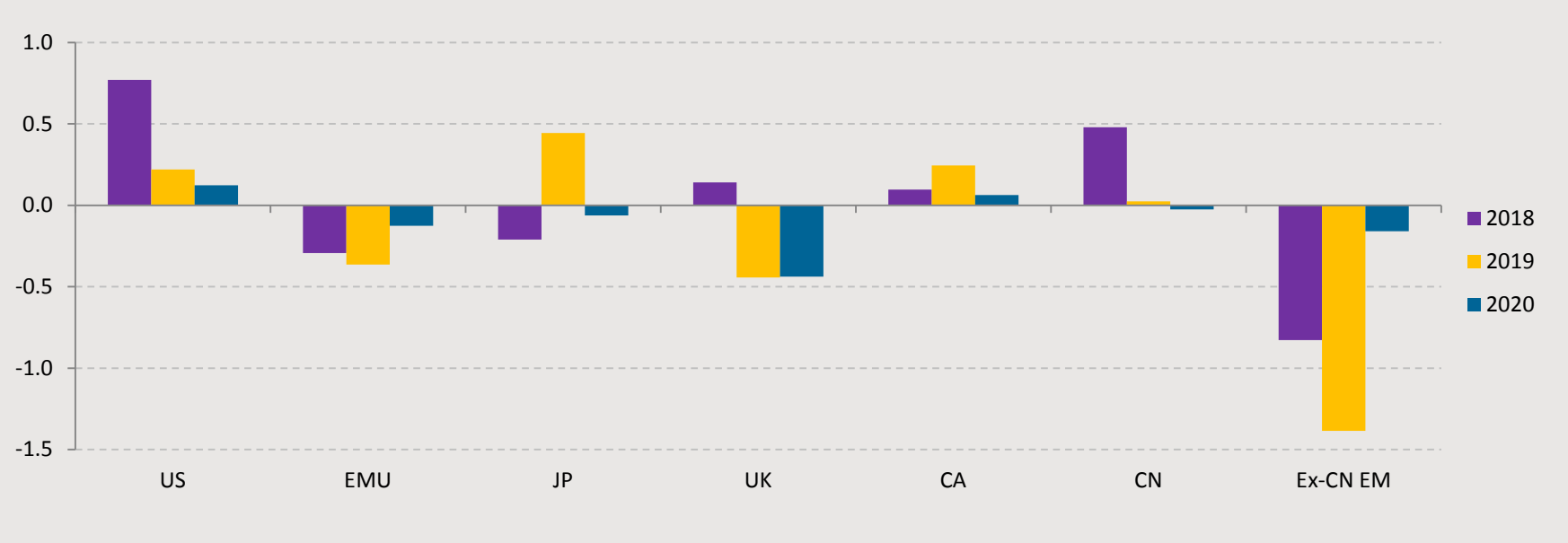
J.P.Morgan
Asset Management

Macro

Global growth set to come in slightly below trend for the year as a whole

- The global economy is stuck in an phase of somewhat below-trend growth; tail risks are elevated.
- Annual GDP forecasts mask period of sub-trend growth in 2H19/1H20; trade deal unlikely to fuel sharp rebound.

Real GDP (q/q%, saar)



Source: Haver, Datastream, Bloomberg, J.P. Morgan Asset Management; data and estimates as of September 2019.

J.P.Morgan Asset Management

Macro

The qualitative business cycle scorecard for the U.S.

		Early Cycle	Mid Cycle	Late Cycle	Recession
Economic metrics	Overall economic output	Below potential, rising	Near potential, rising	**Above potential, rising**	Contracting
	Consumption	Low, lagging income	Recovering	**High, ahead of income**	Falling
	Capital investment	Low as % of GDP	Rising, moderate as % of GDP	**High as % of GDP**	Falling
	Residential investment	Low as % of GDP	Rising, moderate as % of GDP	**High as % of GDP**	Contracting
	Price inflation	Below central bank target, stable	**Below CB target, rising**	Above CB target	Falling
	Wage inflation	Low, stable	**Moderate, rising**	High	Falling
	Private credit formation	Low, starting to rise	Rising in line with output	**Rising faster than output**	Falling
	Personal saving rate	High relative to income	**Starting to decline**	Low relative to income	Rising vs. income (excl. deep recession)
	Unemployment	Well above NAIRU	Above NAIRU	**Around or below NAIRU**	Rising sharply
	Consumer confidence	Low	Moderate	**Exuberant**	Falling
Asset market metrics	EPS revision ratios	Downgrade cycle, improving trend	Upgrade cycle, improving trend	Upgrade cycle, falling trend	**Downgrade cycle, falling trend**
	Corporate margins	High	Peaking	**Declining**	Low
	Credit spreads	Wide, contracting	Tight, stable	**Past cyclical trough**	Wide, unstable
	Aggressive issuance	Low as share of total	**Moderate as share of total**	High as share of total	Nonexistent
	M&A activity	Low	Moderate	**High**	Nonexistent
	Yield curve	Rates low, curve steep	Rates rising, curve flattening	**Rates high, curve flat**	Rates falling, curve steepening
	Volatility	Vol high, skew falling	Vol low, skew low	**Vol starting to rise, skew rising**	Vol high, skew high

Source: JPMAM Global Multi-Asset Strategy; assessments as of November 2019.

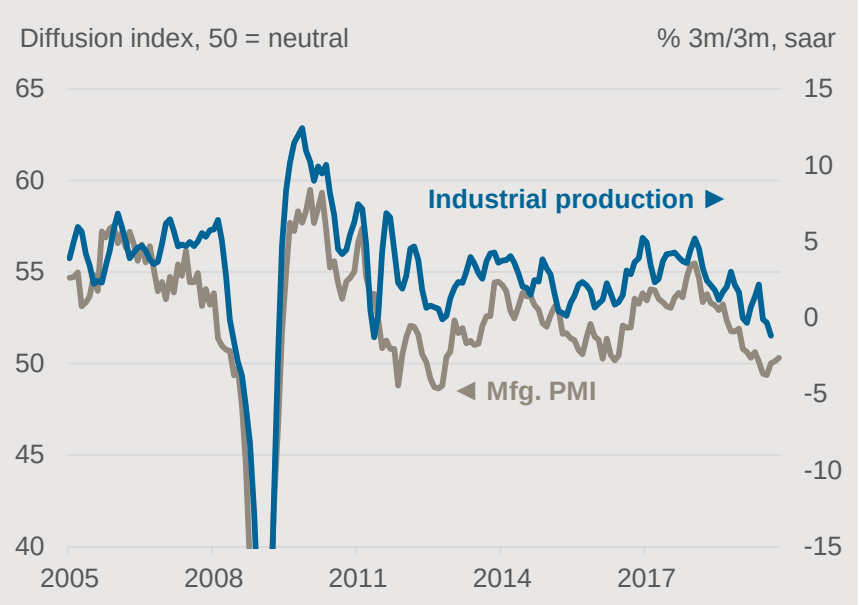
J.P.Morgan Asset Management

Macro

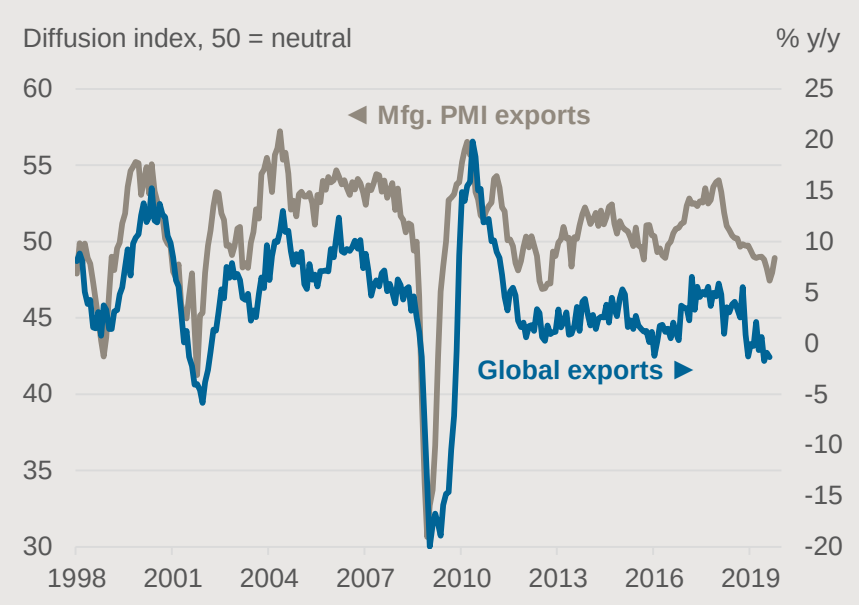
Closer to the end of the manufacturing and trade slump

- Industrial activity stayed weak in the third quarter, but the trough seems to be approaching, with manufacturers now seemingly making some progress in clearing excess inventories.
- Global trade shrank at the start of 2019 but appears to be levelling off.

Manufacturing PMI turned upward, with favourable details



New export orders component of the global mfg. PMI bounced



Source: Haver Analytics, JPMSL, JPMAM Multi-Asset Solutions; data as of October 2019

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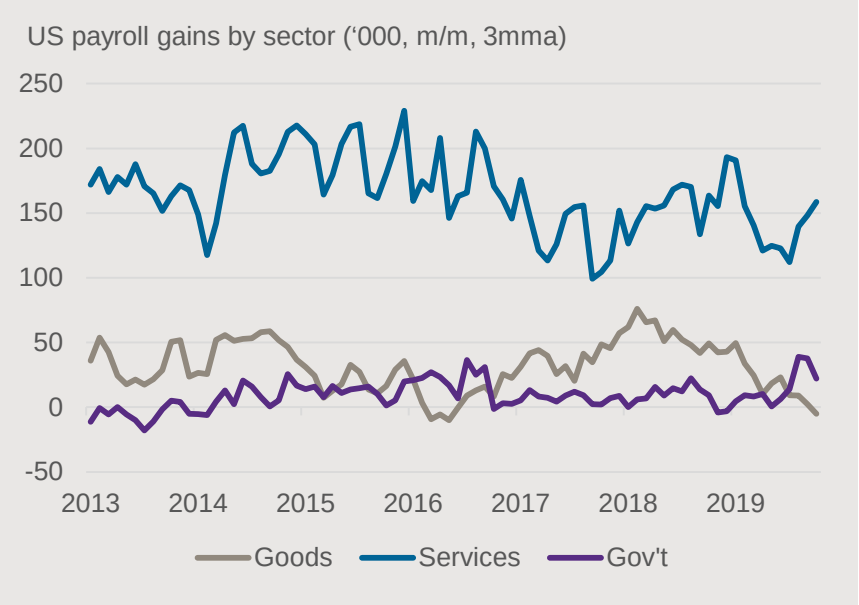
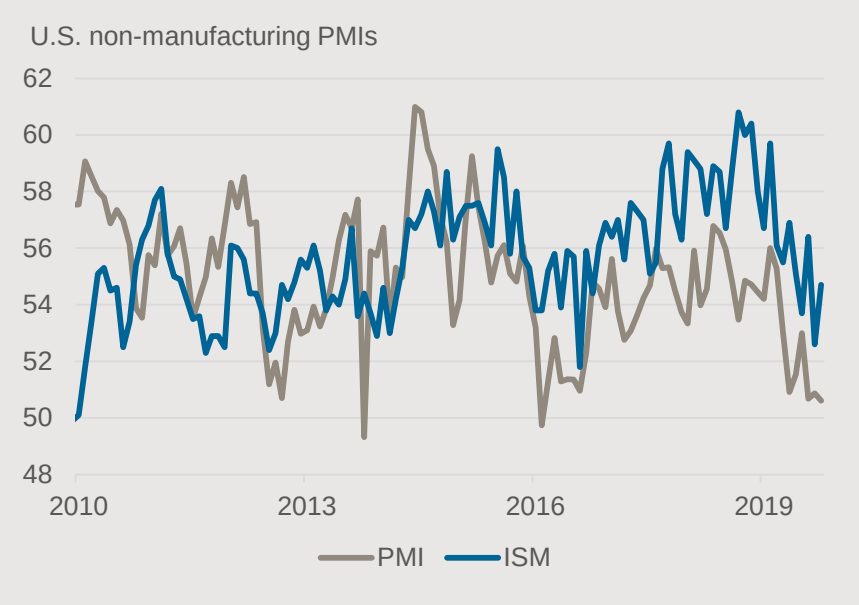
U.S. labor market and some surveys turning more favorable

- In the US, spillovers from manufacturing to services look less worrisome than before.
- Services employment has picked up, and non-manufacturing PMIs have moved higher (in the case of the ISM) or are moving sideways (Markit).

Jobs now more encouraging



U.S. services activity troughed



Source: Haver Analytics, JPMAM Multi-Asset Solutions; data as of October 2019

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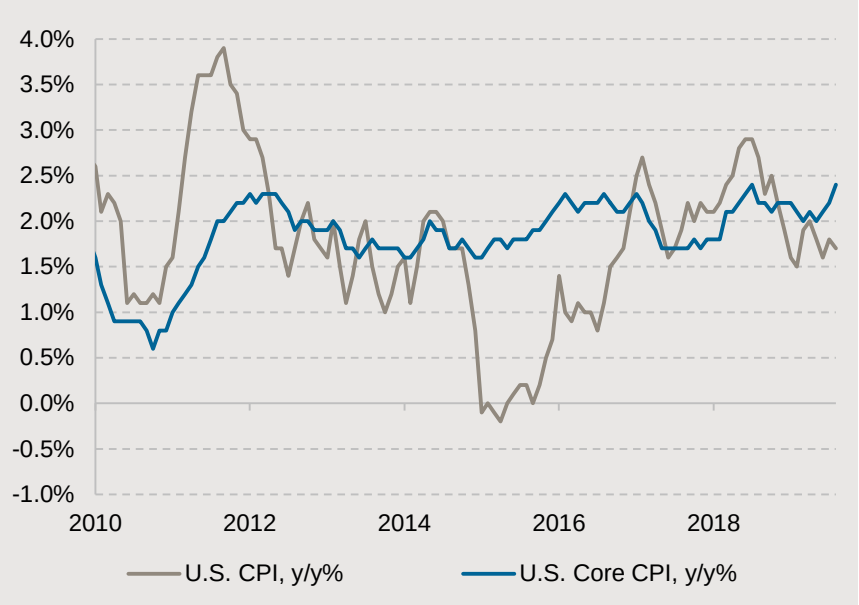
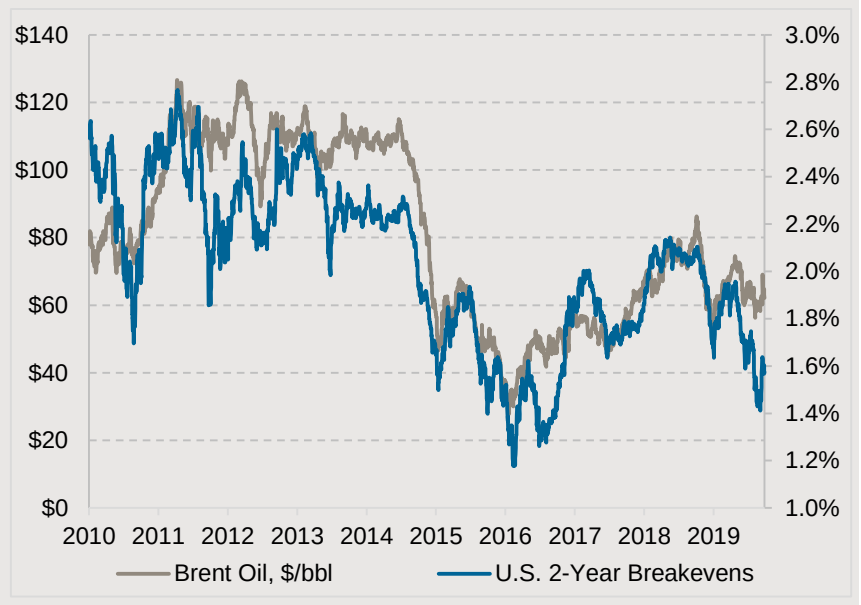
U.S. inflation has momentum, but is unlikely to be a constraint for the Fed

- U.S. inflation has picked up recently, especially on the core measure which has reached 2.4% y/y
- However, inflation pricing has remained moderate, esp. vs. oil prices, and expectations are stable

U.S. inflation has some momentum



Oil prices vs breakevens



Source: Datastream, Bloomberg, J.P. Morgan Asset Management; data and estimates as of September 2019.

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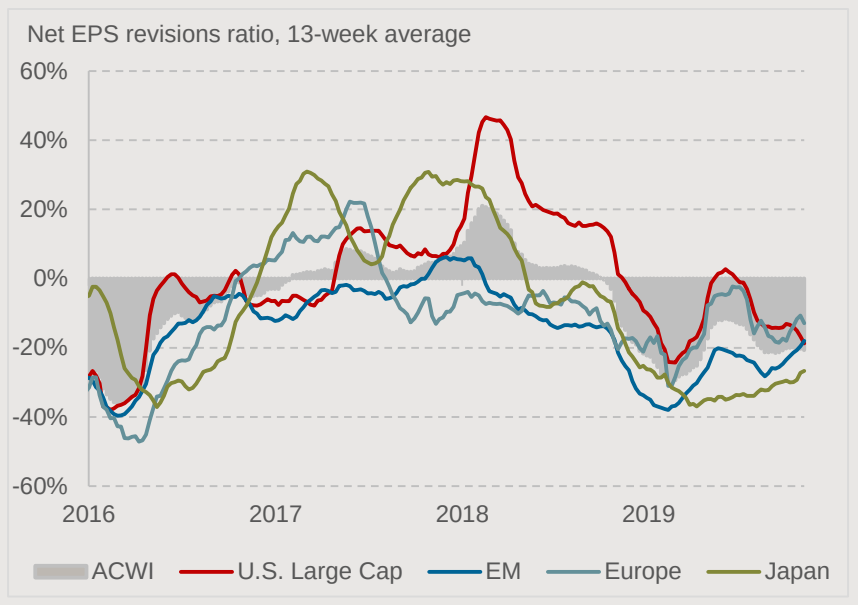
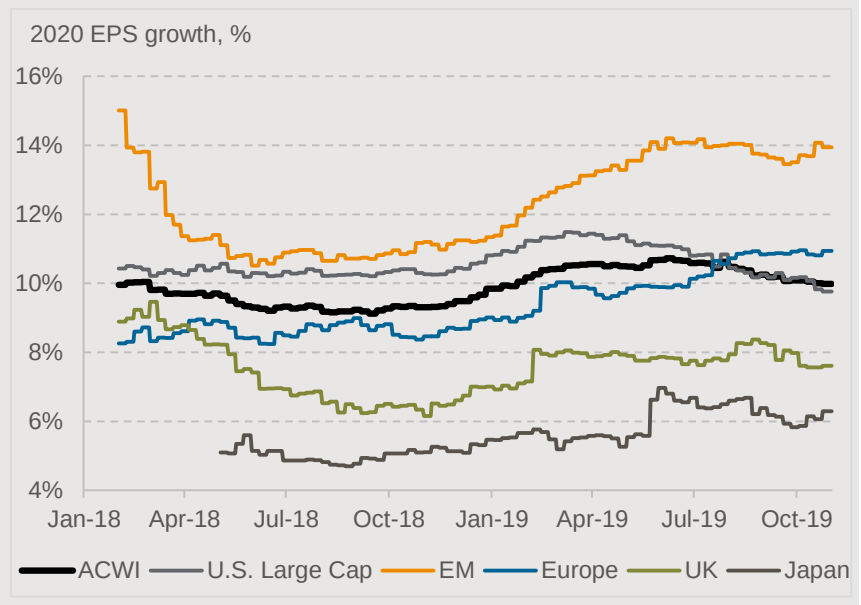
Equities
Worst of the earnings headwind has passed

- Earnings picture still weak and 2020 expectations remain too elevated, but no longer to unusual degree.
- Trade war disruptions unlikely to disappear in any wholesale fashion.

Earnings revisions ratios still negative but now improving



And 2020 EPS expectations still somewhat too optimistic



Source: Datastream, Bloomberg, J.P. Morgan Asset Management; data and estimates as of November 2019.

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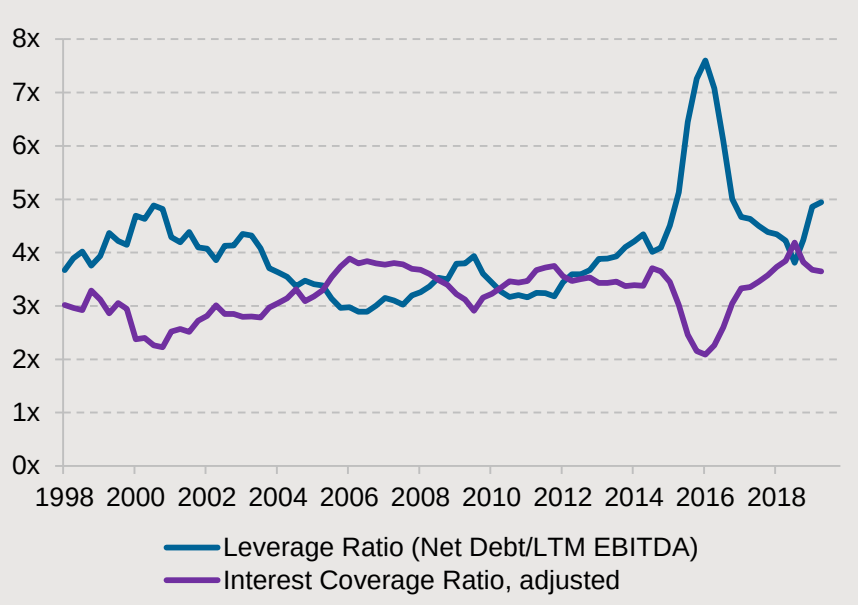
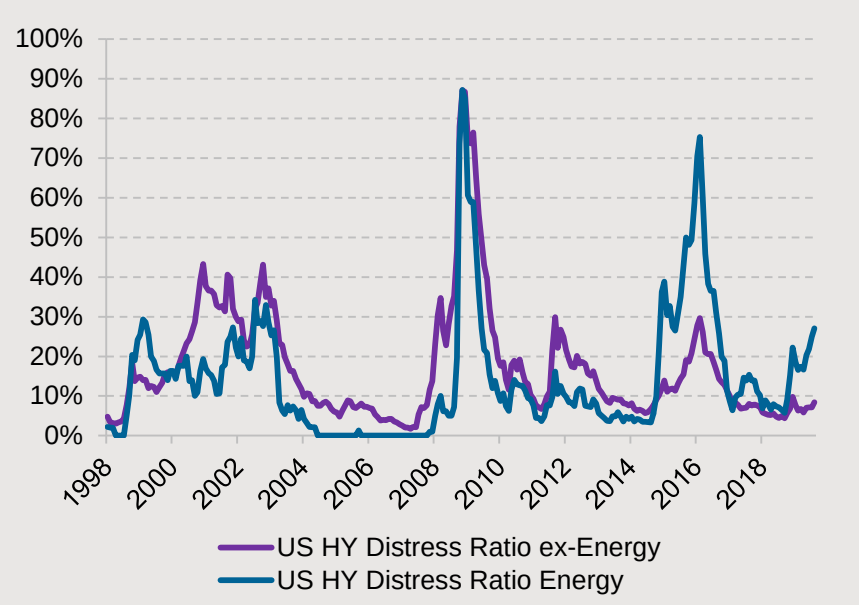
Credit
Increasingly mature cycle sees us move up in quality

- High yield fundamentals deteriorating at the margin, with higher leverage and lower coverage
- Default volume and distress has increased, but driven by energy names: energy remains a key vulnerability

U.S. HY leverage and interest coverage ratios



The energy sector accounts for much of the distress in credit



Source: Bank of America Merrill Lynch, Bloomberg, Securities Industry and Financial Markets Association, Federal Reserve Bank of New York, J.P. Morgan Asset Management; data as of September. 2019. HY-High Yield. Distress ratio: the number of bonds with an OAS > 1000bps divided by the total number of bonds outstanding at a particular point in time.

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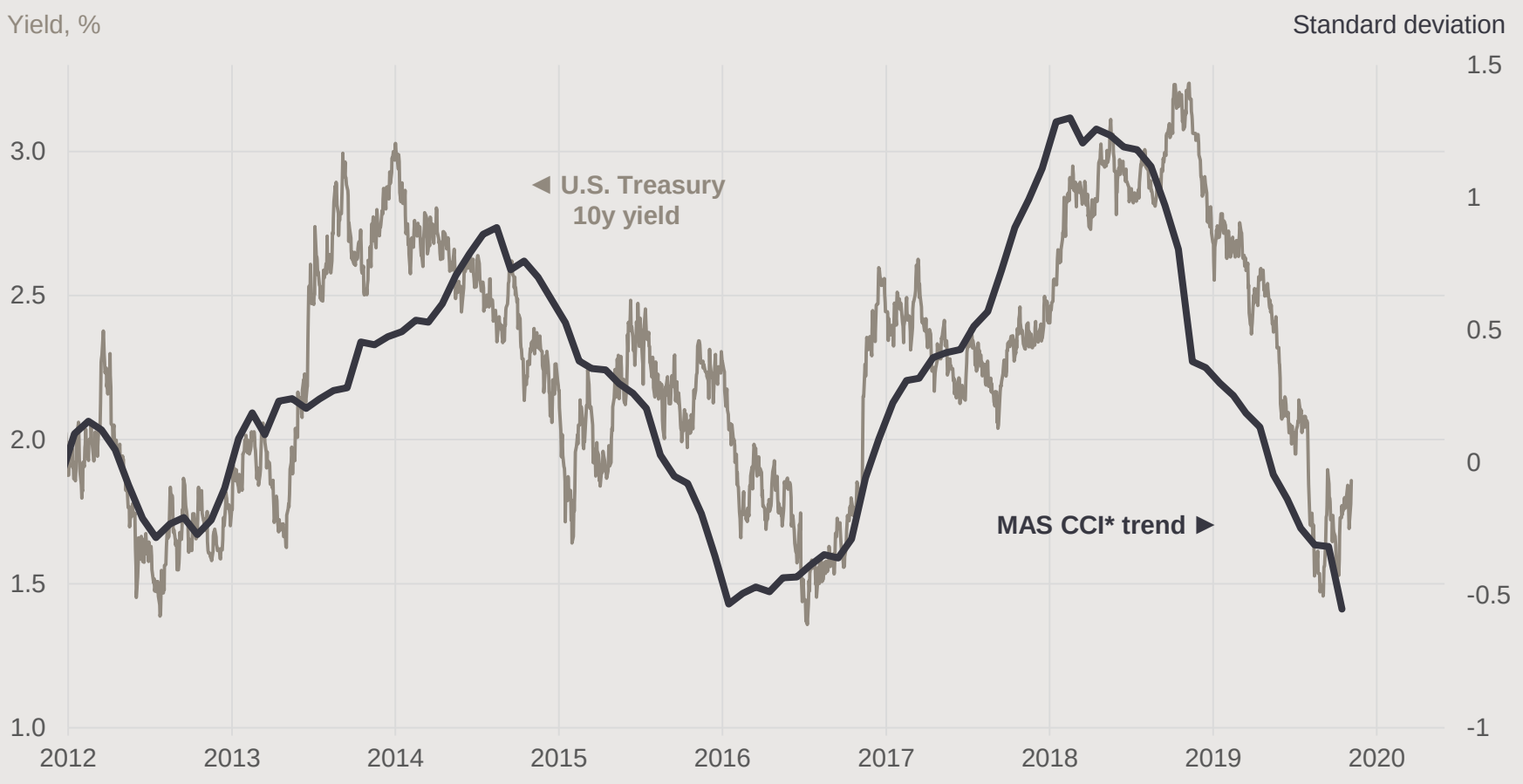
Bonds

Core scenario: growth stabilization and improved sentiment to lift yields modestly



* Current Conditions Index (CCI) is proprietary high-frequency composite measure of economic activity and sentiment.

Source: J.P. Morgan Asset Management Multi-Asset Solutions (MAS). Data as of 5 November 2019.

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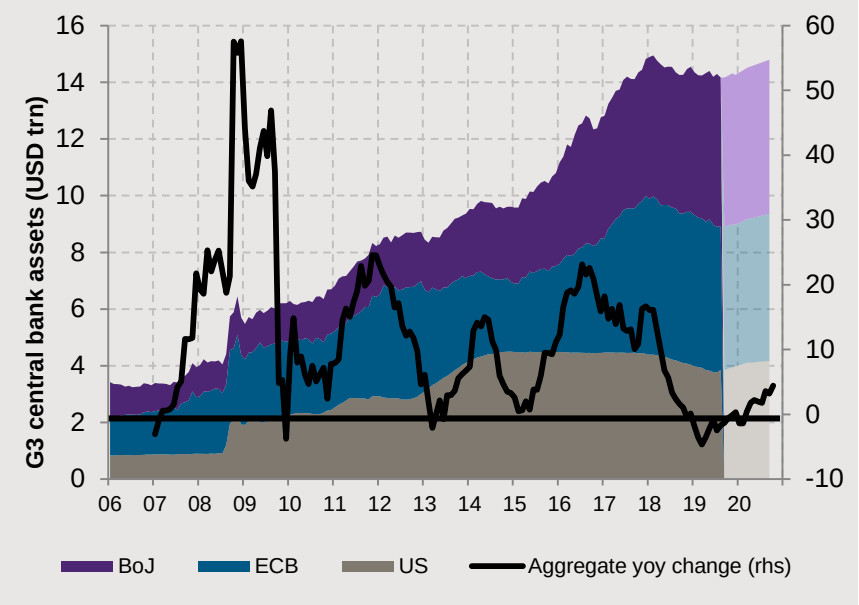
Bonds

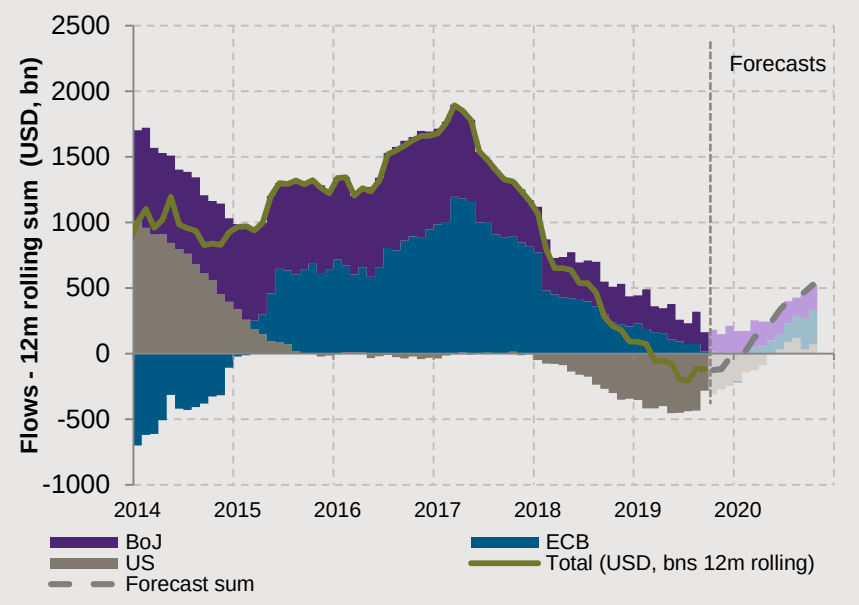
Net supply: ECB restarted QE, Fed now re-expanding balance sheet

- ECB adding €20bn/month in asset purchases to balance sheet
- Fed restarted technical asset purchases to keep balance sheet constant (about $10bn/month), but doing so by buying Treasury Bills; also injecting a $200-250bn buffer of excess liquidity into the system.

Stock of QE: ECB to restart QE



Flows (12m sum): 12m rolling flows to turn positive



Source: Bloomberg, J.P.Morgan Asset Management Multi-Asset Solutions; data as of September 2019.

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Bonds

Scenario analysis: average expected returns is positive for duration

- **Rates still grind higher in core scenario**, but elevated recession odds still skew risks to lower rates.
- Over the next year, relative to the market, our **expected value of future yields is lower and flatter**.

Economic scenarios with Fed & yield curve implications*

Scenarios -- *where we end up in one year*				Prob. (%)	Fed hikes by EOY '20	U.S. yields in 12m (%/bps)		
#		U.S. economy	Fed is…			2y	10y	2s10s
1		Bigger slowdown or recession in 2019/20, e.g., on corporate caution	Forced to continue cutting aggressively	30	-7.5	0.50	0.75	25
2	core scenarios	Growth stabilized back to trend; core PCE remains subdued (average 1.9%)	Making another cut or two	5	-1	1.55	1.80	25
3	core scenarios	Growth stabilized back to trend; core PCE remains subdued (average 1.9%)	Patient again, feels no pressure to hike or cut	60	0	1.95	2.05	10
4	core scenarios	Growth stabilized back to trend; core PCE remains subdued (average 1.9%)	Hiking on labor market tightness and/or financial instability	2.5	1	2.20	2.10	-10
5		Growth stabilization with core PCE pickup to >2.5% y/y in 2020	Forced to hike more aggressively	2.5	2	2.75	2.60	-15
		1-year forward, MAS probability-weighted average:			**-2.2**	**1.52**	**1.66**	**14**
		1-year forward, market-implied outcome:			**-2.1**	**1.64**	**1.92**	**28**
		Current levels:				**1.64**	**1.86**	**22**

Source: Bloomberg, J.P.Morgan Asset Management Multi-Asset Solutions; views as of 5 November 2019. * Each scenario represents a stylized range of outcomes, with projections defined as each's mean expectation.

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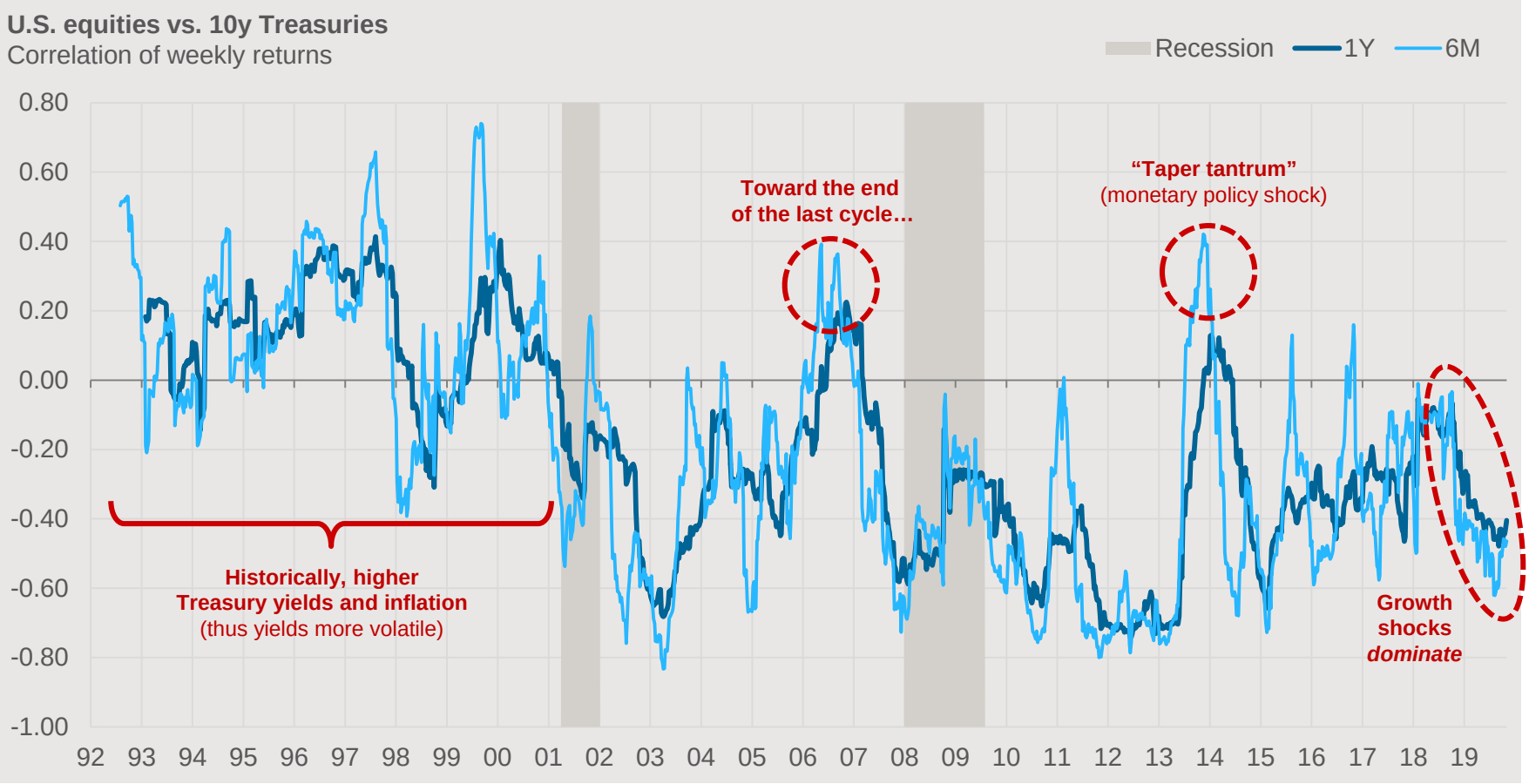
Portfolio construction

Stock-bond correlation remains negative, especially amid growth shocks



Source: Bloomberg, J.P.Morgan Asset Management Multi-Asset Solutions; data as of 7 November 2019.

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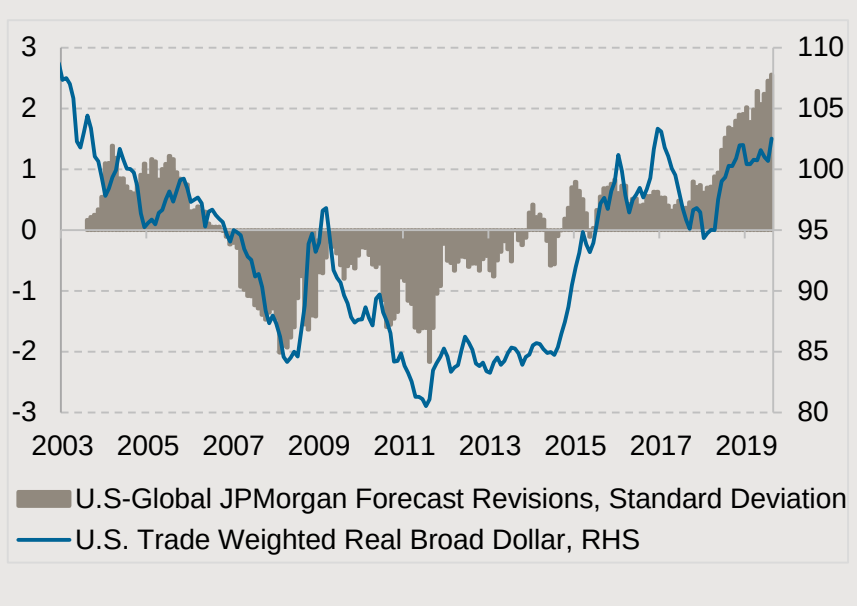
FX

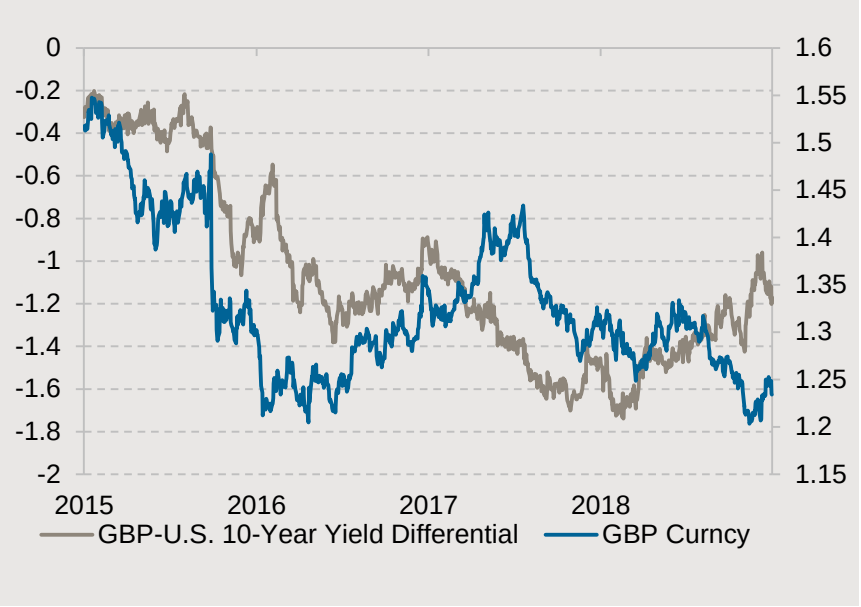
USD upgraded, with growth and money market stress supportive

- The resilience of the domestic U.S. economy, and recent money market stress, is supporting USD
- Brexit continues to weigh on GBP, potential general election adds further uncertainty

US-Row growth differential still supportive



We still see downside risk to GBP



Source: Bloomberg, J.P.Morgan Asset Management Multi-Asset Solutions; data and estimates as of September 2019.

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Watch list
How durable is macro and policy stability?

- ***Trade war***: *U.S.-China Phase I and done?; Possible ramp up vs. Europe; USMCA passage likely but no slam dunk*
- ***Global industry***: *Sand still in the gears from Sept. tariff hike? Tech cycle head fake for EM Asia*
- ***Private sector resilience***: *Labor market slowdown weighs on sentiment (Japan as cautionary tale); Latent effects of policy uncertainty; Credit conditions turning?*
- ***Monetary policy***: *Following the Fed is less fun when it leads to a pause; How much cushion if inflation ticks up?*
- ***Geopolitics***: *Looking forward to the return of Brexit fears; Re-emergence of oil price vol*
- ***U.S. politics***: *If impeachment matters, it will be through negative interactions with govt. spending bill, trade negotiations, and the 'Warren premium'*

Source: JPMAM Global Multi-Asset Strategy; assessments as of November 2019.

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MAS GST key views (12m unless stated):

Focus	Views	Key considerations	Conviction
Macro & policy Environment	1/ Global growth below trend but stabilizing	Given tentative signs of stabilization, no longer extrapolating weakness into additional weakness. Coming quarters look better for growth, though forecast expects return to trend only in H2 2020	Moderate
	2/ No US recession in 2020	Recession risk ebbing from acute levels as geopolitical threats recede and signal extraction problem wanes. Reason for cautious optimism on sustainability of cycle if self-inflicted wounds can be avoided	Low
	3/ Policy uncertainty dragging on growth	U.S.-China deal helpful but not a panacea for the outlook. Prospect of re-escalation, latent uncertainty, and pass-through to private sector confidence cause growth effects to linger	High
	4/ Central banks responding to downside risks	Inflation stable at or below central bank targets, perpetuating dovish CB tone; FOMC done with its "recalibration," creating pockets of divergence in the global easing cycle	High
Fixed income & Currency	5/ Countervailing forces on bond yields	Stabilizing growth and slowing Fed easing cycle lend upward bias to yields, but tame inflation, ECB purchases, and lingering growth doubts makes 2%+ unlikely. Tail risks lingering in the background	High
	6/ USD range-bound in base case scenario	Possible upturn in global growth would likely push USD lower, but dollar remains a high-yielder. EM FX may benefit from stable CNY, signs of industrial improvement, but upside capped by dovish EM CBs	Low
	7/ Credit: equity-like asymmetry, upside capped	Credit likely to provide some carry in a low-vol environment, but with higher default rates and low riskless rates, all-in yields are limited; higher quality spreads remain tight and vulnerable to vol pick up	Moderate
DM Equity	8/ Equity outlook asymmetric	Trade risks and soft earnings cap upside to stocks, but with growth bottoming and sentiment improving, market likely to look through earnings downgrades. Easy policy supportive of valuations	Moderate
	9/ US core OW, tactical on other regions	Still like the U.S. as high quality, but increasing preference for cyclical markets like EM as growth stabilizes. EU and JP in the middle of the pack; still dislike U.S. small cap	Moderate
EM	10/ EM levered to upside risks	Trade issues and soft global growth have weighed on EM assets over the past two years. While risks still remain, relative valuations suggest a role for EM as a means of capturing upside	Moderate

Source: JPMAM Global Multi-Asset Strategy; assessments as of November 2019.

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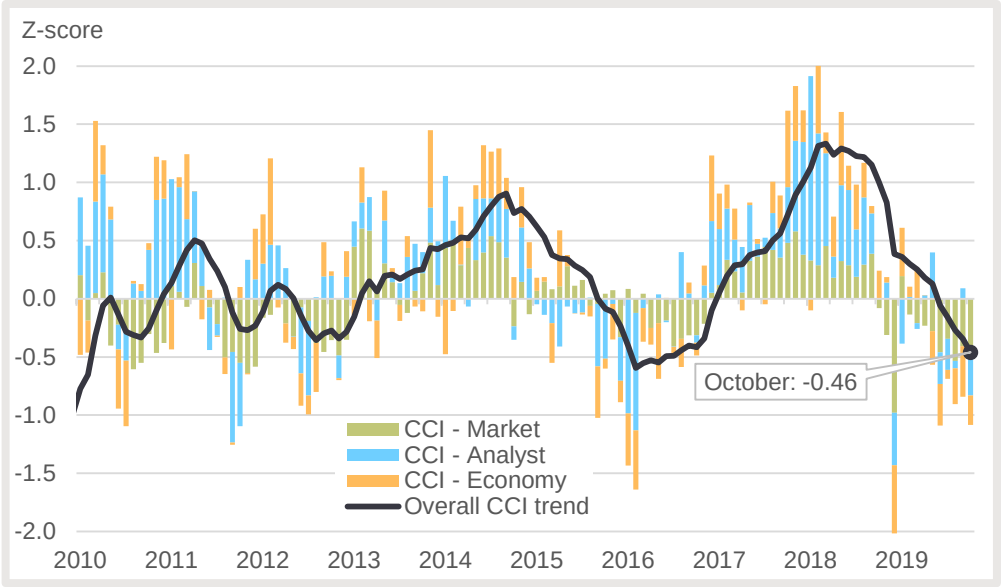
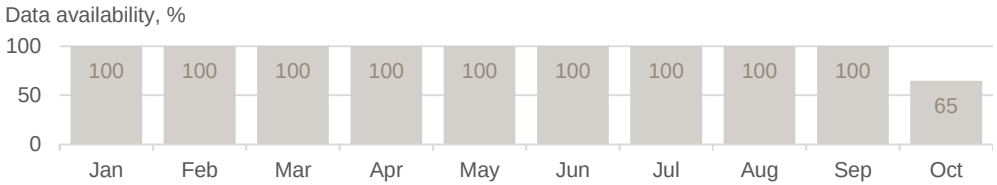
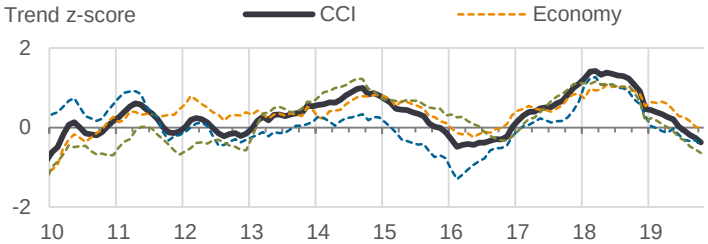
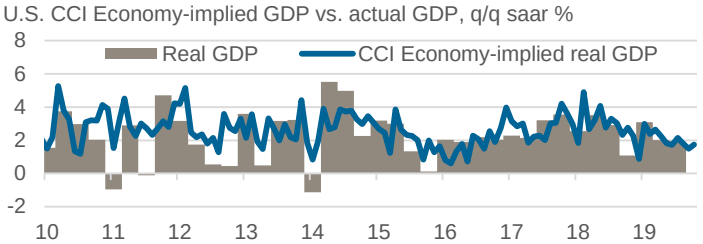
MAS U.S. Current Conditions Index (CCI)

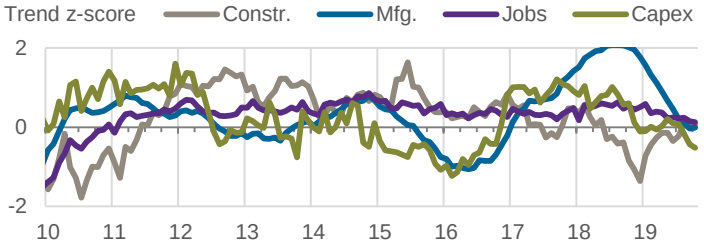
Remains at below-average pace, with only faint signs of stabilization











Source: JPMAM Global Multi-Asset Strategy. Data as of 5 November 2019.

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MAS Active Asset Allocation

Asset		Opportunity set	Chg	Negative				Positive		
MAIN ASSET CLASSES		Equities/bonds		○	○	●	○	○	○	○
		Duration		○	○	○	●	○	○	○
		Credit	▼	○	○	○	●	○	○	○
		Commodities		○	○	○	●	○	○	○
		Real estate		○	○	○	●	○	○	○
		Cash	▲	○	○	○	○	●	○	○
PREFERENCE BY ASSET CLASS	EQUITIES	U.S. large cap		○	○	○	○	●	●	○
		U.S. small cap		○	○	●	○	○	○	○
		Canada	▲	○	○	○	○	●	○	○
		Europe ex-UK		○	○	●	○	○	○	○
		UK		○	○	○	●	○	○	○
		Japan		○	○	○	●	○	○	○
		Australia		○	○	○	●	○	○	○
		Hong Kong	▼	○	○	●	○	○	○	○
		Emerging markets		○	○	●	○	○	○	○
	REAL EST.	Drect real estate		○	○	○	●	○	○	○
		U.S. REITs		○	○	○	●	○	○	○
	SOVEREIGN FIXED INCOME	U.S. Treasuries		○	○	○	○	●	○	○
		U.S. TIPS		○	○	○	○	●	○	○
		Euro, core (Bund)		○	○	○	●	○	○	○
		Euro, periphery (BTP)	▲	○	○	○	○	●	○	○
		UK Gilts	▼	○	○	●	○	○	○	○
		Japanese JGBs		○	○	○	●	○	○	○
		Canadian gov't bonds	▲	○	○	○	●	○	○	○
		Australian gov't bonds	▼	○	○	○	●	○	○	○
	CREDIT	Investment grade	▲	○	○	○	○	●	○	○
		U.S. high yield	▼	○	○	○	●	○	○	○
		European high yield	▼	○	○	○	●	○	○	○
		Emerging markets debt		○	○	○	●	○	○	○
	FX	USD	▲	○	○	○	○	●	○	○
		EUR		○	○	○	●	○	○	○
		GBP		○	○	●	○	○	○	○
		JPY	▼	○	○	○	●	○	○	○

Key Takeaways

- Growth to come in below trend; households & labor market still robust
- Caution on risk; maintain underweight on stocks vs bonds
- Tail risks rising; trim credit to neutral and move up in quality
- Small upgrade to USD cash to allow for tactical deployment opportunities
- Easy policy supports duration but yield volatility on the rise
- ECB QE supportive of peripheral and EU credit but less so for EU Equity
- Earnings still under pressure; U.S. Equity O/W; Europe and EM U/W
- USD likely range-bound but risks skewed to upside on liquidity stress

Source: J.P. Morgan Asset Management Multi-Asset Solutions; assessments are made using data and information up to September 2019. For illustration only. These asset class views apply to a 12- to 18- month horizon. Up/down arrows indicate a positive (↑) or negative (↓) change in view since the prior quarterly Strategy Summit. This summary of our individual asset class views shows relative direction and strength of conviction, but is independent of portfolio construction considerations. These views should not be construed as a recommended portfolio. The opinions and views expressed here are those held by the author at the date of publication which are subject to change and are not to be taken as or construed as investment advice. 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.

J.P.Morgan Asset Management

Long-term Capital Market Assumptions

2020 | 24th ANNUAL EDITION

2020 Long-Term Capital Market Assumptions

am.jpmorgan.com/institutional/ltcma

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J.P.Morgan
Asset Management

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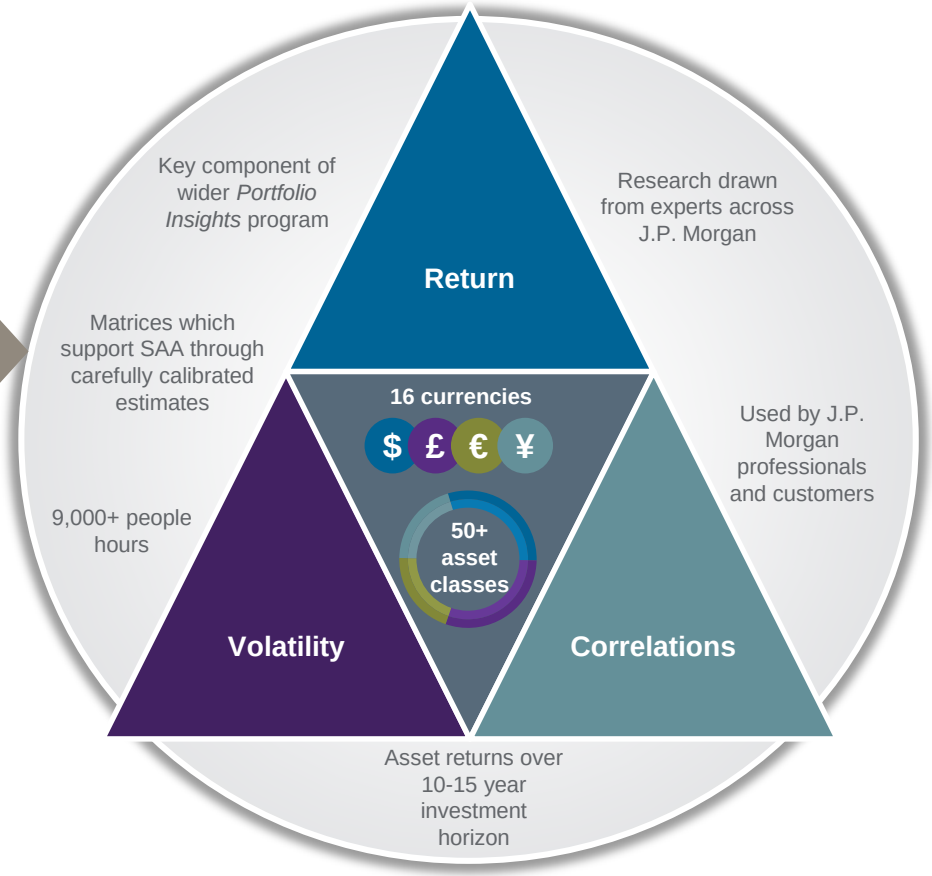
Introducing the 2020 LTCMAs

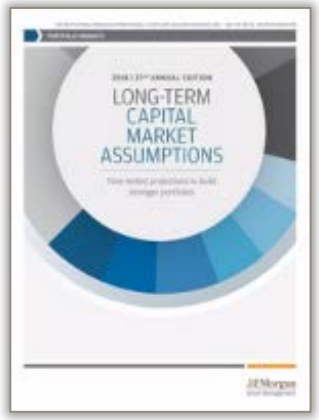
J.P. Morgan Asset Management's Long-Term Capital Market Assumptions provide return and volatility estimates to support portfolio investment decisions across markets and asset classes.

Firm-wide initiative

Senior management sponsorship

CIO endorsed





24 annual editions

Source: J.P.Morgan Asset Management.

Key takeaways from the 2020 LTCMAs

Recycling the cycle	The economic outlook is sluggish bet stable, cycle is mature but the exuberance is in safe assets
Inflation M.I.A.	A decade of ultra-low policy hasn't led to higher inflation, it may take fiscal stimulus to trigger a rise
Rates lower for *even* longer	Low inflation means low rates and flat curves, little scope for higher rates now until the *next* cycle
Stocks hold up…relatively	Equity returns are well ahead of bond returns, but in absolute terms they are rather muted
Alternative attractions	A tech led productivity boost is the upside risk to growth, and is best played via private markets
China slower but stronger	China is set for slower GDP growth but higher GDP/Capita and its asset markets are opening up
Keepin' it real (assets)	Real assets offer an attractive return compared to a 60/40 and are a source of stable income
Reconfiguring 60/40	Low yields means rethinking the role each investing building block plays in robust portfolio design

Despite cyclical risks, with a little more flexibility in portfolio strategy, and a little more precision in executing that strategy, there are still reasonable returns to be harvested across asset markets

Source: J.P. Morgan Asset Management Multi-Asset Solutions; data as of 30 September 2019.

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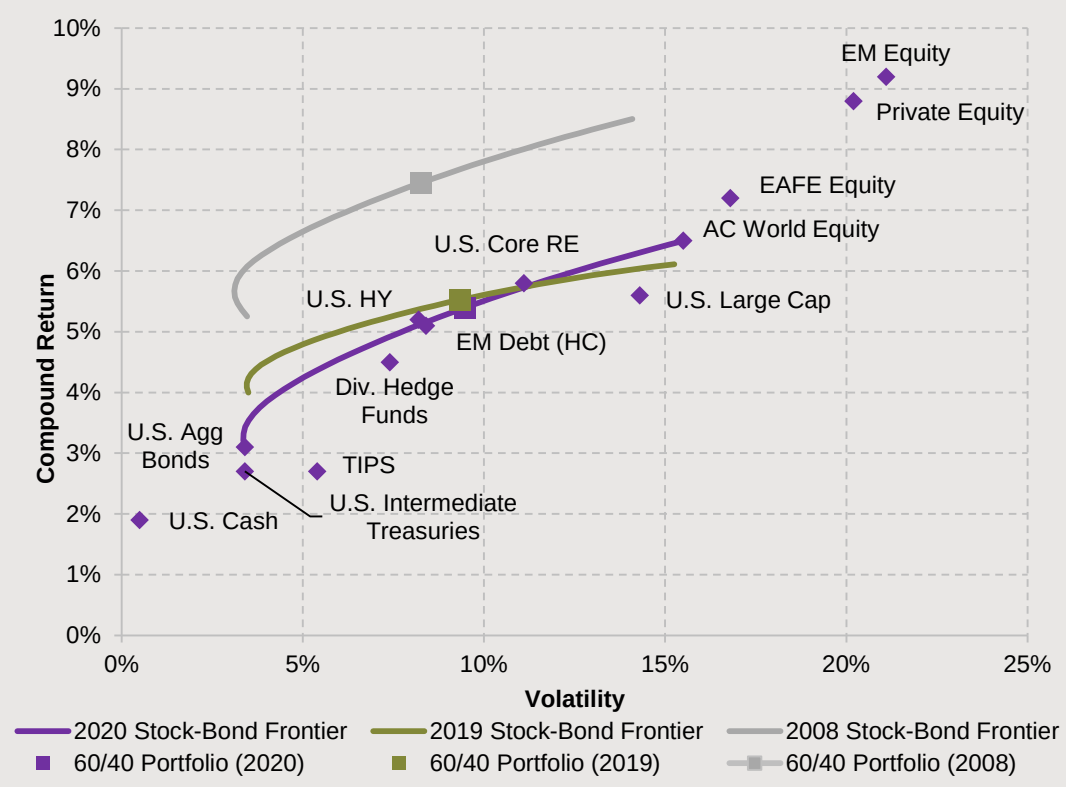
Bond returns forecasts drop, stocks stable: USD stock-bond frontier re-steepens

Stock-bond frontiers: 2020 vs. 2019 and 2008 assumptions (USD)



KEY PORTFOLIO CONSIDERATIONS

- 60/40 returns marginally lower, with steeper frontier now more in line with other regions
- Re-steepening leaves stocks well ahead of bonds in relative terms, but in absolute terms returns are subdued in most assets
- Many assets clustering around the frontier suggests ample room for diversification despite low returns
- Real assets, EM and Private Equity still above the line, but by a lesser margin than last year
- The improved returns available from bonds last year, have fully unwound but the cyclical risks have not

Source: J.P. Morgan Asset Management; estimates as of September 2019 and September 2018. *EM: Emerging Markets; DM: Developed Markets

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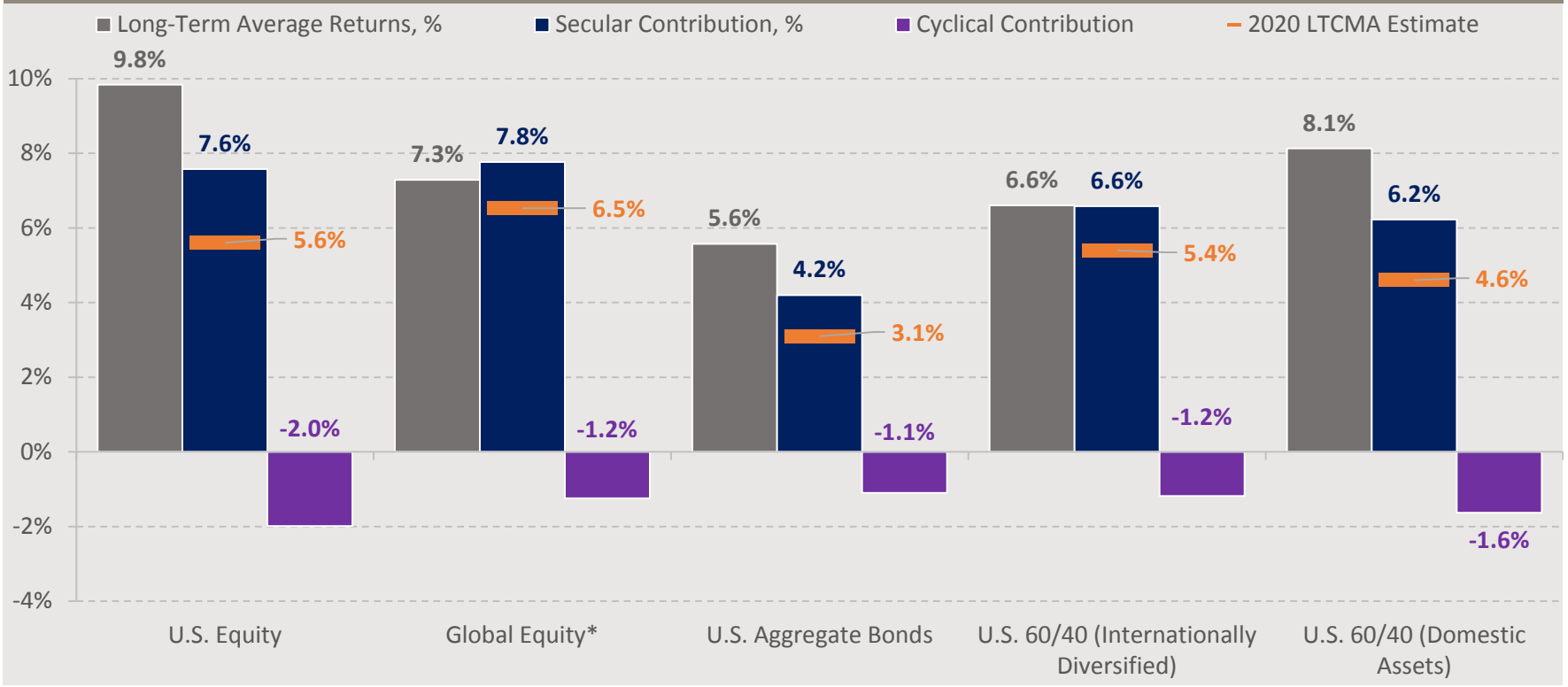
Cyclical factors remain a constraint, but equilibrium returns are stable

Historical 25-year average returns and this year's estimates, split into secular (equilibrium) and cyclical components



Source: Bloomberg, Datastream, J.P. Morgan Asset Management Multi-Asset Solutions; data as of September 30, 2019. For equities, 'cyclical' components are the valuation and margins components of our building block framework. For bonds, the 'cyclical' component is the normalization impact as rates and spreads are forecasted to return towards our equilibrium estimates. U.S. Equity is S&P 500. U.S. High Yield is Bloomberg Barclays High Yield 2% Issuer Cap. U.S. Investment Grade is Bloomberg Barclays U.S. Corporate. U.S. Aggregate is Bloomberg Barclays U.S. Aggregate. U.S. 60/40 is 60% S&P 500, 40% Bloomberg Barclays U.S. Aggregate.

J.P.Morgan Asset Management

Structured process underpins all LTCMA assumptions

											Key inputs
Nom. GDP Growth	=	Labor input growth*	+	Capital growth	+	Productivity growth*	+	Inflation			Population growth
Equities	=	Revenue growth	+	Change in margins	+	Share count change **	+	Change in valuations	+	Dividends	RoE Pay-out ratio
Fixed Income	=	Coupon income	+	Duration impact	+	Curve roll-down	+	Default & loss			Equilibrium yields Normalization period
Financial Alternatives	=	Core beta	+	Alpha	+	Adjustments					

* Labor input growth captures changes in size of the labor force, average hours worked, and skills; productivity refers to total factor productivity (TFP).
** Change in share count refers to net dilution, further decomposed into gross dilution and buybacks.
Source: J.P.Morgan Asset Management.

LTMCA key themes

2018	2019	2020
1. **Technology**, productivity and the labor force 2. The impact of changing **demographics** 3. **Pension investment** strategy 4. The future path of **Chinese interest rates** 5. **U.S. dollar** forecast	1. Fewer **recessions** but weaker recoveries 2. Dealing with the upward drift in **government debt** 3. Managing **illiquidity risk** in public and private asset markets 4. Assessing and building investor **resilience** to a downturn	1. The failure of **monetary stimulus** 2. How **China**'s financial markets are changing as it becomes a higher-income country 3. The future of **e-commerce** and what it holds for the economy and markets 4. Rethinking **safe havens**

Source: J.P.Morgan Asset Management.

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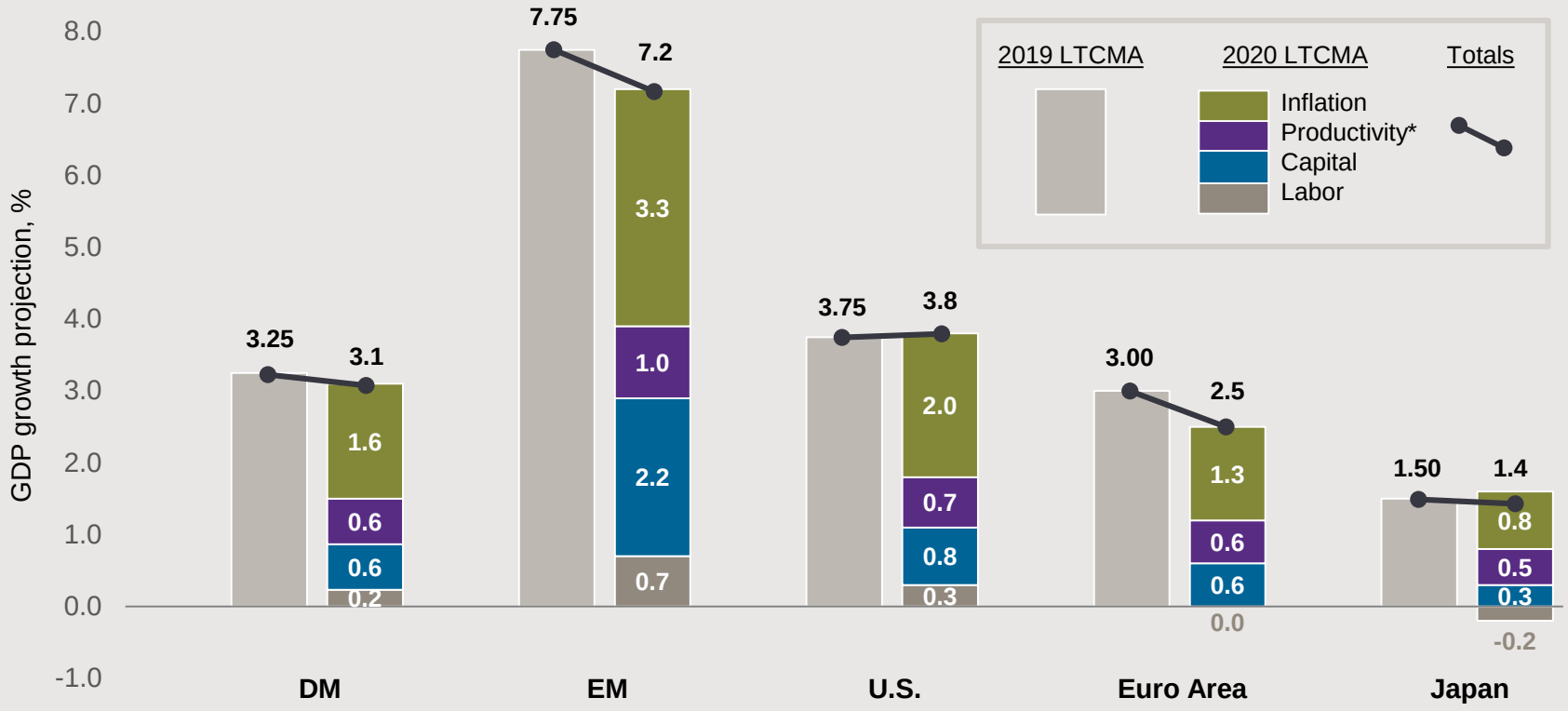
Economics: our long-term growth and inflation projections

Contributions to nominal GDP assumptions, rounded to nearest 10 bps*



* Productivity refers to total factor productivity (TFP).

Source: Penn World Table, Haver Analytics, J.P. Morgan Asset Management; data as of 30 September 2019. * Note: totals may not sum due to rounding.

J.P.Morgan Asset Management

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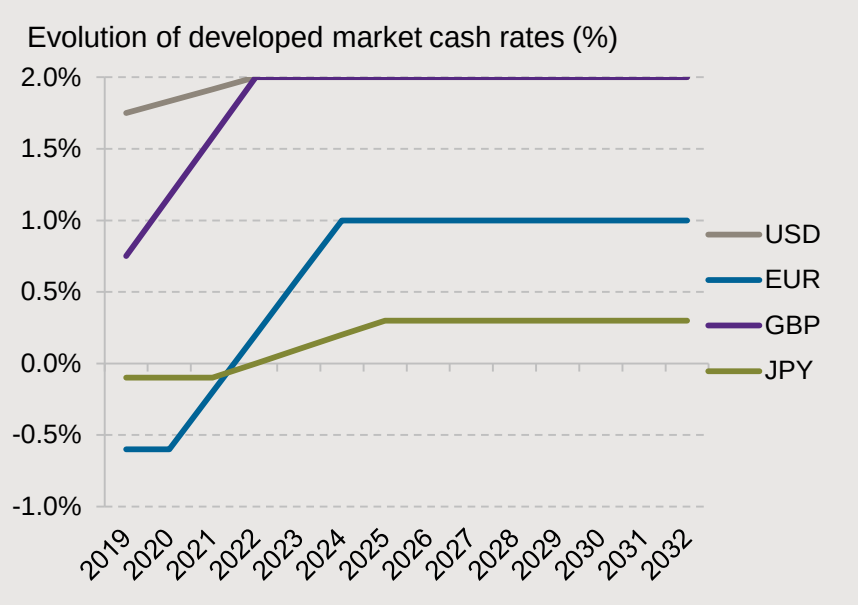
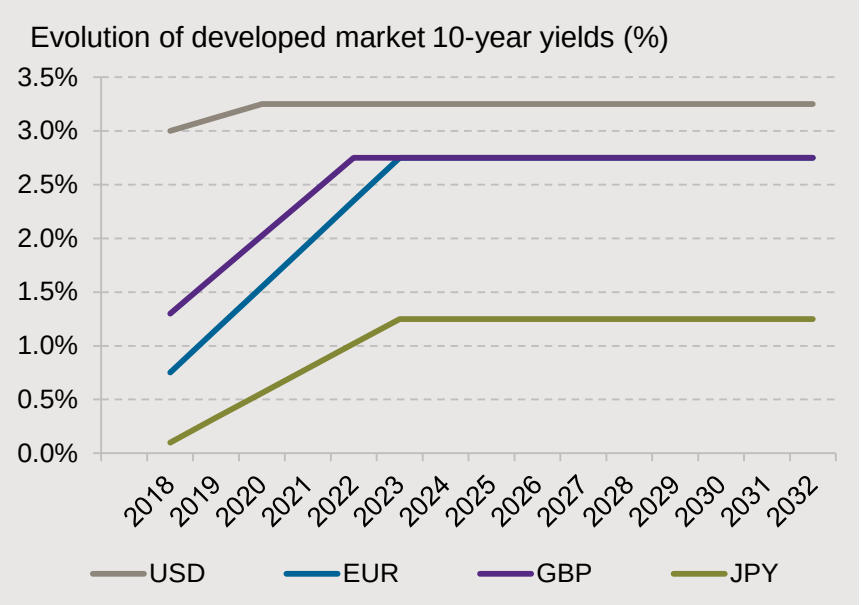
Fixed income: muted growth means low equilibrium yields, lengthy normalization

- Low potential growth and disappointments on the inflation front point to gradualism in policy normalization
- Experience has shown that central bank responses to a downturn are asymmetric

Evolution of developed market cash rates (%)



Evolution of developed market 10-year yields (%)

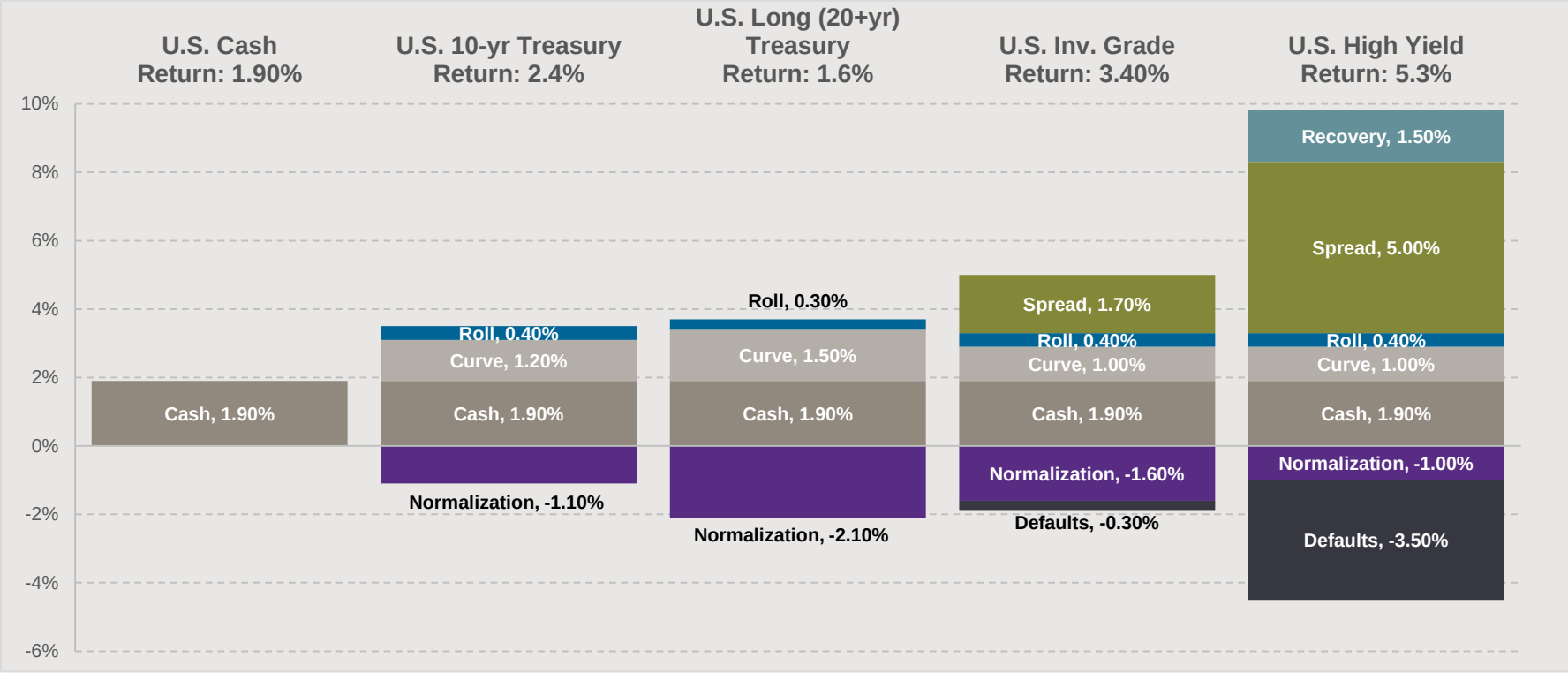


Source: J.P. Morgan Asset Management; estimates as of September 2019.

J.P.Morgan Asset Management

Fixed Income: low starting yields hit returns hard

USD equilibrium total returns; rounded to nearest 10 bps*



Source: J.P. Morgan Asset Management as of September 2019. Note that final return assumptions are rounded to nearest 25bps, and sum of building blocks will therefore differ slightly. Opinions, estimates, forecasts, projections and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. There can be no guarantee they will be met. * Note: totals may not sum due to rounding. IG: Investment grade; HY: High yield

Note: Normalization/cyclical comprises path of rates to equilibrium and credit spread vs. equilibrium for IG and HY, but is purely rate normalization for the government bonds

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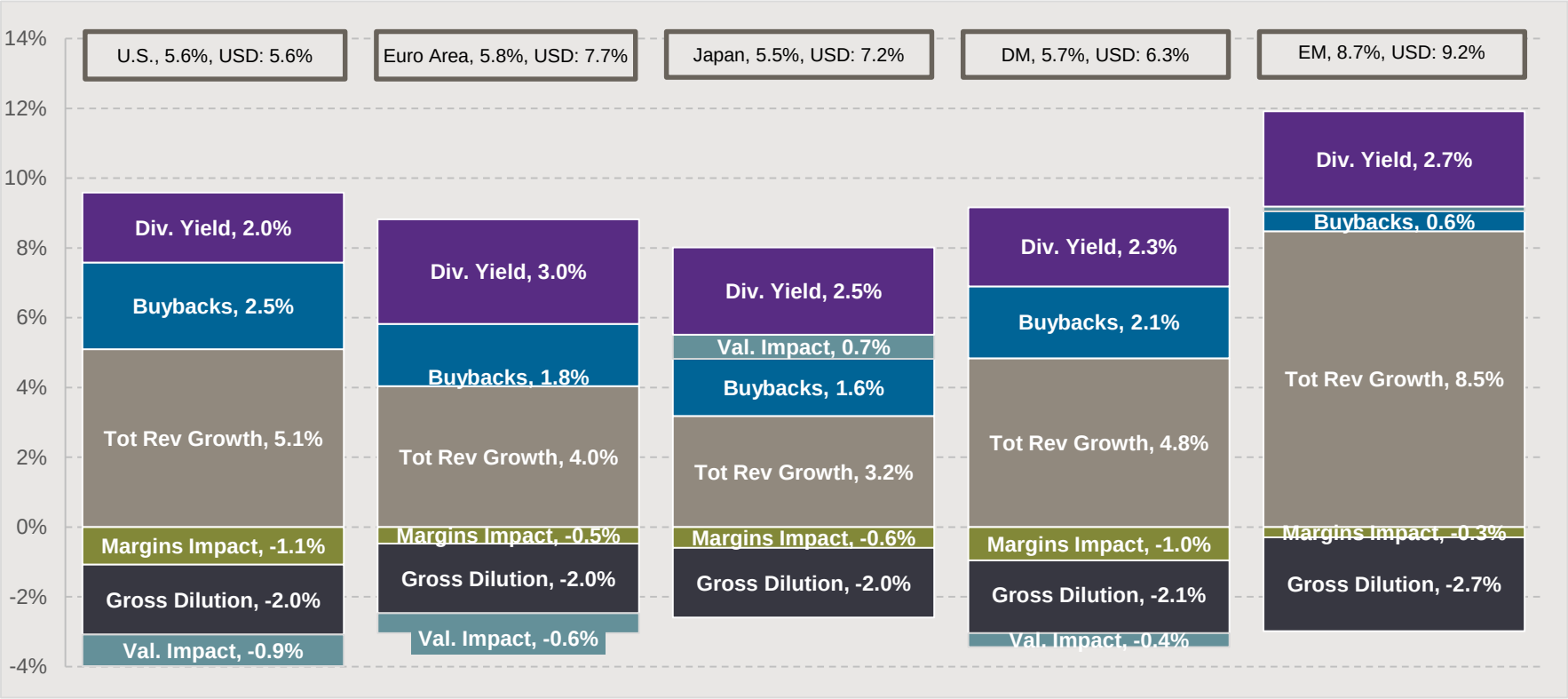
Equities: returns holding up, but cyclical risks rise

Equilibrium total returns; rounded to nearest 10bps*



Source: J.P. Morgan Asset Management as of September 2019. Note that final return assumptions are rounded to nearest 10 bps, and sum of building blocks will therefore differ slightly. Opinions, estimates, forecasts, projections and statements of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. There can be no guarantee they will be met. * Note: totals may not sum due to rounding.

Alternatives: key themes in the 2020 assumptions

Appealing alts	Expected risk-adjusted returns remain attractive relative to those for public markets
PE rising	Private Equity return assumptions raised to reflect the increase in underlying public market return expectations; alpha expectations are held relatively stable
Alts for stable income	Real Assets, in-particular core/core-plus real estate and infrastructure are gaining traction due to their diversifying and income driven return characteristics
Manager selection is key	Wide dispersion means the quality of due diligence is critical in realizing the full potential of an allocation to alternatives, particularly for PE and hedged funds

Source: J.P. Morgan Asset Management; data as of September 30, 2019.

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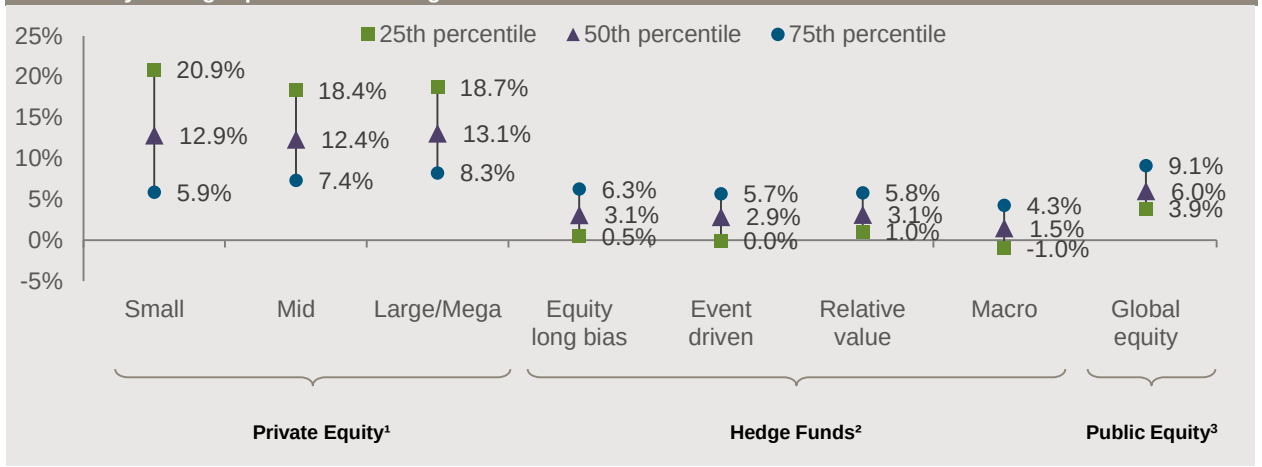
Alternatives: financial strategies' alpha environment improves

	Private Equity				Hedge Funds				
	Small Cap	Mid Cap	Large/Mega Cap	Cap-Weighted*	Equity Long Bias	Event Driven	Relative Value	Macro	Diversified**
2020 LTCMAs	8.70	8.50	9.00	8.80	4.80	4.80	4.50	3.30	4.50
2019 LTCMAs	7.75	8.00	8.50	8.25	4.75	4.75	4.50	3.75	4.25

Returns by manager percentile ranking



FINANCIAL STRATEGIES:

- Manager selection is a critical determinant of success
- PE return assumptions are raised vs. last year's reflecting our increased public market return expectations; alpha projections are relatively stable
- Hedge fund return projections are mostly flat to up modestly from 2019, due to improved market beta expectations but challenging alpha conditions.
- Investors are seeking innovative and global opportunities, awaiting a more fundamentally- vs. macro-driven environment

Source: (Top) J.P. Morgan Asset Management, as of September 30, 2018, and September 30, 2019. (Bottom) ¹ Burgiss Private IQ, J.P. Morgan Asset Management, USD data as of March 31, 2019, IRR of vintage years 2006-2016; ² Hedge Fund Research, J.P. Morgan Asset Management, USD data as of June 30, 2019, trailing 5 years as of June 2019; ³ Morningstar, MSCI ACWI Peer Group for trailing 5 years as of June 30, 2019.
* The private equity composite is AUM-weighted: 60% large cap and mega cap, 30% mid cap and 10% small cap. The regional weights for capitalization-weighted PE composite are: U.S.: 55%; Europe: 25%; Asia and other: 20%.
** The diversified assumption represents the projected return for multi-strategy hedge funds.

J.P.Morgan Asset Management

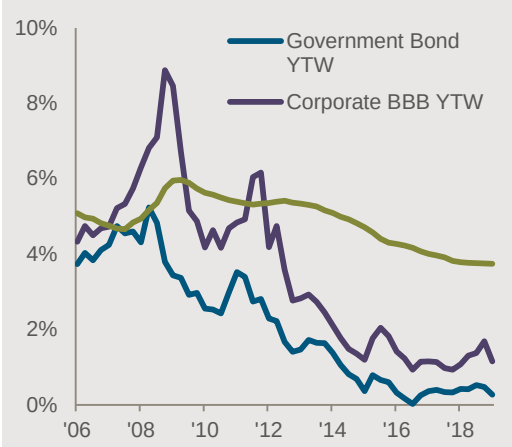
Alternatives: real assets' solid return outlook; more defensive than many believe

	Real Estate – Direct (USD, %)						
	U.S. Core	U.S. Value-Added	European ex-UK Core	European ex-UK Value-Added[1]	UK Core	UK Value-Added[1]	Asia-Pacific Core
2020 Levered	5.80	7.70	5.00	7.50	5.50	7.70	6.50
2020 Unlevered	5.30	5.10	3.95	4.40	4.80	5.05	5.35
2019 Levered	5.75	7.75	5.50	8.00	5.00	7.25	6.00

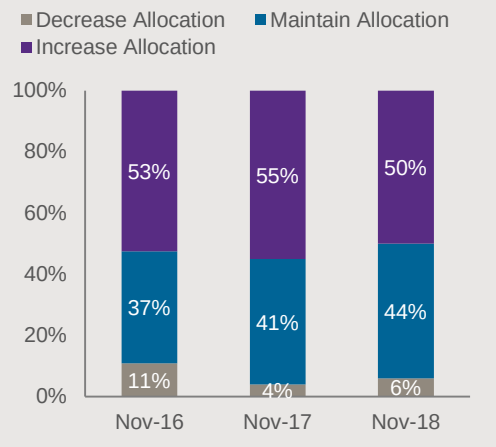
Infrastructure (USD, %)		
	Equity–Direct	Debt
2020 Levered	6.00	3.30
2018 Levered	6.00	4.75

Commodities (USD, %)		
	Commod.	Gold
2020 Net of fess	2.50	3.00
2019 Net of fees	2.25	2.50

European ex-UK prime property vs. bond yields



Investors' intentions for infrastructure allocations over the long term



REAL ASSETS – KEY POINTS

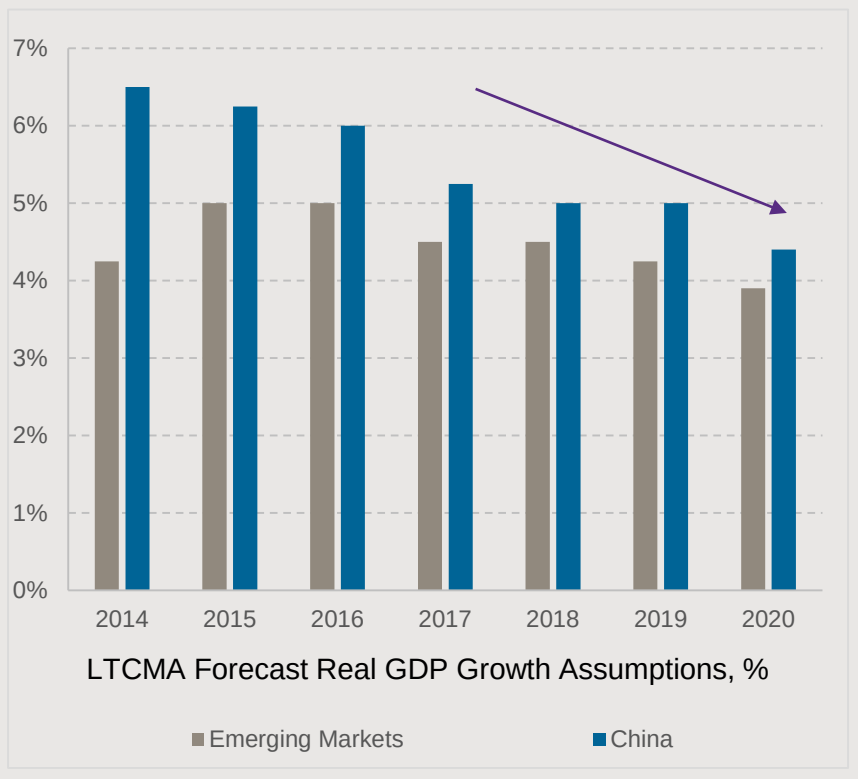
- Core real estate assumptions are little changed from last year for the U.S., up slightly for the UK and Asia-Pacific and reduced for Europe-ex UK; regional patterns are similar for Value-added
- A decline in retail and an increase in industrial allocations may have a positive impact on core real estate returns
- More Asian cities are likely to be admitted to the core real estate as a result of growth and increased investor demand
- Value-added risk premia assumptions are unchanged vs. 2019, reflecting our view of the strategy's stretched valuation vs. core
- The outlook for infrastructure equity remains strong; we expect increasing investor demand and fee compression to offset the impact from deleveraging and slower asset growth

Source: (Top) J.P. Morgan Asset Management; estimates as of September 30, 2018, and September 30, 2019. (Bottom Left) Bloomberg, CBRE, data as of March 31, 2019. (Bottom Right) Preqin Investor Interviews, November 2016-2018, Preqin Investor Outlook: Alternative Assets H1 2019. Components may not add to 100% due to rounding.

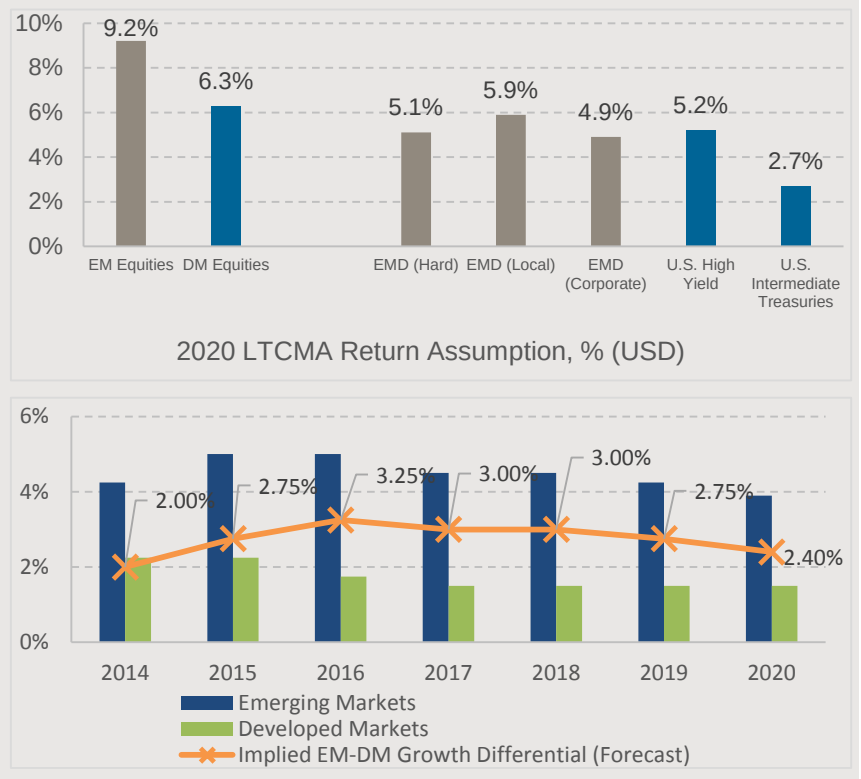
J.P.Morgan Asset Management

EM growth estimates have been coming down, but returns still offer a pick up

Our EM growth estimates have been coming down



But returns still offer a pick up, and growth is still good



Source: J.P. Morgan Asset Management as of September 2019.

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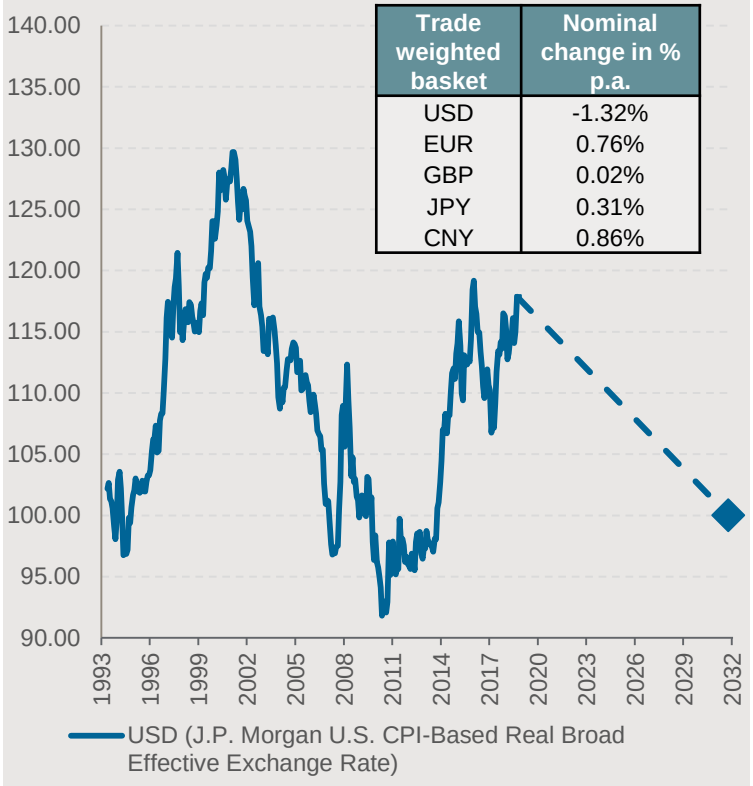
FX assumptions: 2020 vs. 2019 – USD strength continues to dominate FX outlook

LTCMA FX assumptions, 2020 vs. 2019

	EUR	JPY	CHF	GBP	CAD	AUD	CNY	BRL	MXN
Spot vs. USD on September 30, 2020									
	1.09	108	1.00	1.23	1.32	0.68	7.15	4.16	19.74
2020 LTCMA FX forecast									
% annual change from current level	+1.90	+1.70	+1.50	+1.50	+1.20	+0.50	+2.00	+0.60	-0.80
Terminal spot rate assumption (10-15 yr)	1.38	88	0.83	1.48	1.14	0.72	5.58	3.86	21.82
2019 LTCMA FX forecast									
	1.32	92	0.85	1.43	1.18	0.68	6.07	4.02	20.56

On a trade weighted basis the USD is the most overvalued currency



Trade weighted basket	Nominal change in % p.a.
USD	-1.32%
EUR	0.76%
GBP	0.02%
JPY	0.31%
CNY	0.86%

Source: J.P. Morgan Asset Management; estimates as of September 2018 and September 2019.

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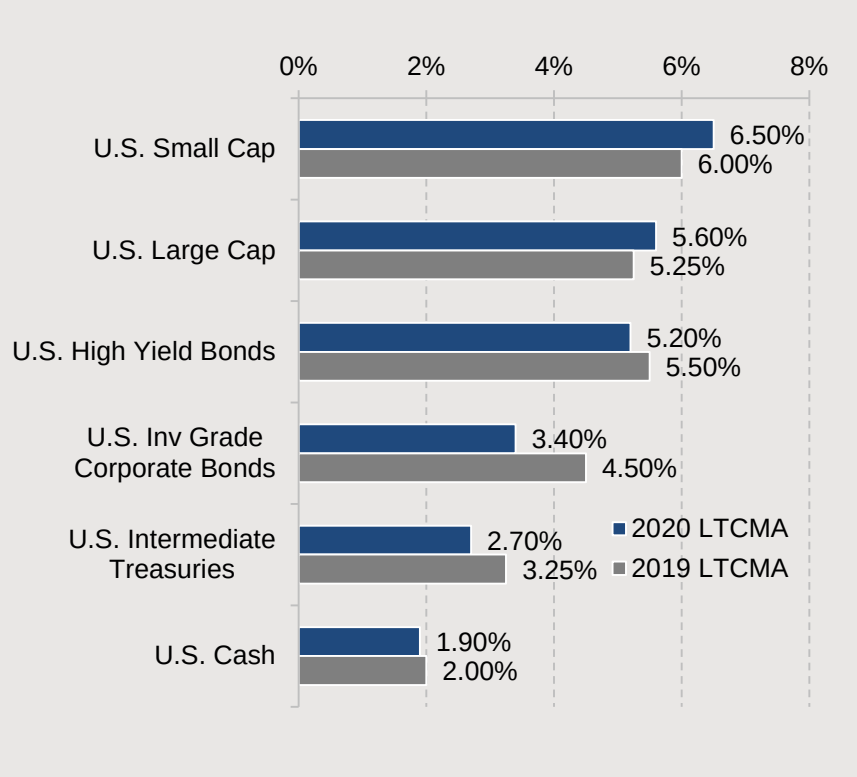
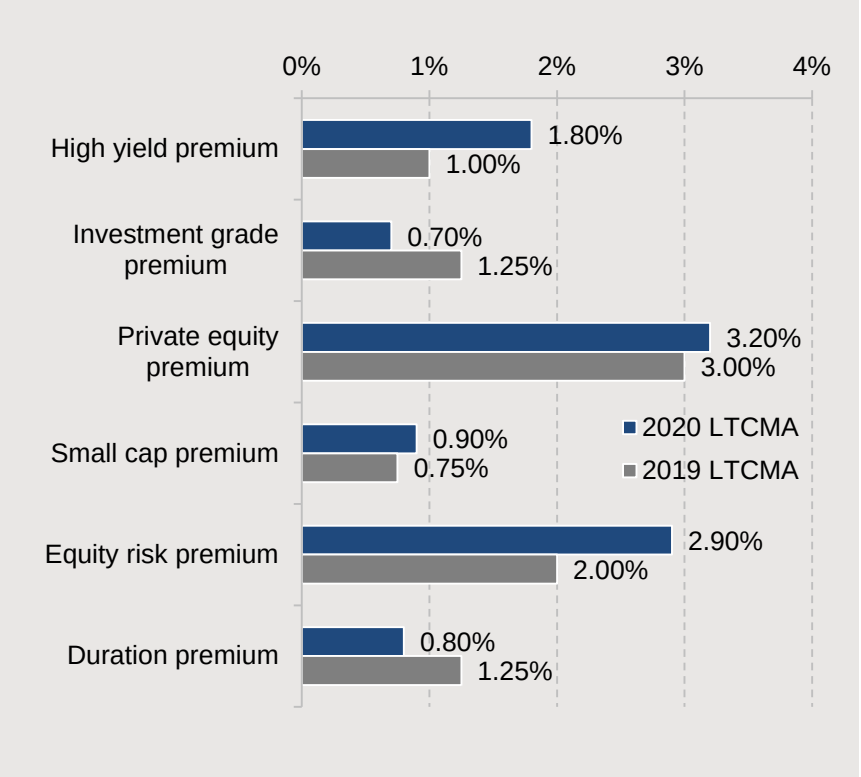
USD expected returns stable; risk premia higher in equities and high yield

Expected returns



Risk premia



Source: J.P. Morgan Asset Management; data as of September 2018 and September 2019. High yield premium = U.S. High Yield Bonds – U.S. Investment Grade Corporate Bonds. Investment grade premium = U.S. investment grade corporate bonds – U.S. intermediate treasuries. Private Equity premium = Private Equity – U.S. Large Cap. Small cap premium = U.S. Small Cap – U.S. Large Cap. Equity Risk Premium = U.S. Large Cap – U.S. Intermediate Treasuries. Duration Premium = U.S. Intermediate Treasuries – U.S. Cash.

2020 LTCMA appendix

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2020 Long-Term Capital Market Assumptions: Key Messages (Page 1 of 2)

About the LTCMAs

- Our LTCMAs are developed as part of a deeply researched proprietary process.
- 24th annual set of risk-adjusted return estimates for more than 50 asset and strategy classes.
- The assumptions are based on a 10- to 15- year investment horizon.

Executive Summary – Reconfiguring 60/40: Investing in a world of ultra-low rates

- Growth still low by historical standards; aging populations a key headwind, technology-driven boost to productivity the main upside risk.
- Today's low interest rates and lengthy path to normalization drive down our fixed income forecasts. Credit remains a brighter spot, but forecasts sharply lower. Equity forecasts improve a little as valuation headwinds recede.
- Those seeking higher returns will continue to be drawn to private markets. Real assets remain an attractive source of both returns and diversification.
- Expected returns for a 60/40 U.S. stock-bond portfolio fall 10 basis points to 5.4%, and the stock-bond frontier steepens.
- Bonds simply can't offer the same combination of portfolio protection and positive income that they did in the past. This calls for, in equal measure, greater flexibility in portfolio strategy and greater precision in executing that strategy.

Macroeconomic – Modestly lower growth, stable inflation

- Our modestly lower developed market (DM) growth projections stand below the average growth rate of the past 10 years in every region except the euro area. We expect weak labour force growth, though we could see a possible uplift in productivity.
- Emerging market (EM) economies will continue to outgrow their DM counterparts, though we trim several EM GDP forecasts, notably China.
- We anticipate fairly steady inflation at the global level and leave unchanged our U.S. CPI forecast

Volatility and Correlation – Stable long-term forecast; rising risks in the short term

- Our long-run volatility expectations remain stable.
- Equity market movements have become more significant recently, which translates into marginally higher equity volatility forecasts.
- Our case study finds that, compared with a conventional Sharpe ratio-based portfolio optimization, a Sortino ratio-based optimization realized lower drawdowns during market downturns.

Fixed Income – Lower rates for even longer

- Anticipating continued central bank dovishness, we shift our equilibrium interest rates lower across major G4 markets and extend the time horizon over which we expect rate normalization.
- Cash rates are still far below equilibrium in markets outside the U.S.
- Long core duration assets see poor returns in absolute terms and relative to cash, as starting yield curves are very flat.
- In the corporate bond market, duration has risen and quality has deteriorated. Expected investment grade returns are lower.
- Expected total returns in emerging market debt have come down due to lower rates and tighter starting spreads.

Equities – Better starting point, higher returns

- Equity return assumptions rise across most regions, with developed markets and emerging markets both up.
- U.S. equity return assumption increases to 5.60% from 5.25%, primarily due to the reduction in the drag from valuation normalization.
- Euro area return estimates are slightly lower and UK equity returns are higher, with attractive valuations offsetting lower margins and a stronger pound sterling vs. the U.S. dollar.
- Japanese equities posted the largest upgrade among developed markets, increasing from 5.00% to 5.50% in local terms.
- We project modestly higher emerging market equity returns, with a diminished drag from margin normalization.
- We expect the USD to weaken over our forecast horizon, providing a tailwind to the attractiveness of international equity markets to U.S. dollar-based investors.

Currency – USD remains structurally overvalued but awaiting cyclical catalyst

- Greater appreciation of major currencies vs. the USD than forecasted last year, in both nominal and (by a smaller magnitude) real exchange rate terms, driven by:-
  - The appreciation of the USD over the past year vs. most currencies.
  - An increase in the expected inflation differential between the U.S. and most other countries, as other central banks undershoot their inflation goals by a wider margin than the Federal Reserve.
- At present, major currencies' deviations from fair value, on a trade-weighted basis, are quite limited, with the exception of the USD.

Source: J.P. Morgan Asset Management Multi-Asset Solutions; data as of September 2019.

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2020 Long-Term Capital Market Assumptions: Key Messages (Page 2 of 2)

Alternatives - Attractive outlooks relative to public market options

- Relative to 2019 estimates, our long-term return assumptions for financial strategies are generally neutral to higher. Projected returns for real assets are largely unchanged given stable fundamentals.
- **Private equity:** PE return assumptions higher across fund size and capitalization categories. Alpha projections essentially unchanged.
- **Direct lending:** Return estimates trimmed slightly, given strong investor demand and increasing lender competition.
- **Hedge funds:** Return projections essentially flat vs. 2019 on an equal-weighted basis, reflecting our mixed public market outlook along with challenging alpha conditions.
- **Real estate:** Core real estate return assumptions are essentially unchanged from last year for the U.S., up slightly for the UK and Asia Pacific, and reduced for Europe ex-UK. Regional patterns are similar for value-added assumptions. REITs: global projection flat.
- **Infrastructure:** Infrastructure equity return estimates flat vs. 2019. Increasing investor demand, fee compression expected to offset impact from deleveraging, slower asset growth.
- **Commodities:** Commodity returns are expected to rise; the long-term impact of a decline in the USD is likely to more than offset any late-cycle softening in commodity demand. Gold's premium to broad commodities is projected to increase.

Thematic article - The failure of monetary stimulus

- Global central banks implemented conventional and unconventional monetary easing after the financial crisis. We assess its effectiveness in stimulating aggregate demand through six transmission mechanisms
- We conclude that the price, wealth and currency effects of monetary stimulus are mostly positive and the income, confidence and expectations effects are mostly negative The net economic impact of monetary stimulus in today's global economy is, at best, low and, at worst, negative.
- Central bankers will respond to future economic weakness with similar monetary stimulus tools. This is an important rationale for our developed economies forecast of slow growth, low inflation and low interest rates over the next 10 to 15 years.

Thematic article - The next phase of China's growth

- We project China's real GDP growth will average 4.4% annually over the next 10 to 15 years, putting China into the high income group of countries.
- China's investment opportunity set does not match China's economic heft, and significant changes to its financial markets likely lie ahead – posing opportunities and risks for investors.

Thematic article - New economy, same old returns?

- The extent of e-commerce adoption is substantially higher than official statistics suggest.
- E-commerce intensity tends to be positively correlated with corporate performance.
- There are regional and sectoral pockets in public markets that are e-commerce intensive.
- Private companies account for a nontrivial share of e-commerce activity.
- These findings give us a higher level of confidence that technology adoption will raise productivity growth from current low levels, with greater benefits to firms levered to this trend.

Thematic article - Rethinking safe haven assets

- Holding safe haven assets (high quality sovereign bonds, reserve currencies, gold) has always involved a trade-off. Over the last 30 years, bonds have provided both income and capital appreciation – hence, masking this trade-off.
- A large proportion of developed market sovereign bonds now yield zero or less- investors must pay for portfolio protection bonds provide.
- Bonds still have a significant role to play in portfolio protection – despite low yields.
- Stable and high quality income streams from core real estate and infrastructure investments provide a strong offset against their lack of liquidity. When held through the cycle, select alternative assets can act as diversifiers.

All LTCMA resources are available at:
www.jpmorgan.com/institutional/LTCMA

For questions or to schedule a client meeting:
ltcma.inquiries@jpmorgan.com

Source: J.P. Morgan Asset Management Multi-Asset Solutions; data as of September 2018.

Failure of monetary stimulus: has it become ineffective?

QUALITATIVE SUMMARY OF ALL SIX EFFECTS ACROSS FOUR REGIONS

Effect	Description	U.S.	Japan	Europe	UK
Price	Reduce interest costs to encourage spending/investment	✓	✓	✓	✓
Wealth	Boost asset prices, create wealth, promote consumption	✓✓	✓	✓	✓
Currency	Reduce currency, boosting exports and reducing imports	✓	✓✓	✓✓	✓✓
Income	Reduce expense for borrowers and income for savers	✗✗	✗	✗	-
Confidence	Boost confidence in economic prospects	✗	-	✗	✗
Expectations	Discourage borrowing today in anticipation of lower future rates	✗✗	✗	✗✗	✗✗

✓ Boost to aggregate demand ✗ Drag on aggregate demand - Neutral to aggregate demand

Source: J.P. Morgan Asset Management; August 31, 2019.

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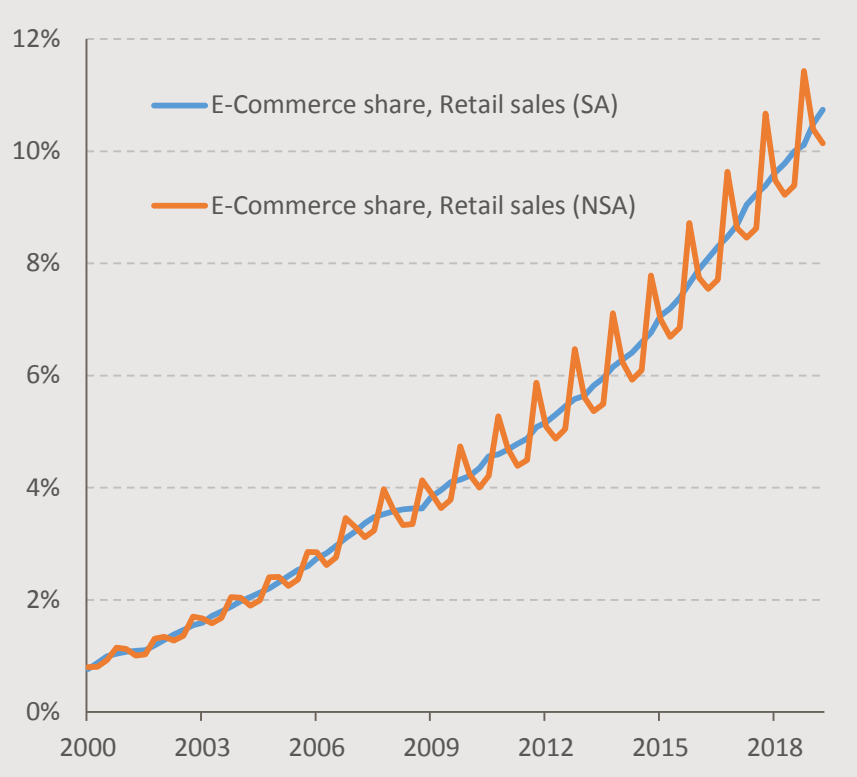
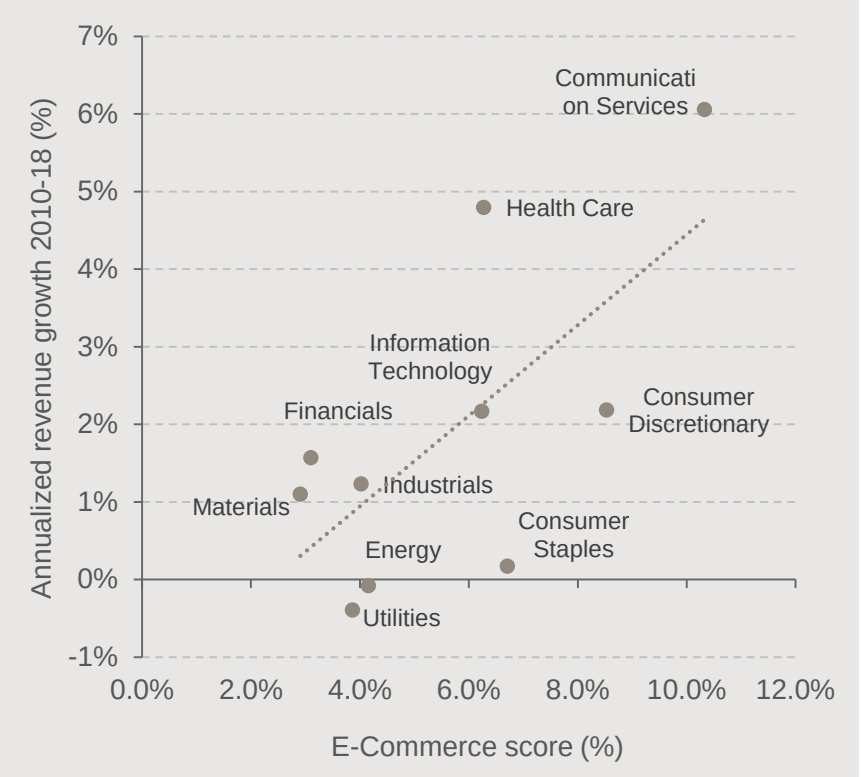
Technology is the upside risk for growth… and eCommerce growth is surging

Retail e-commerce has been growing rapidly. Proprietary data suggests the share is even higher than official statistics



E-commerce adoption creates winners and losers among firms but is, on balance, a positive fundamental



Source: U.S. Census Bureau, Factset, Standard & Poor's, JPM IDS, FactSet, J.P. Morgan Asset Management. estimates as of September 2019.

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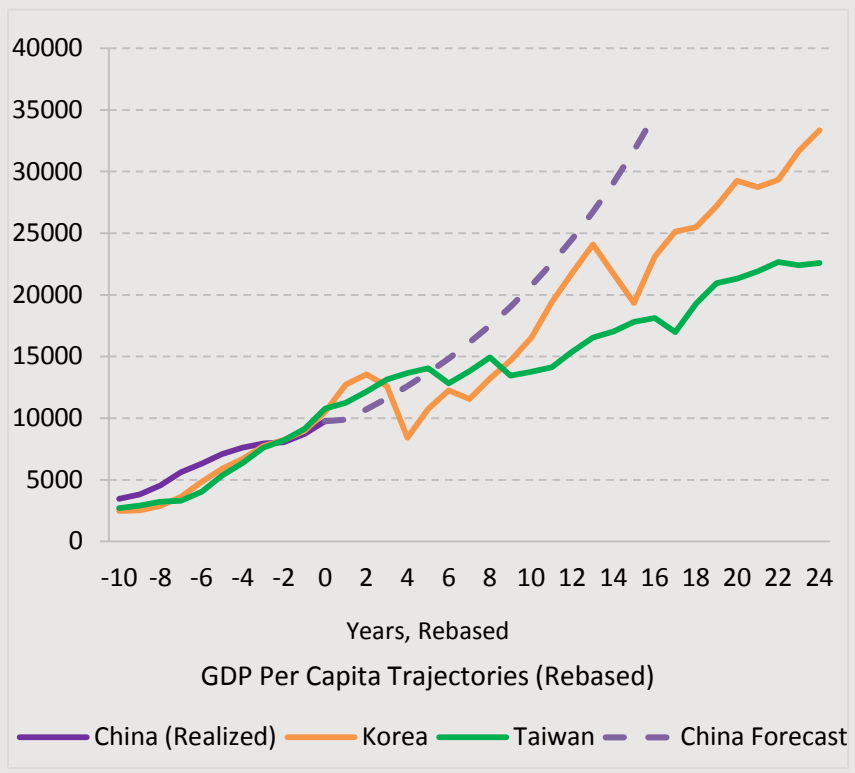
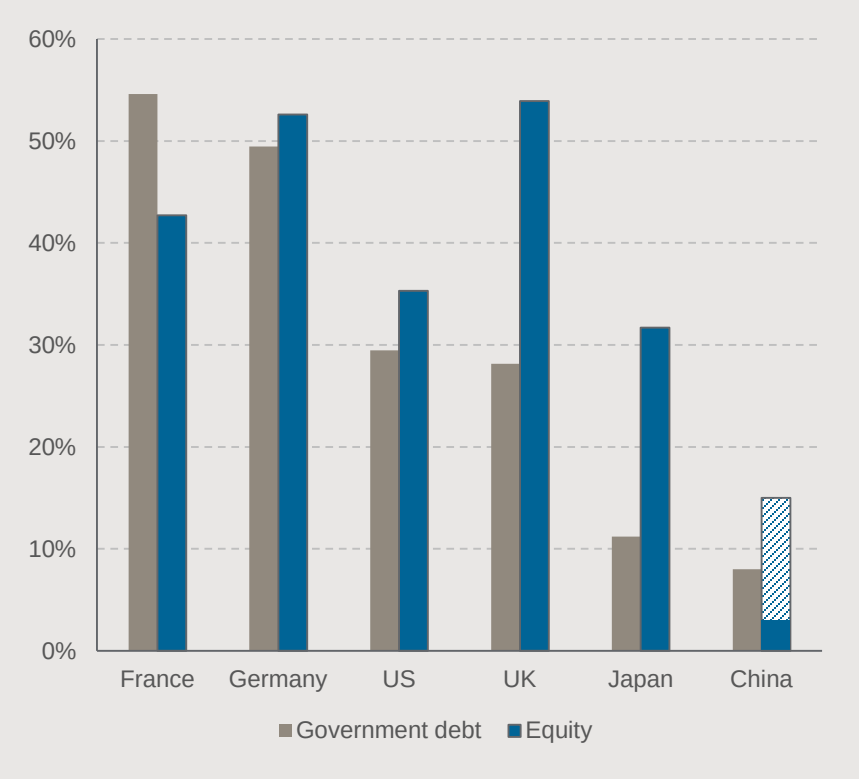
China GDP growth is slowing; GDP/Capita is rising & asset markets are opening up

Chinese GDP per capita trajectory vs Korea and Taiwan



Non-Residents as % of Investor Base



Source: J.P. Morgan Asset Management; estimates as of September 2019.

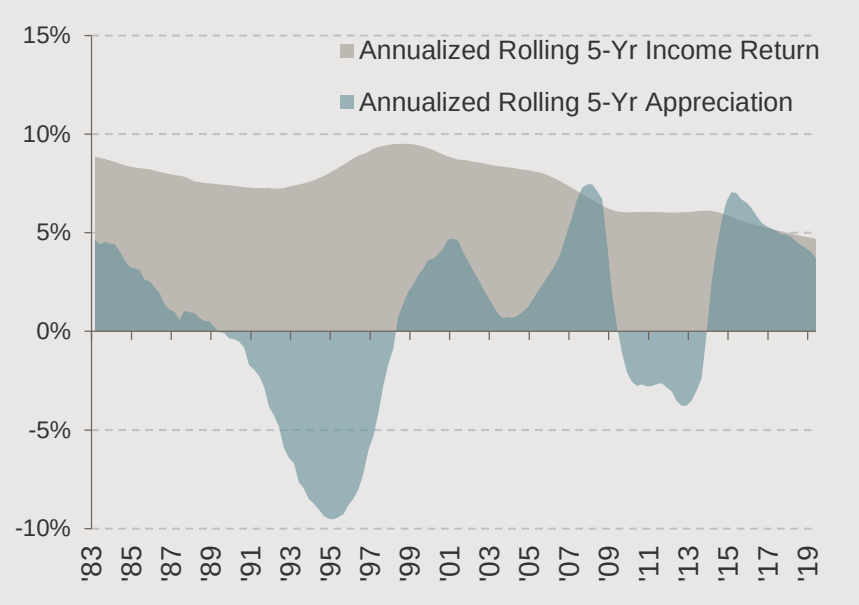
J.P.Morgan Asset Management

Rethinking safe havens:
If bond yields are low & returns are in riskier assets, how do we build our portfolio?

- Bond “free-lunch” appears to be over. What other assets can improve portfolio resilience?
- Some currencies (USD, CHF, JPY, etc.) and of course gold offer diversification but there are always tradeoffs
- Real assets are not traditional safe havens but behave defensively in most stress periods, besides outlier of 07-08 crisis.
- Where liquidity is less of a consideration, focus on high quality income streams which tend to smooth out total returns.

Preportion of Barclays Agg index yielding negative

Real estate: yield cushion smooths returns



Source: NCREIF, Bloomberg, J.P. Morgan Asset Management Multi-Asset Solutions. Data as of 30 August 2019. Past performance is not a reliable indicator of current and future results.

J.P.Morgan
Asset Management

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Economic assumptions: 2020 vs. 2019 – demographics continue to weigh on growth

Compound 10- 15-year GDP Growth and Inflation (%)

	DM*	U.S.	Europe	U.K.	Japan
2020 LTCMAs					
Real GDP	1.50 ↓	1.80	1.20 ↓	1.20	0.60
Inflation	1.60 ↓	2.00	1.30 ↓	2.00	0.80 ↓
2019 LTCMAs					
Real GDP	1.50	1.75	1.50	1.25	0.50
Inflation	1.75	2.00	1.50	2.00	1.00

	EM*	China	India	Brazil	Russia
2020 LTCMAs					
Real GDP	3.90 ↓	4.40 ↓	7.00	2.40 ↓	1.20
Inflation	3.30 ↓	2.50 ↓	5.00	4.50 ↓	5.50
2019 LTCMAs					
Real GDP	4.25	5.00	7.00	3.00	1.25
Inflation	3.50	2.75	5.00	4.75	5.50

SLIGHTLY SLOWER GLOBAL GROWTH

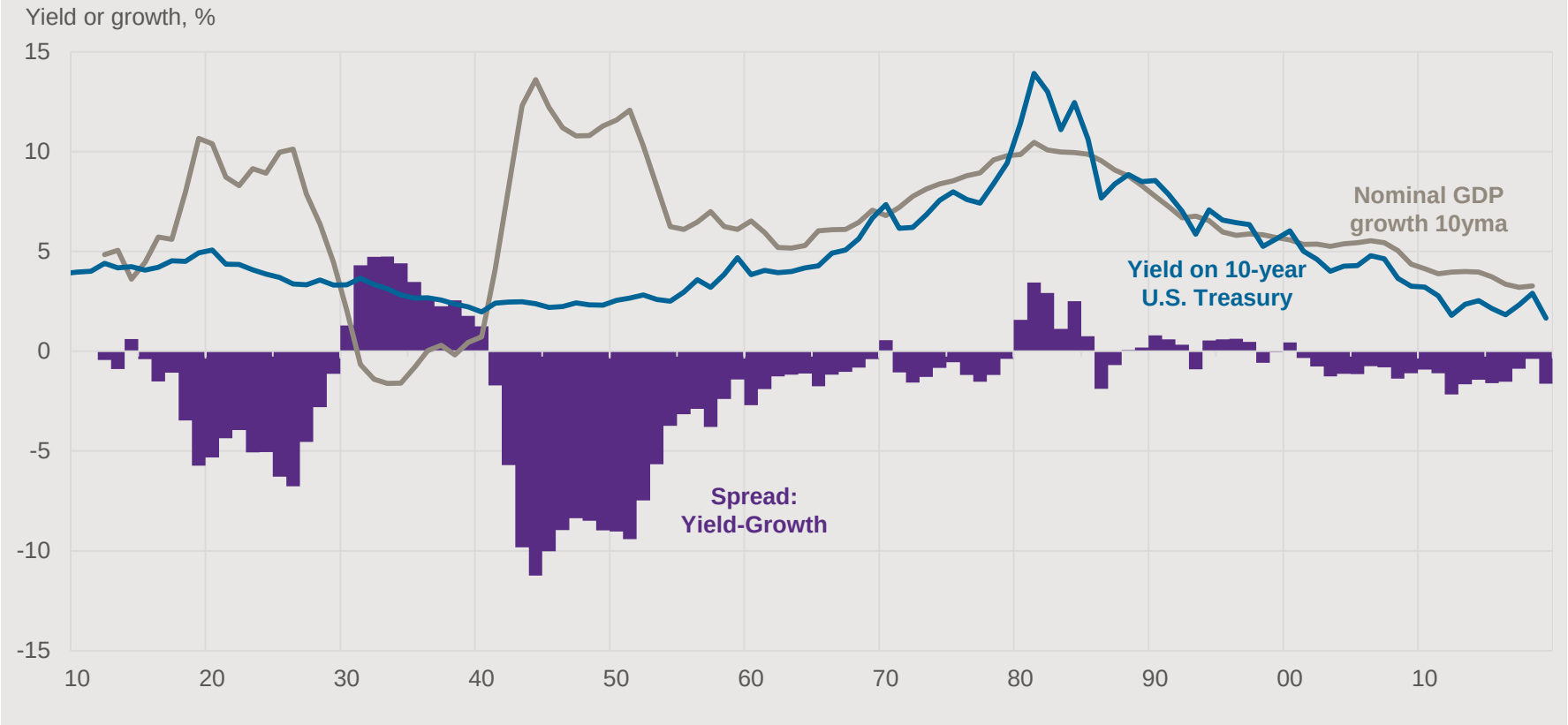
- **Growth** – DM projections broadly stable, EM down about a quarter point from 2019
- **Population** – DM labor forces expanding very slowly by historical standards; EM demographics not universally better
- **Productivity** – Recent acceleration likely to be maintained but productivity boom remains upside risk, not base case
- **Inflation** – Several projections cut, following last year's U.S. reduction; many DM central banks to fall short of targets

Source: J.P. Morgan Asset Management; estimates as of September 2018 and September 2019. *EM: Emerging Markets; DM: Developed Markets

J.P.Morgan Asset Management

Fixed income: equilibrium interest rates tend to track nominal GDP since 1960s

Historical 10-year U.S. Treasury yields vs. nominal U.S. GDP growth (YoY%, 10-year average)



Source: Bloomberg, Haver Analytics, Bureau of Economic Analysis, J.P.Morgan Asset Management, data as of September 2019. GDP = Gross Domestic Product.

J.P.Morgan Asset Management

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USD Fixed income: 2020 vs. 2019 – low starting yields hit returns hard

U.S. dollar key fixed income assumptions, 2020 vs. 2019

	Inflation rate	Cash rate	10-yr bond yield	20+-yr bond yield	U.S. IG	U.S. HY	EMD (hard)
2020 LTCMAs							
Equilibrium Rate / Spread	2.00%	1.90%	3.20%	3.40%	165 bps	500 bps	350 bps
Rate / spread on Sept 30, 2019	-	2.00%	1.65%	2.09%	127 bps	409 bps	352 bps
Return (%)	-	1.90%	2.40%	1.60%	3.40%	5.30%	5.10%
2019 LTCMAs							
Equilibrium Rate / Spread	2.00%	2.00%	3.25%	3.50%	150 bps	500 bps	325 bps
Rate / spread on Sept 30, 2018	-	2.20%	3.06%	3.19%	103 bps	332 bps	337 bps
Return (%)	-	2.00%	3.50%	3.25%	4.50%	5.50%	6.25%

FIXED INCOME KEY POINTS

- We shift our equilibrium interest rates lower across major G4 markets.
- The U.S. cash rate is reduced marginally to reflect a structurally more dovish central bank and lower real cash rates globally.
- Depressed starting yields and long normalization windows create a drag on returns. Long duration Treasury returns now lower than cash.
- US HY and EMD returns are still attractive with most of the drag coming from the normalization in government bond yields.

Source: J.P. Morgan Asset Management; estimates as of September 2018 and September 2019. IG = Investment Grade; HY = High Yield; EMD = Emerging Market Debt. Spreads are listed in bps terms.

Equity assumptions: 2020 vs. 2019 – returns holding up, but cyclical risks rise

U.S. dollar key equity market return assumptions, 2020 vs. 2019 (%)

	Developed Markets	U.S large cap	Euro area	Japan	UK	EAFE
2020						
Local Currency	5.70	5.60	5.80	5.50	6.10	5.60
U.S. dollar*	6.30	5.60	7.70	7.20	7.60	7.20
2019						
Local Currency	5.50	5.25	6.00	5.00	5.75	5.50
U.S. dollar*	5.75	5.25	7.00	6.75	6.50	6.75

	Emerging Markets	China (H)	Korea	Taiwan	India	Brazil
2020						
Local Currency	8.70	9.10	7.90	7.50	10.30	6.60
U.S. dollar*	9.20	9.10	9.30	9.50	11.70	7.20
2019						
Local Currency	8.50	8.75	8.50	8.00	8.75	8.75
U.S. dollar*	8.50	8.75	8.50	9.50	7.50	8.75

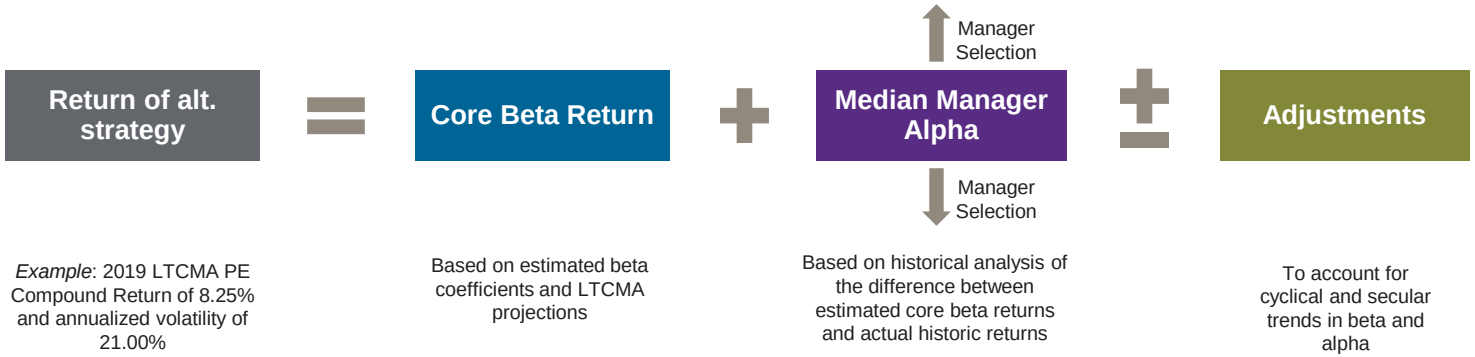
EQUITY KEY POINTS

- Global equity return forecast increased, U.S., UK and Japan higher while Eurozone lower due to slower nominal growth outlook, EM modestly higher
- More advantageous cyclical starting points drive the upgrade in developed equity markets while structural growth headwinds to EM narrow the EM/DM return gap
- A weaker USD over our forecast horizon, is a material tailwind to international equity markets for USD based investors
- Return of capital to shareholders in the form of dividends and buybacks dominates the forecast returns in DM equity
- By contrast, dilution remains a meaningful headwind to otherwise strong EM returns

Source: J.P. Morgan Asset Management; estimates as of September 2018 and September 2019. *Unhedged FX translation

J.P.Morgan Asset Management

LTCMA for financial alternative strategies



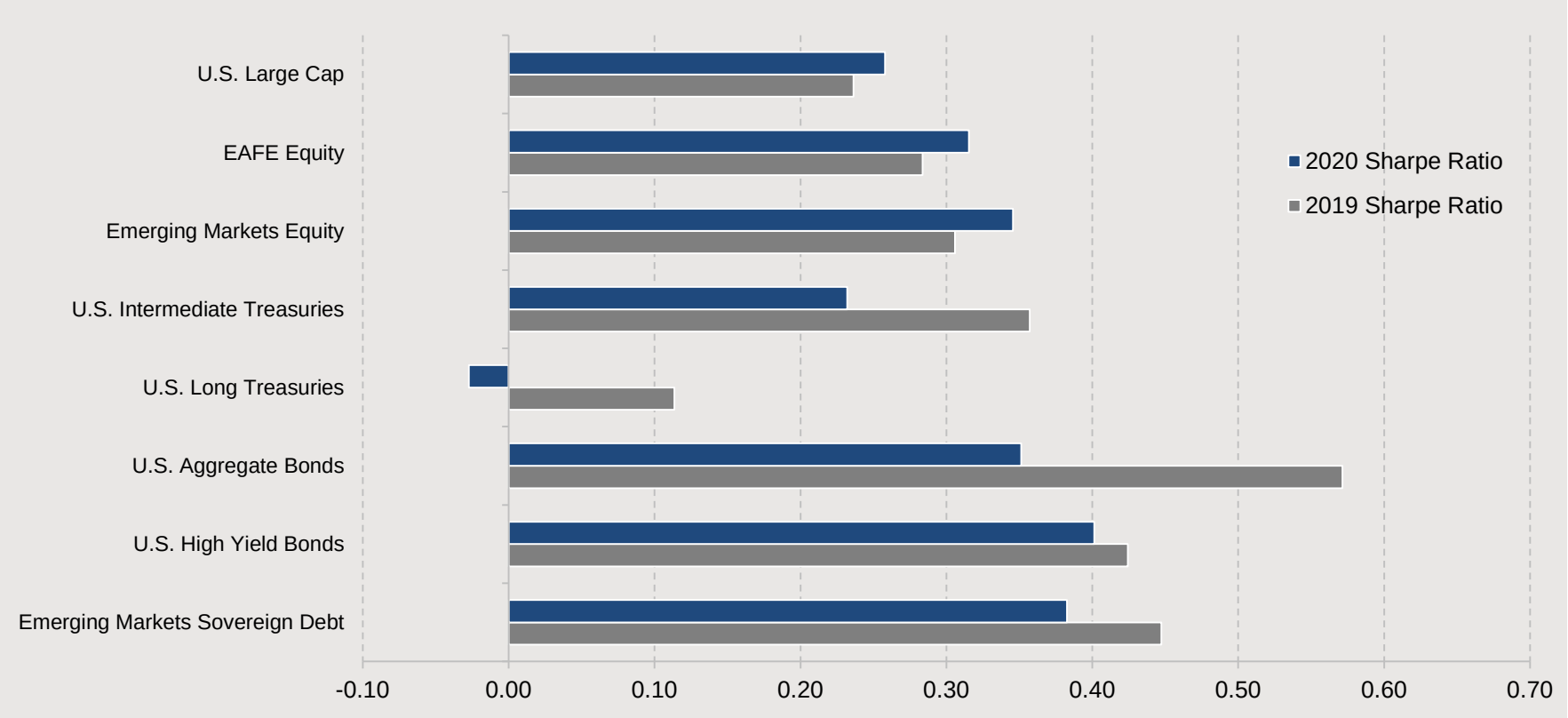
- Our beta assumptions for PE and HF follow a statistical approach with a qualitative overlay, based on a proximate understanding of the market risk taken within portfolios. Beta is the major component in returns.
- Alpha estimates are based on trends in the difference between estimated beta and actual observed returns. Adjustments take into account industry conditions and strategy potential.
- Common to all alternative strategies is the wide dispersion of returns available. Our estimates are for an average manager, which may not fully compensate investors for extra risk.

➡ ***Manager selection remains a key return driver in the alternative space***

Source: J.P. Morgan Asset Management, as of October 2019.

USD Sharpe ratios now more balanced for stocks versus bonds

USD Expected Sharpe ratios



Source: J.P. Morgan Asset Management; estimates as of September 2018 and September 2019.

J.P.Morgan Asset Management

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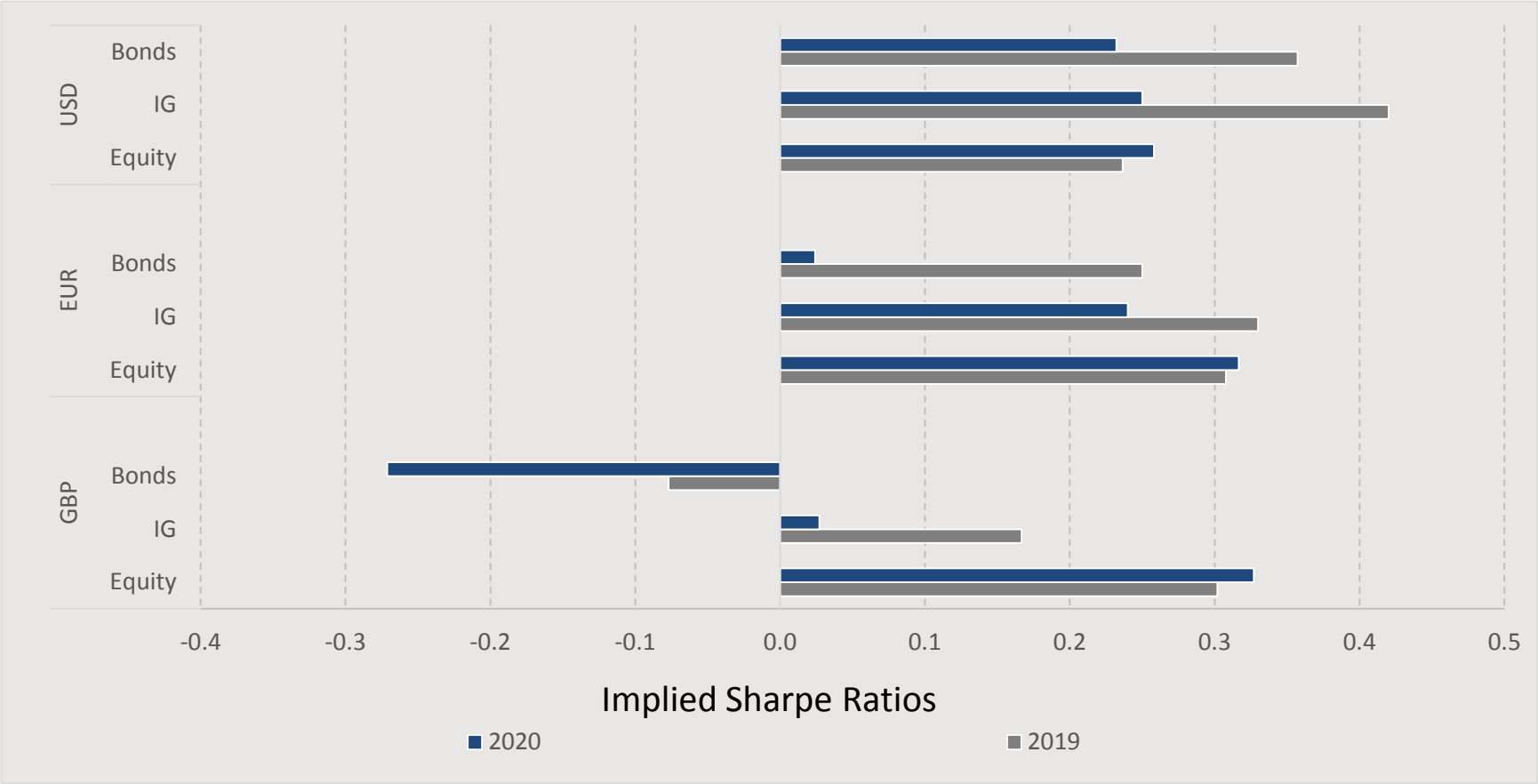
USD Sharpe ratios balanced for bond vs stocks; in EUR/GBP, bonds look very poor



Source: J.P. Morgan Asset Management; estimates as of September 2018. Implied Sharpe ratio = (expected compound return – expected cash return) / expected volatility. IG: Investment grade.

J.P.Morgan Asset Management

J.P. Morgan Asset Management – Risks & Disclosures

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Additional information

The number of “investment professionals” includes portfolio managers, research analysts, traders and investment specialists with VP title and above. Sourced from J.P. Morgan Asset Management; as of September 30, 2019.

“Top 10 multi-asset mutual fund manager” is sourced from J.P. Morgan Asset Management analysis based on data from Strategic Insights; multi-asset mutual fund peer group is global and excludes target date funds; based on global data as of September 30, 2019.

Numbers of investment strategies is updated annually, data as of December 31, 2018. Source: J.P. Morgan Asset Management.

Morningstar® Awards 2014. Morningstar, Inc. All rights reserved. The 2014 U.S. Allocation Fund Manager of the Year was awarded to the SmartRetirement team for the management of the JPMorgan SmartRetirement Target Date Series (Institutional shares). Subsequent winners in the Allocation category were not target date funds. In 2015, Michael Reckmeyer and John Keogh won in the Allocation category for Vanguard Wellesley Income Fund. In 2016, the Equity and Fixed Income Investment Policy Committees won the Allocation and Alternatives (combined) category for Dodge & Cox Balanced Fund. Nominations in Morningstar’s Allocation or Allocation/Alternatives categories were awarded in 2012, 2014 and 2017.

The “mutual funds with a 4/5 star rating” analysis is sourced from Morningstar for all funds with the exception of Japan-domiciled funds; Nomura was used for Japan-domiciled funds. The analysis includes Global Investment Management open-ended funds that are rated by the aforementioned sources. The multi-asset classification used in the illustration is based on J.P. Morgan’s own categorization. The share class with the highest Morningstar star rating represents its respective fund. The Nomura star rating represents the aggregate fund. Other share classes may have different performance characteristics and may have different ratings; the highest rated share class may not be available to all investors. All star ratings sourced from Morningstar reflect the Morningstar Overall RatingTM. For Japan-domiciled funds, the star rating is based on the Nomura 3-year star rating. Funds with fewer than three years of history are not rated by Morningstar nor Nomura and hence excluded from this analysis. Other funds which do not have a rating are also excluded from this analysis. Ratings are based on past performance and are not indicative of future results.

The Morningstar RatingTM for funds, or "star rating", is calculated for managed products (including mutual funds, variable annuity and variable life subaccounts, exchange-traded funds, closed-end funds and separate accounts) with at least a three-year history. Exchange-traded funds and open-ended mutual funds are considered a single population for comparative purposes. It is calculated based on a Morningstar Risk-Adjusted Return measure that accounts for variation in a managed product's monthly excess performance, placing more emphasis on downward variations and rewarding consistent performance. The top 10% of products in each product category receive 5 stars, the next 22.5% receive 4 stars, the next 35% receive 3 stars, the next 22.5% receive 2 stars and the bottom 10% receive 1 star. The Overall Morningstar Rating for a managed product is derived from a weighted average of the performance figures associated with its three-, five- and 10-year (if applicable) Morningstar Rating metrics. The weights are: 100% three-year rating for 36-59 months of total returns, 60% five-year rating/40% three-year rating for 60-119 months of total returns and 50% 10-year rating/30% five-year rating/20% three-year rating for 120 or more months of total returns. While the 10-year overall star rating formula seems to give the most weight to the 10-year period, the most recent three-year period actually has the greatest impact because it is included in all three rating periods. Rankings do not take sales loads into account.

J.P. Morgan Asset Management

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Past performance does not guarantee future results. Total returns assumes reinvestment of any income. Total return assumes reinvestment of dividends and capital gains distributions and reflects the deduction of any sales charges. Performance may reflect the waiver of a portion of the Fund's advisory or administrative fees for certain periods since the inception date. If fees had not been waived, performance would have been less favorable.

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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

November 15, 2019

Tom Klugherz, Executive Director, Investment Specialist
(415) 772-3018, thomas.klugherz@jpmorgan.com

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

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Presenters

Thomas Klugherz, Executive Director, is a Client Portfolio Manager in J.P. Morgan Asset Management – Real Estate Americas, based in San Francisco. Tom is responsible for capital raising and advising clients for the Real Estate Americas investment platform. Previously, Tom was a member of the Portfolio and Client services Unit for Real Estate US at UBS, a business which forms part of the Real Estate & Private Markets within UBS Asset Management. Tom has 31 years of experience working in various capacities as a fiduciary for some of the nation's largest pension plans and institutions. His prior experience includes acquisitions, asset management, portfolio management and day-to-day operations of several investment managers including GE Capital Investment Advisors and SSR Realty Advisors. During his career, Tom has been directly involved in sourcing, underwriting and managing more than USD 10 billion of institutional grade investments across the United States. Tom has worked directly with existing and prospective separate account and fund clients to analyze their portfolios and formulate investment strategies.

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

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- Environment, Social and Governance (“ESG”) Overview
- Supplemental Exhibits
- Summary of Terms
- SPF Schedule of Investments
- Biographies of Key Professionals
- Important Risks and Disclaimers

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Real Estate Americas Platform Overview

Updated with Prelim AUM

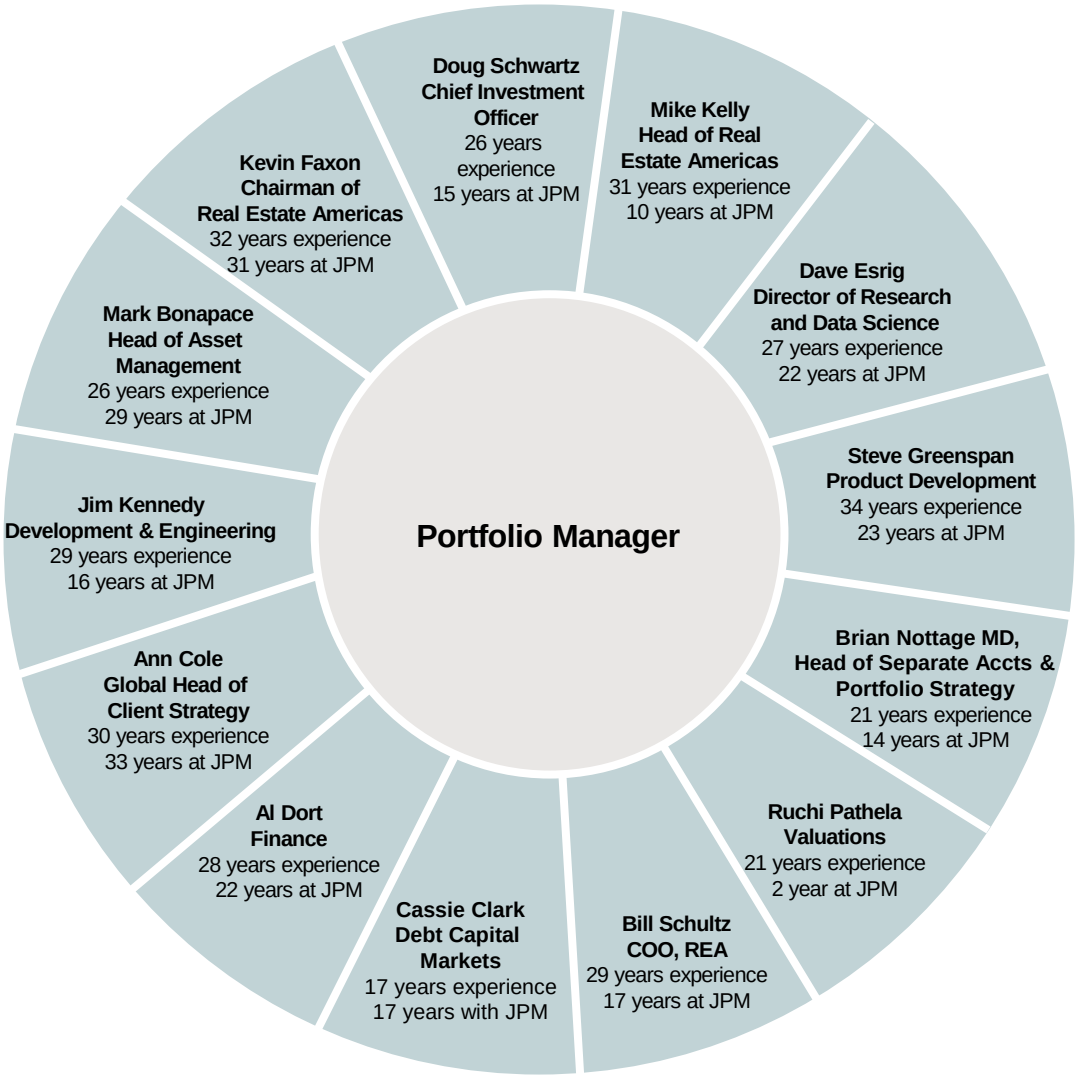
Real Estate Americas

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

SCALE, STABILITY AND STRENGTH	**$65 billion**[1] in AUM across the U.S. **45+ years** of real estate investment management experience **Nearly 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 **Disciplined investment process** consistently implemented across investment types and regions Local **expertise** across strategies, sectors and regions, and complex transactions
INFORMATION ADVANTAGE	JPMAM's **size** provides access to outstanding proprietary and external data sources **Dedicated research team** provides market research and portfolio construction analysis Over **$10 billion** of annual transaction activity provides extensive market knowledge
CLIENT FOCUS	Trusted advisor and fiduciary to over **800 clients** worldwide A legacy of **trusted partnership** built on a promise to put clients interest ahead of our own Focus on open communication, **transparency** and shared information

Source: J.P. Morgan Asset Management as June 30, 2019. [1]Preliminary AUM as of 3Q19.

Diverse, experienced specialists support portfolio manager



- Team-based approach
- Multi-disciplinary investment process
- Deep functional expertise with a cross real asset perspective
- No single perspective; no tunnel vision
- Experienced and stable team
  - 26 years average industry experience
  - 19 years average JPM experience
- Nearly 200 professionals supporting Real Estate Americas Platform

For discussion purposes only.
Source: J.P. Morgan Asset Management. As of September 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 – *31 years experience*

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

Aric Chang, ED

Luigi Cerreta, ED

20 years average experience

Chief Investment Officer
Doug Schwartz, MD
26 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

15 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

29 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

24 years average experience

REA Chief Operating Officer
Bill Schultz, MD
29 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

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

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

16 years average experience

Functional Partners

Finance
Al Dort, MD
28 years experience

DC Trading
Barney Fahey, MD
38 years experience

Valuations
Ruchi Pathela, ED
21 years experience

Global Product Development
Steve Greenspan, MD
34 years experience

Alternative Investment Strategy & Solutions
Pulkit Sharma, MD
13 years experience

Client Relations
Ravi Sharma, MD
22 years experience

September 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.

Investment committee

Institutionalized process employed across the platform: collaborative, streamlined, efficient, and thorough

Voting members: unanimous vote required to approve all acquisitions and dispositions

Chief Investment Officer	■ **Provides investment experience and ensures consistency of process and policy** ■ **Underwriting responsibility**
Portfolio Manager	■ **Represents the interests of the Fund** ■ **Responsible for adherence to Fund investment strategy and maintaining portfolio diversification**
Head of Asset Management	■ **Assures consistency of asset management policies across regions and sectors** ■ **Responsible for providing a further reasonableness check on underwriting from an asset management perspective**
Real Estate Research ***Senior Member***	■ **Provides macro perspective** ■ **Advises on economic and demographic trends, risks/opportunities and portfolio strategies**

Participating members: provide expertise in respective areas to aid in decision making

Chairman of Real Estate Americas	**Head of Real Estate Americas**	**Development and Engineering**	**Financial**	**Head of Portfolio Strategy**	**Global Head of Client Strategy**	**Sector Strategist**	**Director of Valuations**	**Debt Capital Markets**

For illustrative purposes only

October 2019

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Investment Summary and Performance

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Tucson Supplemental Retirement System
Investment summary as of September 30, 2019

Invested capital	Market value
Strategic Property Fund	$51,596,889

Account Performance (%)	Income	Appreciation	Total	ODCE
Three months[1]	1.0	-0.5	0.4	1.3
One year	3.8	0.2	4.0	5.6
Three years	4.0	2.4	6.5	7.3
Five years	4.3	4.2	8.7	9.3
Ten years	5.0	5.4	10.6	10.9
Fifteen years	5.2	3.0	8.4	7.9
Since inception (10/1/00)	5.8	2.6	8.5	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 September 30, 2019

US Real Estate Income and Growth Domestic LP	Net Asset Value
Tucson Supplemental Retirement System	$ 25,531,029

Investment Performance time-weighted rates of return (%)	Quarter	YTD	1 Year	3 Year	5 Year	10 Year	Since Inception[1]
Gross Income	0.9	2.7	3.9	4.7	5.1	6.3	6.5
Appreciation	(0.1)	(0.5)	(1.0)	1.7	3.6	5.7	(1.1)
Gross Total Return	0.8	2.2	2.8	6.5	8.9	12.3	5.3
Net Income	0.6	1.9	2.8	3.6	3.9	4.9	5.0
Net Total Return	0.5	1.4	1.7	5.4	7.6	10.9	3.9

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

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Strategic Property Fund

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The market leading U.S. core real estate investment strategy

Size and scale

- **Information advantage** driven by access to proprietary data
- Generational assets provide a unique entry point into **gateway markets**
- Meaningful sector, geographic and intra-market **diversification**
- Proven **liquidity** track record

High quality assets

- Focus on **stabilized** investments with **high quality** physical improvements
- **Durable income** stream constructed to be resilient across cycles
- **Dominant assets** with credit tenancy and superior rent growth trajectories
- Build to core program to facilitate next generation of **functional assets** in growing submarkets

Full cycle outperformance

- Long term outperformance with **lower risk profile**
- **Asset and geographic selection** are key to driving performance
- SPF outperformed ODCE by **32 bps over full market cycle**[1] with **0.91x beta** of peer set

It should not be assumed that Fund positioning in the future will be profitable or will equal past performance. [1]As of September 30, 2019; full market cycle is calculated from 1Q08 to 3Q19

Strategic Property Fund is core real estate

Residential

Palisade, San Diego, CA
USD 96.8 million, 0.3% SPF NAV

Retail

University Towne Center, San Diego, CA
USD 710.1 million, 2.3% SPF NAV

Industrial

South Florida Logistics Center, Miami, FL
USD 397.3 million, 1.3% SPF NAV

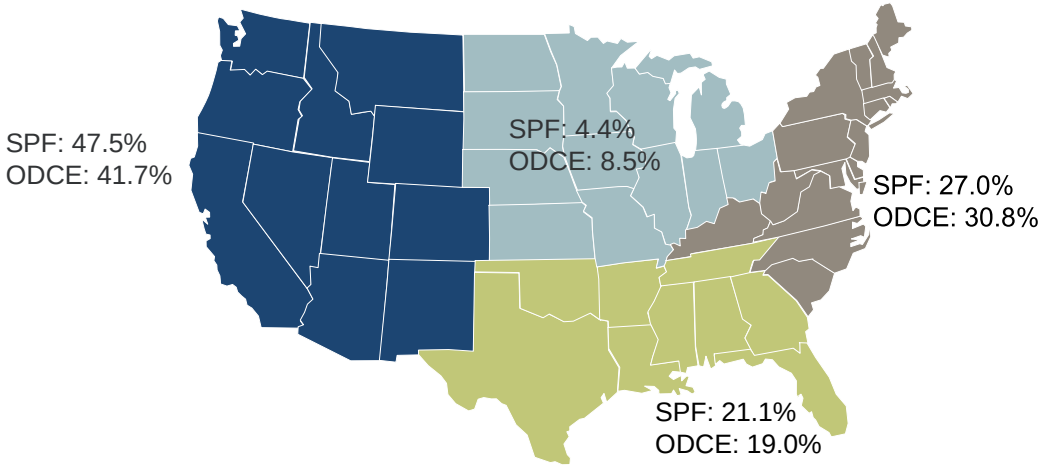
Office

200 Fifth Avenue, New York, NY
USD 387.2 million, 1.2% SPF NAV

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).**

Geographic and sector diversification

Geographic diversification



Top 5 markets by MSA

Investment	# of Assets	NAV (USDmm)	% of NAV
Dallas, TX	16	3,659	11.8
Los Angeles, CA	16	3,446	11.1
New York, NY	14	3,283	10.6
Boston, MA	13	2,910	9.4
San Jose, CA	8	2,623	8.5

Sector diversification[1]

	SPF (%)	ODCE (%)	Mid-Year 2020 Target Range
Office	37.0	33.8	↓
Industrial	15.9	19.3	↑
Residential	20.7	25.3	↑
Retail	25.6	17.1	↓
Other	0.8	4.5	
Total	100.0	100.0	

Investments as of 9/30/2019

- 55 office buildings
- 176 industrial buildings
- 26,070 units in 77 apartment communities
- 11 super regional and regional malls
- 200+ neighborhood and community retail centers

[1]Net of debt; values may not total 100% due to rounding. Past performance is not a guarantee of comparable future returns. Returns assume the reinvestment of income. 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).**

Innovative investing within traditional sectors

Residential

Single family rental

Palisades, San Diego, CA

Retail

University Towne Center, San Diego, CA

Industrial

High flow through/truck terminals

South Florida Logistics Center, Miami, FL

Office

Life science

200 Fifth Avenue, New York, NY

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Balance sheet snapshot

Size	
Gross Asset Value	USD 41.8bn
Net Asset Value	USD 31.4bn
Number of Investments	166

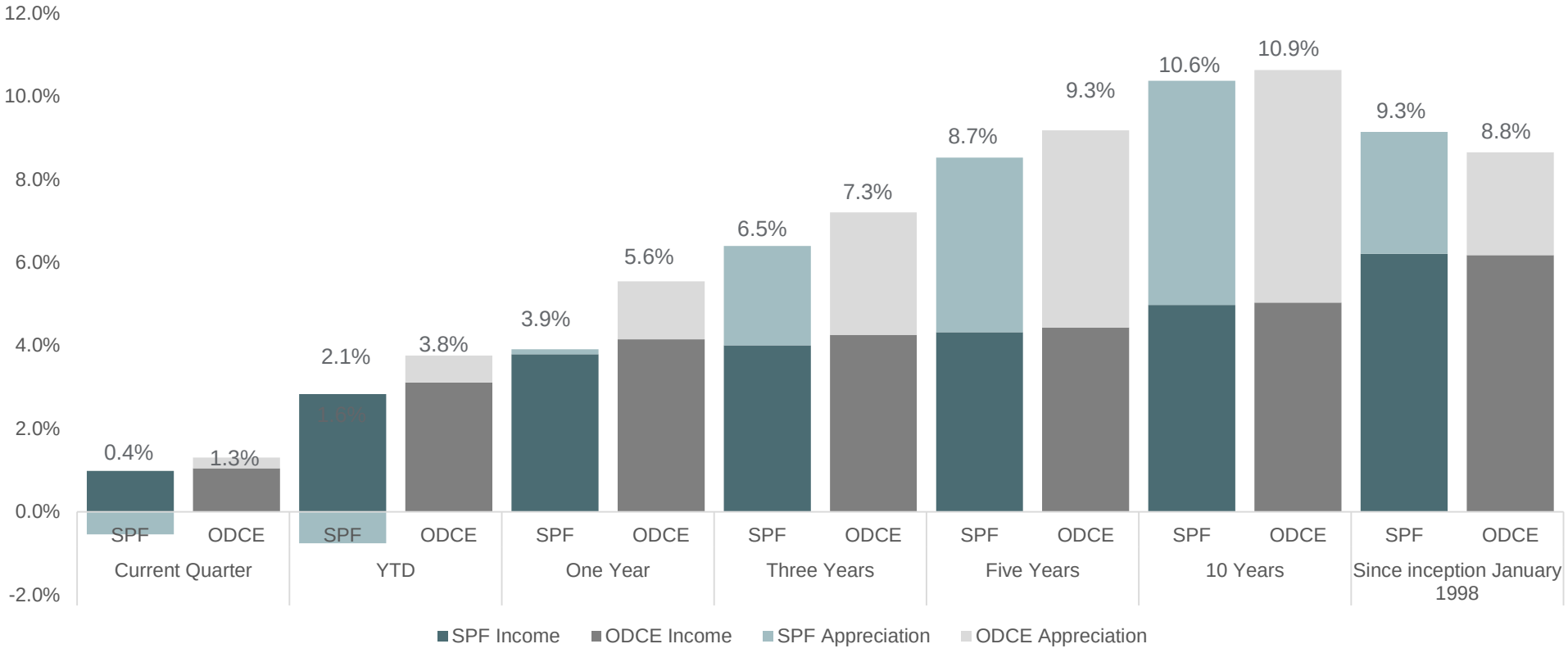
Key risk metrics	SPF	Peer Set[1]
Beta	0.91x	N/A
Non-core property types	0.0%	5.9%[2]
Development (% GAV)	3.3%	7.2%[2]

Client flows	
YTD Capital Funded	USD 882.9mm[3]
YTD Redemptions	USD 4,271.3mm[3]
Contribution Queue	USD 244.8mm[4]
Cash position	1.4%

Debt profile	
Asset level	USD 10,002.9mm
Fund level	USD 0
Leverage ratio	24.5%
Fixed debt	91%[5]
Weighted average interest rate	4.2%

[1]Peer set includes the next four peers in ODCE by NAV; [2]As of 2Q19. [3]As of October 2019. [4]As of November 1, 2019 [5]Fixed vs floating loan designation impacted by derivatives (i.e. swapped loans are considered fixed) **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).**

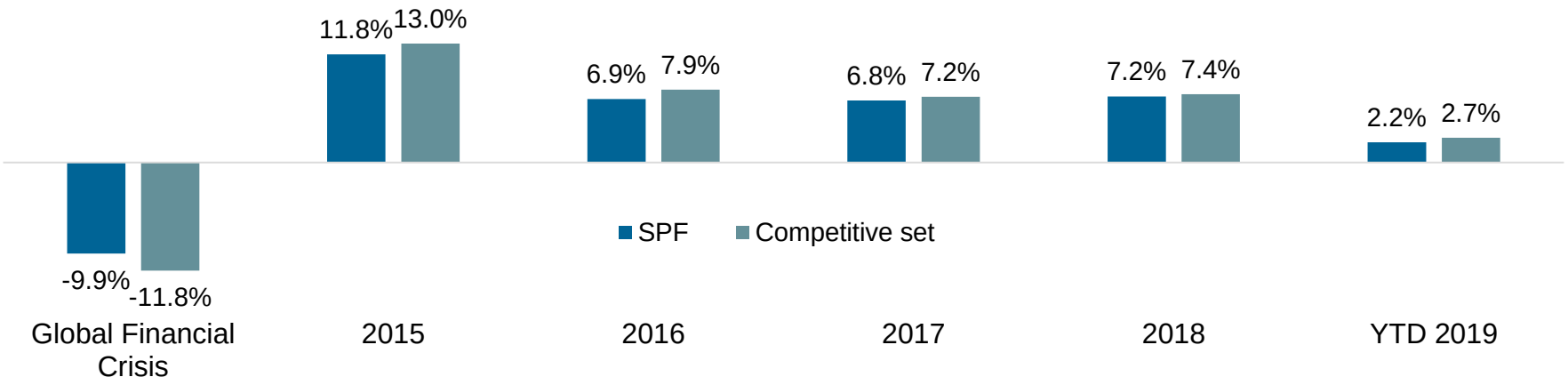
Related: Performance overview



Returns are as of 3Q19. Returns for periods less than one year are not annualized. **Total returns net of fees for SPF were: Current Quarter: 0.20%; YTD: 1.3%; One year: 2.9%; Three years: 5.4%; Five years: 7.6%; 10 years: 9.5%; Since inception: 8.2%. Net returns are based on the highest applicable fee rate for this strategy. Total returns net of fees for ODCE were: Qtr: 1.1%; YTD: 3.1%; One year: 4.7%; Three years: 6.3%; Five years: 8.4%; 10 years: 9.8%; Since inception (January 1998): 7.8%.**
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. Performance numbers represent a composite return of the combined fund investor vehicles (FIVs). Performance is represented at a fund level and is net of FIV taxes.

Historical performance and key drivers

Direct property performance

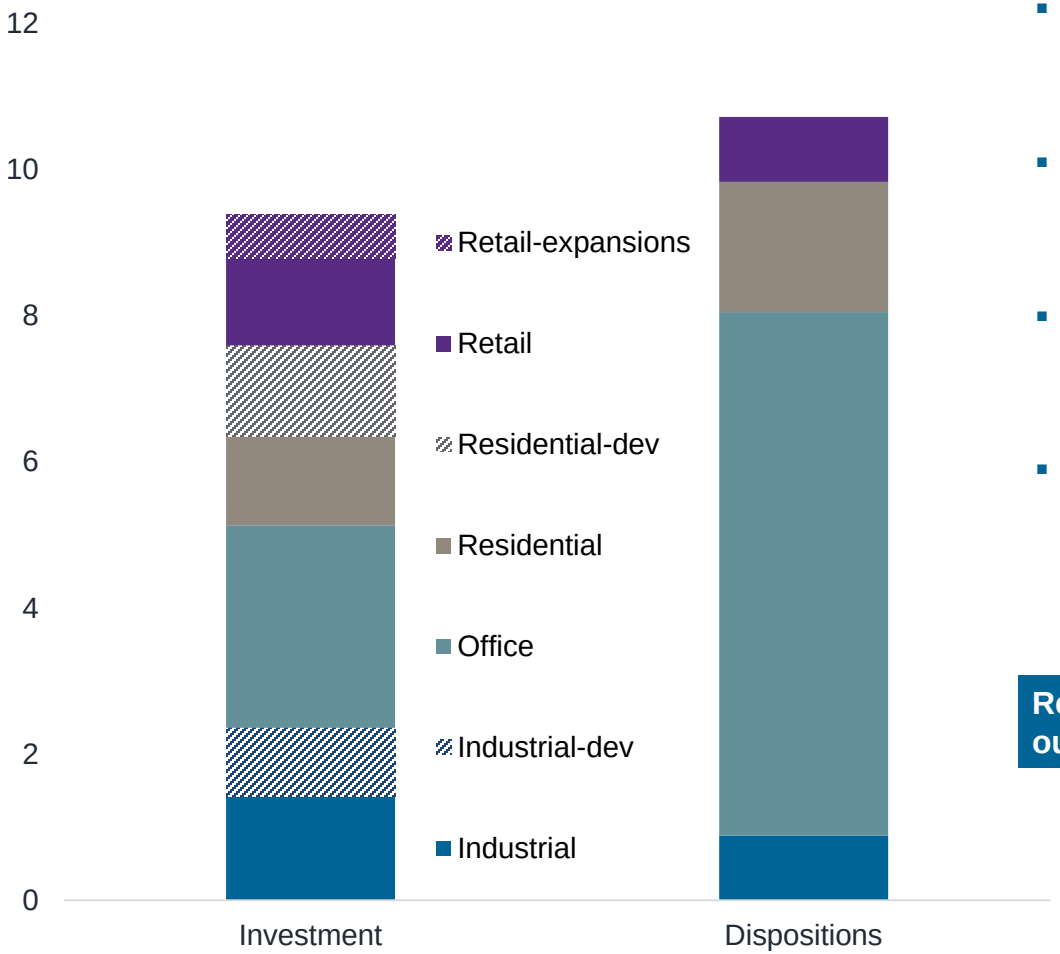


Explaining performance vs. ODCE over the last five years	What's Changing?
▪ Low risk strategy with less development than peer group detracted ~30 bps/year	Status quo
▪ Repositioning office portfolio for evolving tenant demand detracted ~20 bps/year	Complete
▪ Sector allocation: industrial underweight/retail overweight detracted ~20 bps/year	In progress

Source: J.P. Morgan Asset Management and MSCI as of June 30, 2019. Past performance is not a reliable indicator of current and future results.

Capitalizing for growth

Capital flows over the last three years ($bn)



Investment activity focus

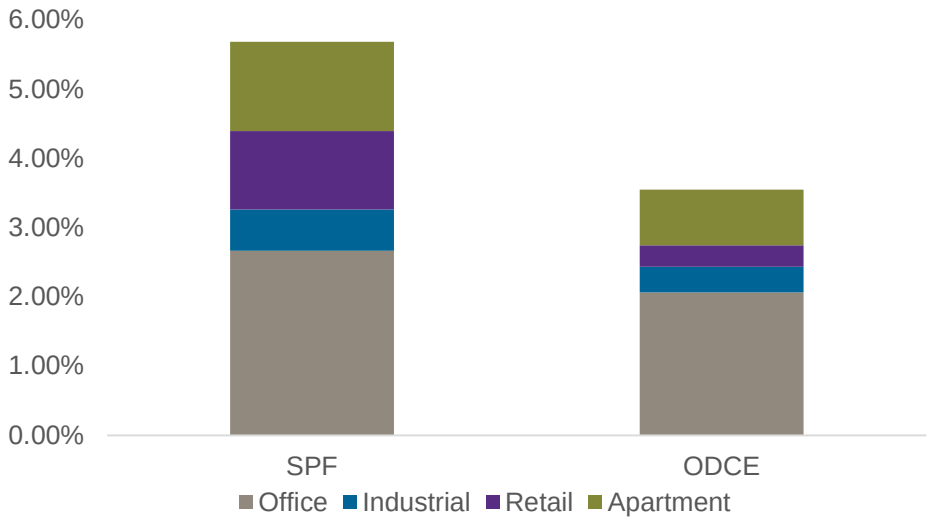
- **Office:** Transforming to functional assets in destination locations attractive to growing tenants; net seller of $4.3B of office assets
- **Multifamily:** Selling assets with limited pricing power and recycling into growth markets with focus on transit oriented, highly amenitized locations with urban qualities
- **Industrial:** Building allocation through development and purchases of existing assets where the fund can leverage its scale
- **Retail:** Expansions at top two assets to solidify competitive positions and re-merchandising capital to position for future growth

Result: Strong NOI growth and positioning for outperformance in a mature cycle

Source: J.P. Morgan Asset Management as of June 30, 2019

NOI growth projections

2020 – 2022 Projected NOI Growth



Three year average NOI growth projections (2020-2022)

	SPF	ODCE
Office	7.0 – 9.0%	4.0 – 5.0%
Industrial	3.5 – 5.0%	3.0 – 4.0%
Retail	4.0 – 6.0%	1.0 – 1.5%
Residential	3.0 – 5.0%	3.0 – 4.0%
Total	**5.0 – 6.0%**	**3.0 – 4.0%**

Source: JPMAM and NCREIF as of June 30, 2019; NOI growth for SPF includes all projects. NOI growth for ODCE is same store for NPI qualifying assets included in ODCE funds at 100% ownership share; NCREIF does not report total NOI growth. NOI projections are forecasted based on JPMAM data. [1]Based on weighted average lease percentage. 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.

Development pipeline

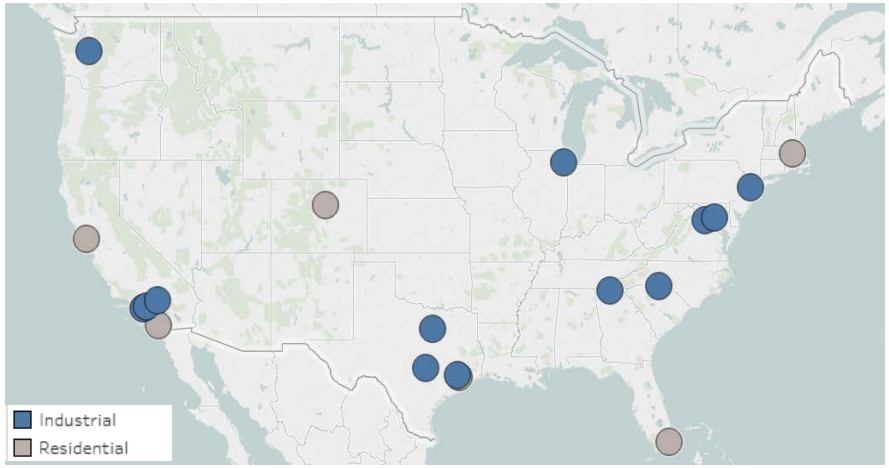
Pipeline

	Size	# of projects	Equity commitment
Multifamily	2,648 units	8	$1,475mm
Industrial	5.2mm SF	13	$1,109mm
Total		**21**	**$2,584mm**

Strategy

- Creatively building industrial allocation at competitive entry points in infill locations attractive to ecommerce tenants
- Upgrading multifamily portfolio in supply constrained, top growth and low home affordability markets
- Prioritizing existing partners, short lead times and asset functionality to meet changing demand

Development map



Fundamentals

- Industrial leasing ahead of pro-forma
- Firm tenant demand in California multifamily; higher construction costs and land prices reduce construction profitability for new projects
- Projects underway are projected to deliver 190 bps of appreciation to SPF over the next 24 months

Source: J.P. Morgan Asset Management as of June 30, 2019

Industrial portfolio

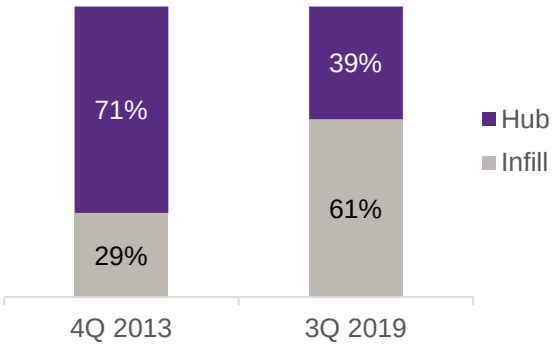
Allocation over time

12/31/2015		9/30/2019	Mid-Year 2020 Target Range
7.7%	→	15.9%	↑

Investment objectives

- 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

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Industrial portfolio – Allocation timeline

Jul 2015
Vineyard Industrial I and II

Apr 2016
Sares Regis
Thousand Oaks

Sept 2016
South Florida
Logistics Center

Aug 2017
Moreno Commerce

Jul 2018
RealTerm Industrial

Jan/Feb 2019
- Sam Houston Distribution Center
- Maywood Park

Apr 2016
Pico Rivera

Sept 2016
Kimball Business Park

Oct 2017
Toyota Campus

Nov 2018
Black Creek Venture

Leverage partnerships for growth and pipeline:

Sares Regis Partnership:

- Partners since 1996
- Best in class regional operator
- Proven track record with local municipalities
- Focus on infill industrial in southern California
- Over 6.5mm SF of industrial with Sares Regis since 2015

Black Creek Venture:

- Access build-to-core pipeline with best-in-class operator
- Goal is to scale the investment to $1 billion+ over time
- Scalable and geographically diversified with a focus on infill
- Control through “discretion in a box”; market fee structure
- SPF’s size was an advantage in securing the opportunity

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Retail portfolio

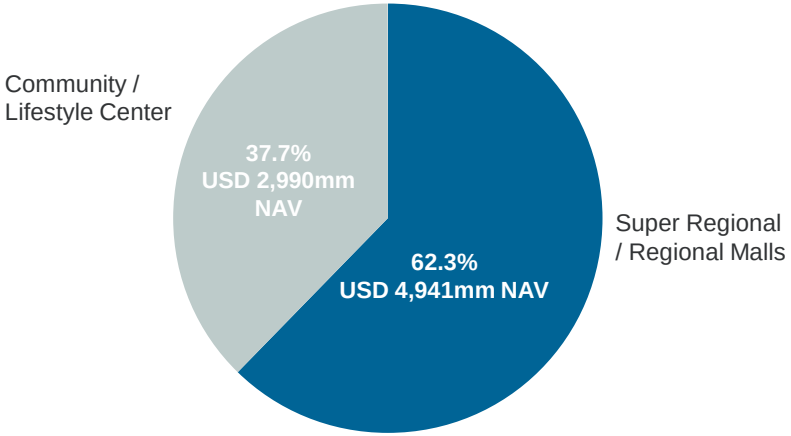
Allocation over time

12/31/2015	9/30/2019	Mid-Year 2020 Target Range
23.9%	25.6%	

Investment objectives

- 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
- Narrow mall holdings to those with outsized NOI growth potential

Retail portfolio composition



	Mall Sales PSF
SPF	USD 1,011
Industry Average	USD 517[1]
Simon Property Group	USD 669
Macerich	USD 776
General Growth Properties*	USD 777
Taubman	USD 848

Source for Mall Sales PSF: J.P. Morgan, Green Street Advisors and as reported by respective companies as of 2019Q2; * GGP sales weighted by NOI. [1]As of 5/21/2019; Royal Hawaiian, which is not rated but would be rated A++ based on sales PSF. **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).**

Mall portfolio health metrics

	SPF Malls	Industry Average
Sales per SF	$1,084	$517
Sales growth (y/y)	7.7%	3.3%
Occupancy	91.1%	89.2%
Occupancy cost	12.1%	12.8%
Occupancy cost (five year change)	-1.4%	
NOI Growth (projected five year; before expansions)	5.2%	2.0%
Stabilized cap rate	4.8%	
Greenstreet cap rate for assets with similar quality ratings	4.9%	

University Towne Center, San Diego, CA

Royal Hawaiian Center, Honolulu, HI

Source: J.P. Morgan Asset Management as of June 30, 2019, Greenstreet mall database as of May 21, 2019 (sales PSF) and Greenstreet Mall Market Snapshot as of August 16, 2019. SPF sales PSF are weighted by SF. 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. Cap rates are as of Sept 30, 2019. **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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Office portfolio

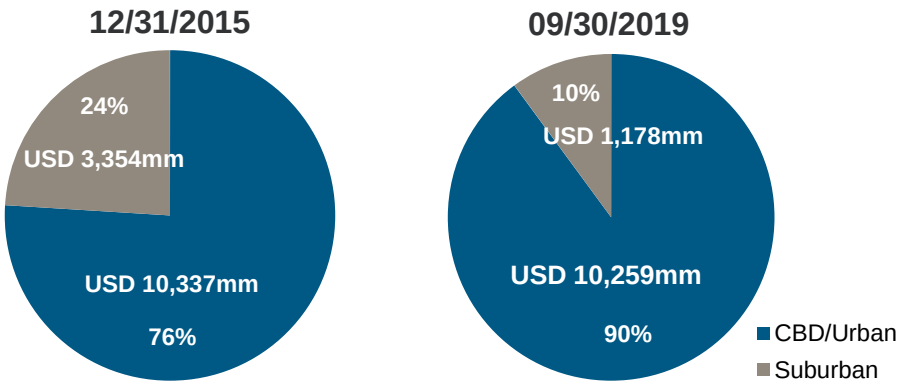
Allocation over time

12/31/2015	9/30/2019	Mid-Year 2020 Target Range
48.2%	37.0%	

Investment objectives

- 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
- Complete three year effort to divest of suburbs, small tenant markets and metros lacking diverse demand drivers
- Focus on dominant assets, growth submarkets and assets with the functionality to meet modern tenant demand
- Remain extremely cautious on co-working

Transformed composition of office portfolio



Strategic dispositions

Advanta Office Commons, Bellevue, WA

Network Drive, Burlington, MA

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Landmark Center, Boston, MA

ASSET OVERVIEW

Property Type	Office
Investment Date	February 2011
Ownership	Joint Venture
Size	983,190 SF
NAV	USD 644 million

- Former Sears, Roebuck & Company distribution center that was built in 1928 and completely redeveloped in 2000
- Property is currently being repositioned as a destination office and retail complex
- Flagship asset located in the heart of the Fenway submarket of Boston
- Major tenants include Children's Hospital, Harvard School of Public Health and Toast (software company)
- The project includes a new destination food hall called TimeOut Market, renovations to the elevators and common areas, and construction of a new landscaped urban park

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Multifamily portfolio

Allocation over time

12/31/2015		9/30/2019	Mid-Year 2020 Target Range
20.0%	→	20.7%	↑

Investment objectives

- 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

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

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Palisade, San Diego, CA

ASSET OVERVIEW

Property Type	Residential
Investment Date	July 2017
Ownership	Joint Venture
Size	300 units
NAV	USD 97 million

- Opportunity to develop a best-in-class, Class-A, luxury high-rise apartment project on 1.6 acres
- Adjacent to SPF's premier mall, University Towne Center
- Will have a four-level parking podium; two of which will be partially subterranean
- Standard unit finishes include floor-to-ceiling glass windows, balconies on all units, upgraded vinyl flooring throughout the common areas and bedrooms, KitchenAid appliances, quartz countertops and electronic entry locks
- Best-in-class amenity package consists of a 4,000 SF rooftop sky deck, resort-style pool, outdoor kitchen and BBQs, 4,100 SF indoor/outdoor fitness center and resident lounge

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Looking ahead

Strategic sector positioning

Industrial: Accretively increasing our allocation with a focus on infill

Office: After significant disposition activity, current concentration in Gateway markets with best in class assets

Multifamily: Transformed holdings with select sales; development pipeline and above market retention capabilities to drive future growth

Retail: Differentiated asset base with newly capitalized formats most sought after by retailers and consumers.

Strong NOI growth and portfolio metrics

2019 Projected NOI Growth: 8%

Occupancy:
92% → 95% by 2019YE

2020-2022 Projected Total NOI Growth	
Industrial	3.5 – 5.0%
Office	7.0 – 9.0%
Multifamily	3.0 – 5.0%
Retail	4.0 – 6.0%
Total	**5.0 – 6.0%**

Quality bias

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

Century Plaza, Los Angeles, CA

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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

Income and Growth: A core plus fund

As of September 30, 2019. There can be no assurance that the past performance or success of the business will serve as an indicator of such future performance or success.
Source: J.P. Morgan Asset Management.

A core-plus fund

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

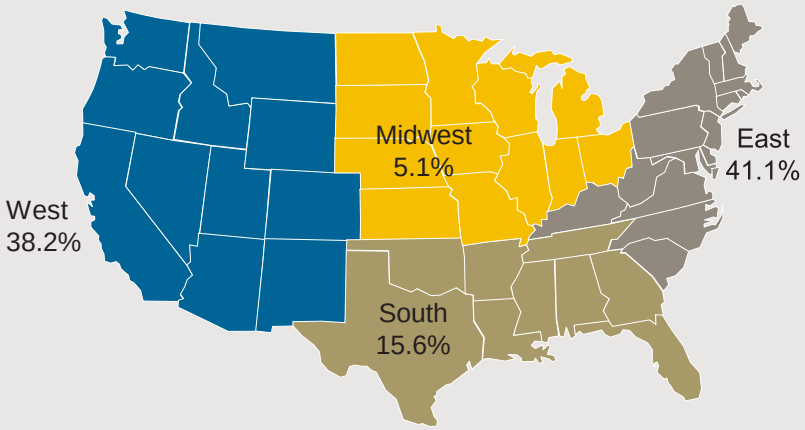
Fund profile as of September 30, 2019	
Gross Asset Value (GAV)	$ 4,065 mm
Net Asset Value (NAV)	$ 2,618 mm
Number of Assets	71
Occupancy[1]	92%

Fund profile as of September 30, 2019	
Current Leverage	35% (40% guideline)
Fixed rate loans	82%
Weighted Average Coupon	4.1%
Weighted Average Time to Maturity	4.1 years

Stanford Research Park, Palo Alto, CA

Diversification by property type and location

Sector	% of NAV
Office	48.8
Industrial	19.6
Multifamily	20.9
Retail	10.7
Total	**100.0**



Top MSAs[2]	% of NAV
New York	18.5
Washington, D.C.	13.0
Silicon Valley	8.9
Dallas	8.1
Seattle	7.4
San Francisco	6.6
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 September 30, 2019. Diversification includes Direct Real Estate and Mezzanine investments. Information subject to change.

Recap: 2018 Guideline Revisions

Guideline Revisions

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

As of September 30, 2019
Source : J.P. Morgan Asset Management

2019: A Transformational Year

Capacity for additional value-add allocations

- 92% portfolio occupancy[1]
- Non-stabilized exposure[2]:
  - I&G 4.9%
  - ODCE (MSCI) 8.6%
  - Core Plus (MSCI)[3] 16.9%

2019 Plan

- Maintain defensive positioning
- Incrementally increase Plus allocation
  - Execute sales program targeting assets with limited upside
  - Redeploy proceeds into value-add investments
    - Targeting industrial and multifamily

Sherry Lane, Dallas, TX

[1]As of September 30, 2019; 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]As of June 30, 2019. 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 repositioning. Source: MSCI [3] Core plus index excluding I&G.

Source: MSCI

I&G – Performance summary

As of September 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	2.6	3.8	4.6	5.0	5.3	6.0	6.7
Appreciation	(0.1)	(0.5)	(1.0)	1.6	3.6	5.0	5.6	0.7
Total Return[2]	0.8	2.2	2.7	6.3	8.6	10.4	11.9	7.5

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 September 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	Multifamily
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 September 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 (9/30/2019)	$ 510	19.6%

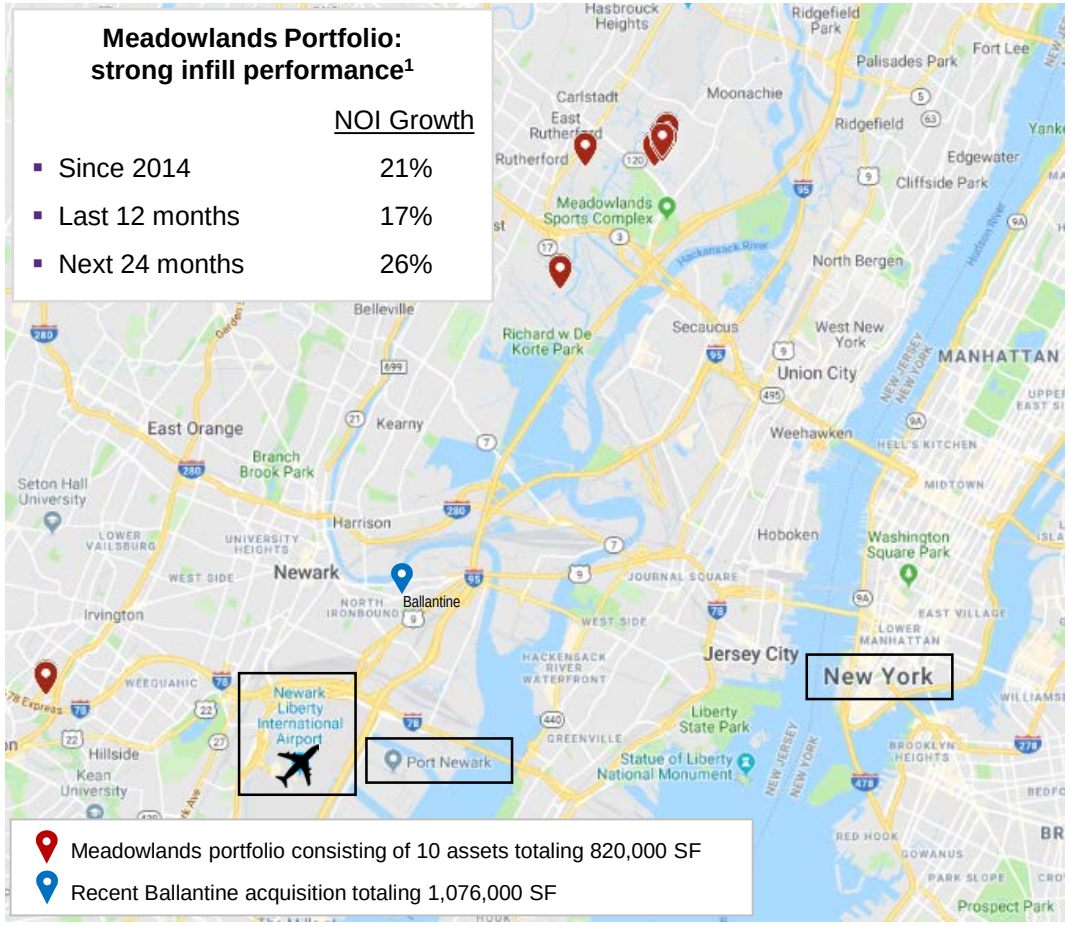
Portfolio Highlights

- Occupancy: 89%
- Weighted average lease term: 4.8 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 September 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

I&G industrial portfolio: Recent acquisitions

Ballantine – Newark, NJ

Repositioning

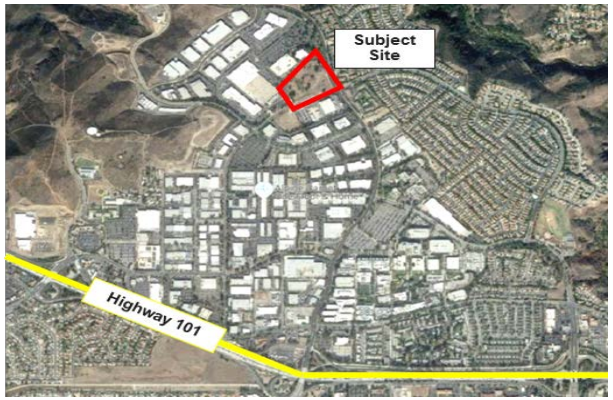
Acquisition Date	January 2019
Size	1,076,000 sf
Purchase price	$ 61.0 mm
JPM equity	$ 18.9 mm

- 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 September 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 (9/30/2019)	$ 542	20.9%

Portfolio Highlights

- Occupancy[1]: 94%
- Composition: 52% suburban
  48% 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 September 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.

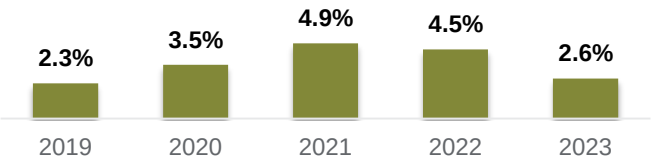
I&G office portfolio: Durable cash flows

I&G Office Exposure

	NAV (millions)	Allocation
Current (9/30/2019)	$ 1,270	48.8%

Portfolio Highlights

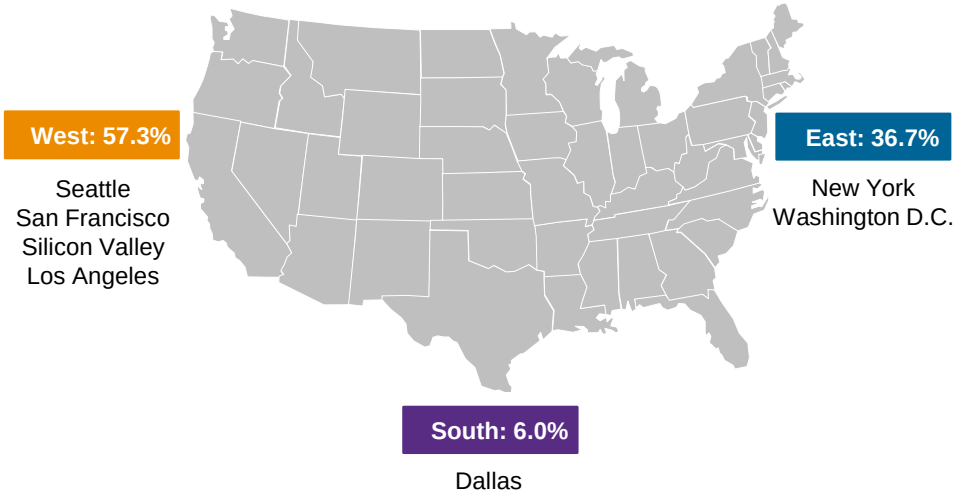
- Durable cash flows
  - Stabilized core asset base
  - 10 year average occupancy of 95%
  - Minimal near term lease rollover:



  - 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 September 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 (9/30/2019)	$ 279	10.7%

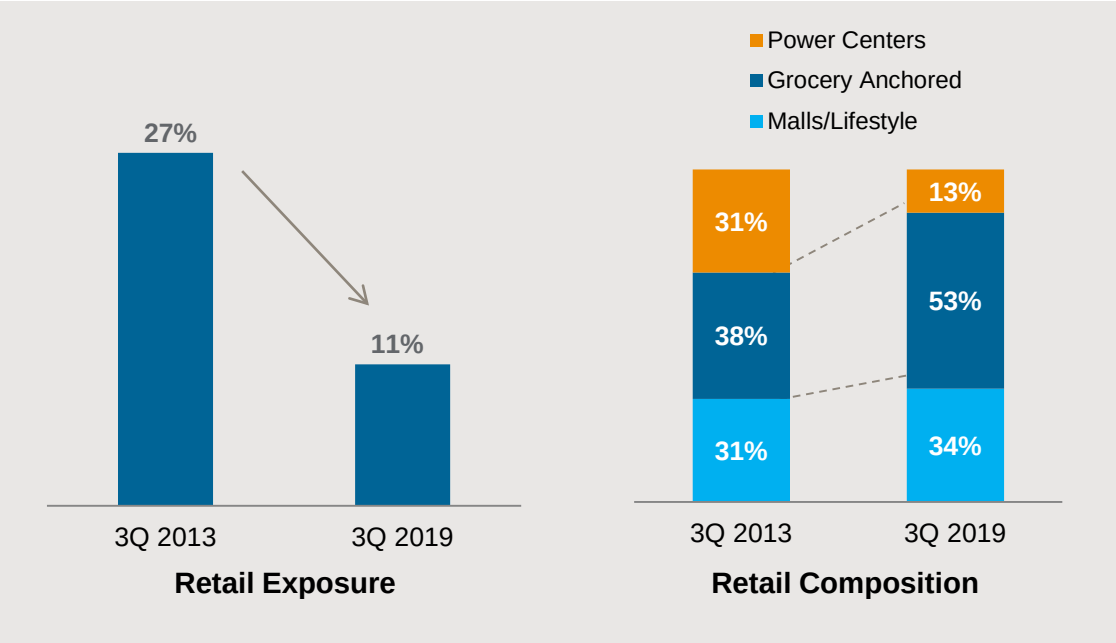
Portfolio Highlights

- 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 year-end 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, every retail asset has been written down
  - Average 17% decline in GAV across portfolio since year-end 2016

As of September 30, 2019 unless otherwise specified. 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 $66B Americas platform
- Confident the return trajectory will be within the Fund's 8-10% target range by 2021

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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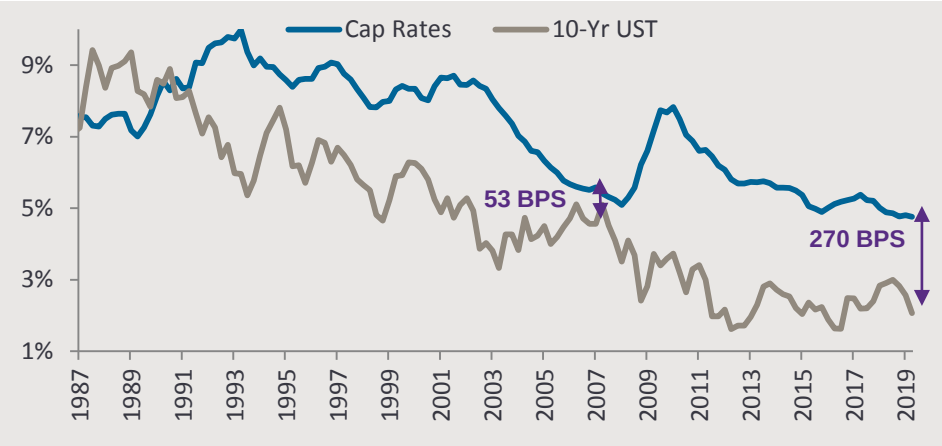
Appendix – U.S. Real Estate Market Outlook

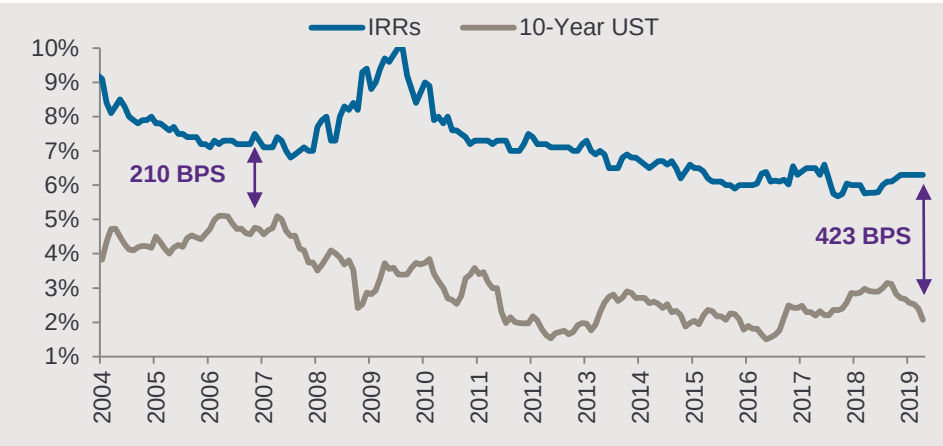
Core property return premium to fixed income near average; Historically, the property index only declines due to recessions

Real estate has no interest rate duration causing little impact on returns

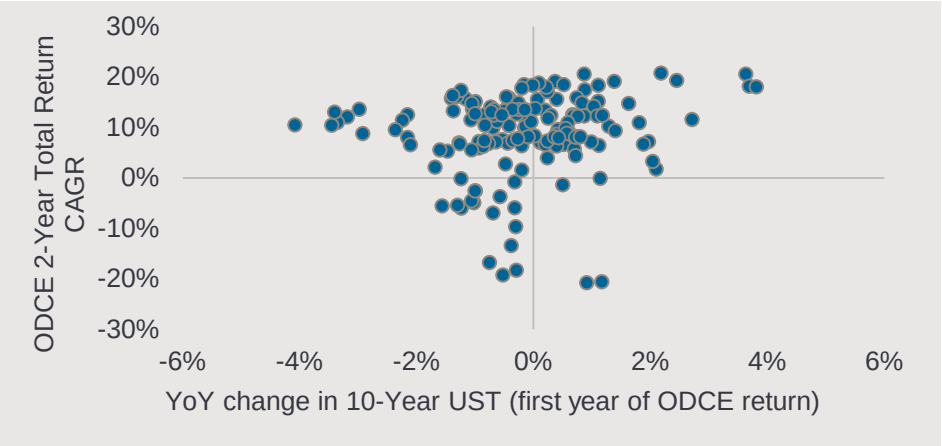
NCREIF transactional cap rates vs. 10-year UST



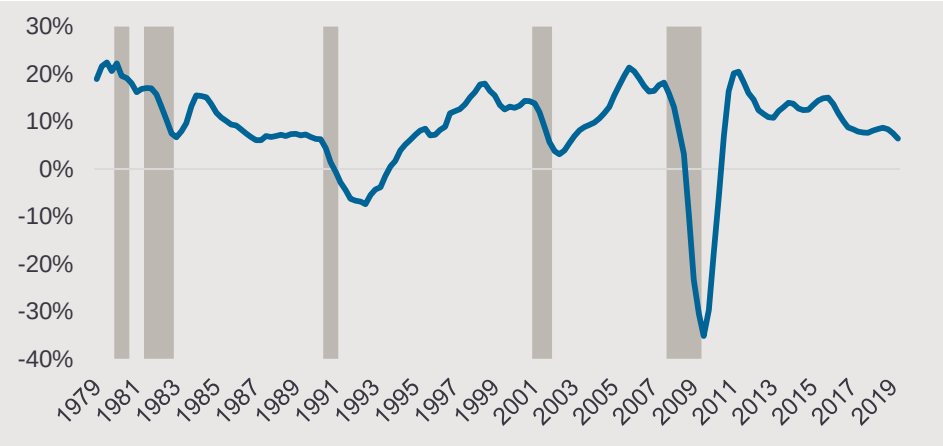
JPMorgan REA underwritten unlevered IRRs vs 10-Yr UST



NCREIF ODCE 2-Year total return vs change in 10-Yr UST



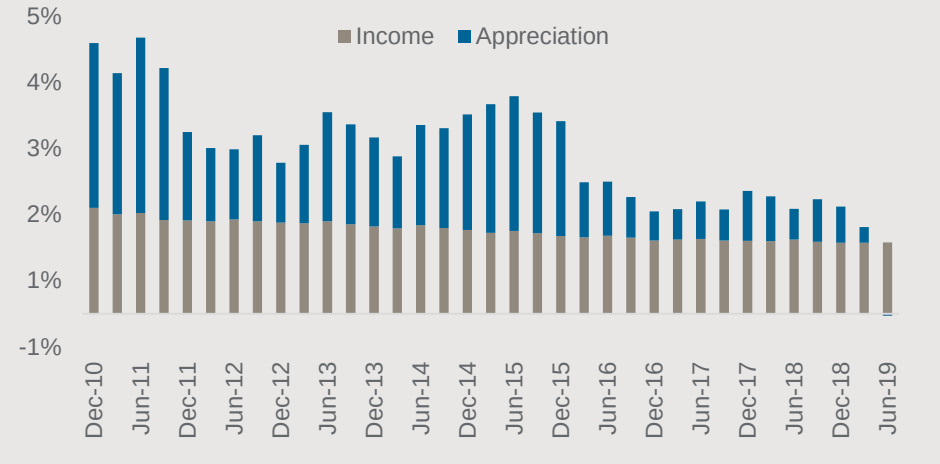
NCREIF NFI ODCE rolling 1-Year return vs Recessions



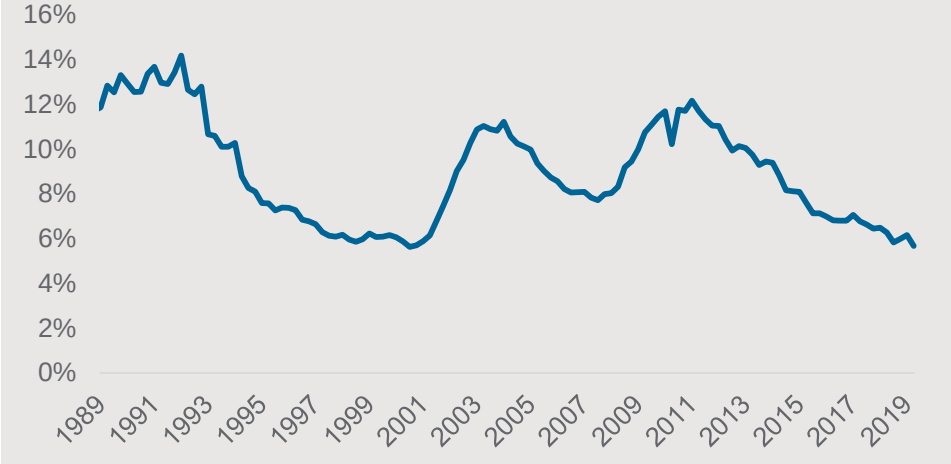
Sources: Top left, and bottom charts: NCREIF and Moody's Analytics, as of June 2019; Top Right: JPMAM and Moody's Analytics, as of June 2019

There is little euphoria or froth to squeeze out of the system and fundamentals are solid

NCREIF ODCE Property Index: Total Returns



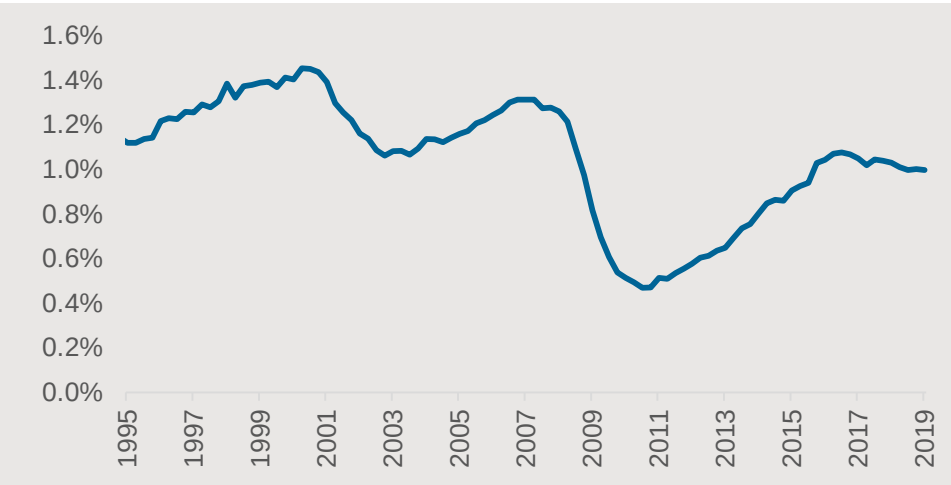
Vacancy rates are nearing thirty year low



Net core flows are zero

Transaction volume is flat (bil.)

Four major sectors construction share of GDP moderating

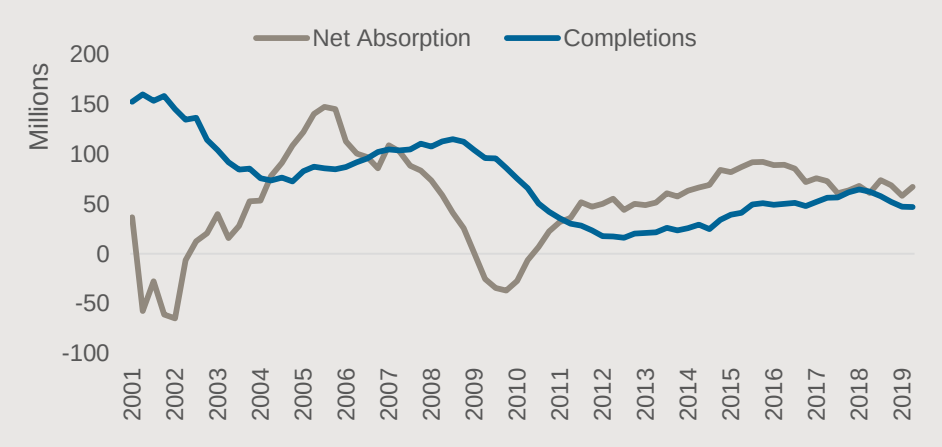


Sources: Top two charts and bottom left: NCREIF, as of June 2019; Bottom middle: Real Capital Analytics, as of June 2019; Bottom right: Moody's Analytics, BOC, and BEA. As of June 2019.

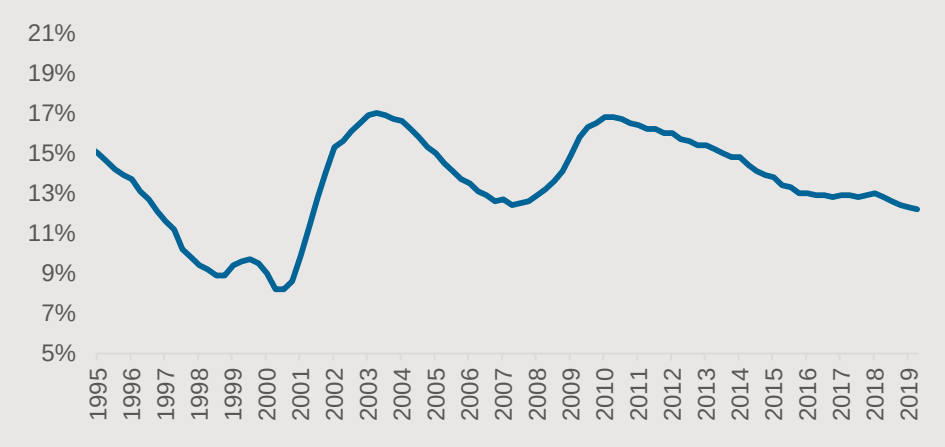
Office Sector

Strong economy and job growth has driven vacancy down; CBDs are consistently tighter markets than suburbs

Supply versus demand (rolling four quarters, square feet)

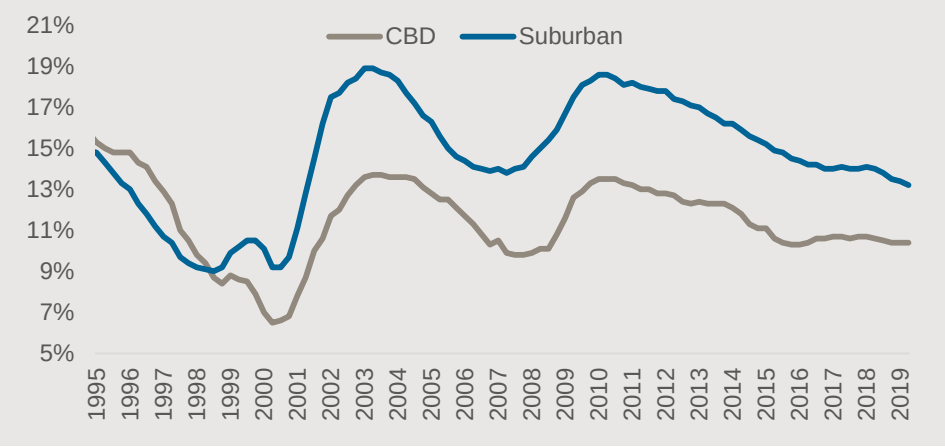


Vacancy rate



Year over year rent growth

CBD vs suburban vacancy rate



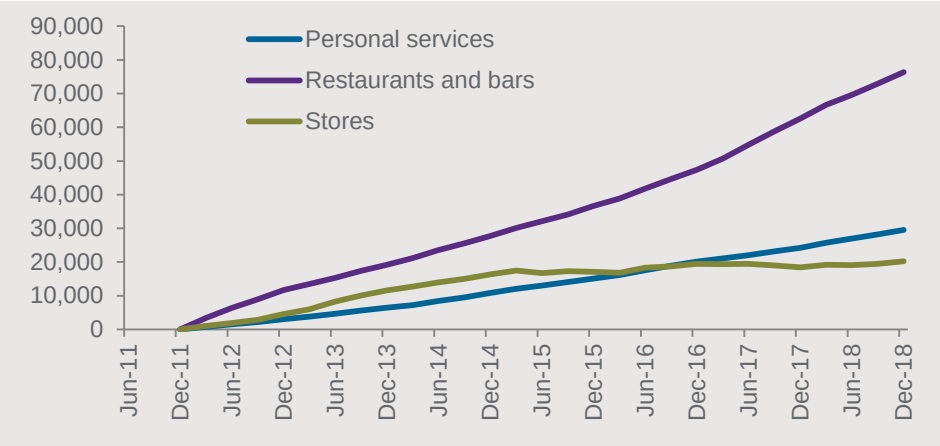
Sources: Left-hand charts: CoStar; Right-hand charts: CBRE-EA, as of June 2019

ALTs by J.P.Morgan Asset Management

Retail Sector

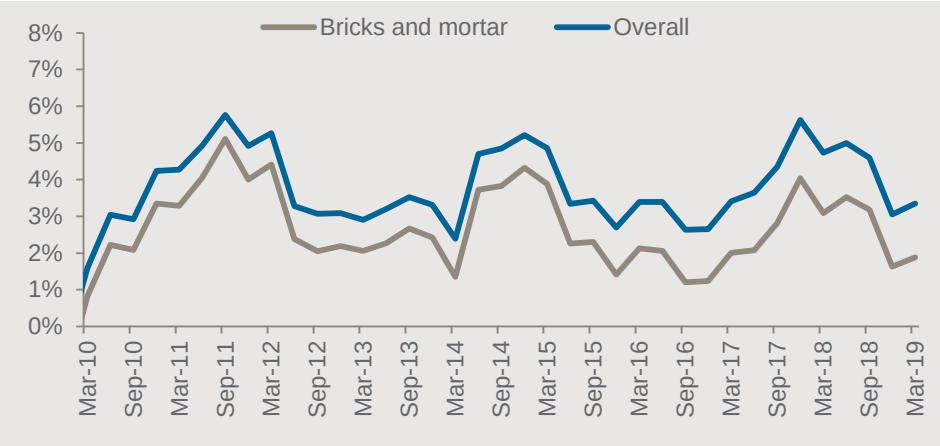
Not as bad as headlines would suggest; quality of retail has become increasingly important

Demand: Net change in number of establishments since 2011

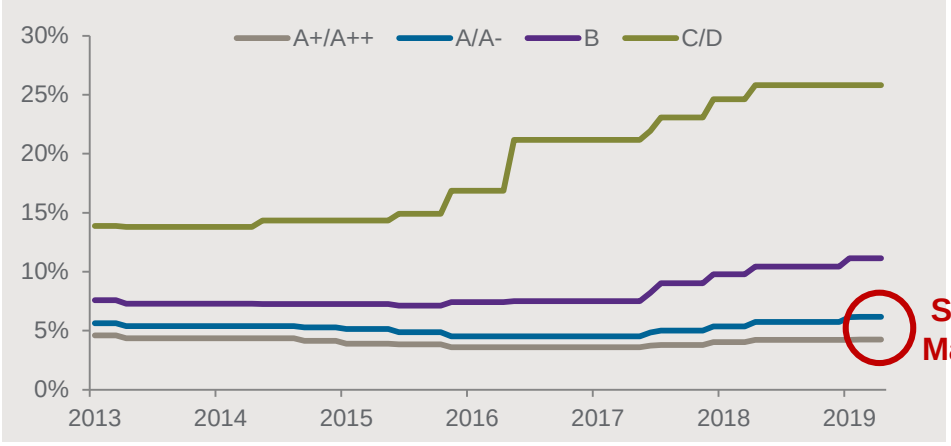


Supply: Retail real value of construction put in place, 2018 dollars

Retail sales growth, year-over-year



Mall cap rate by grade



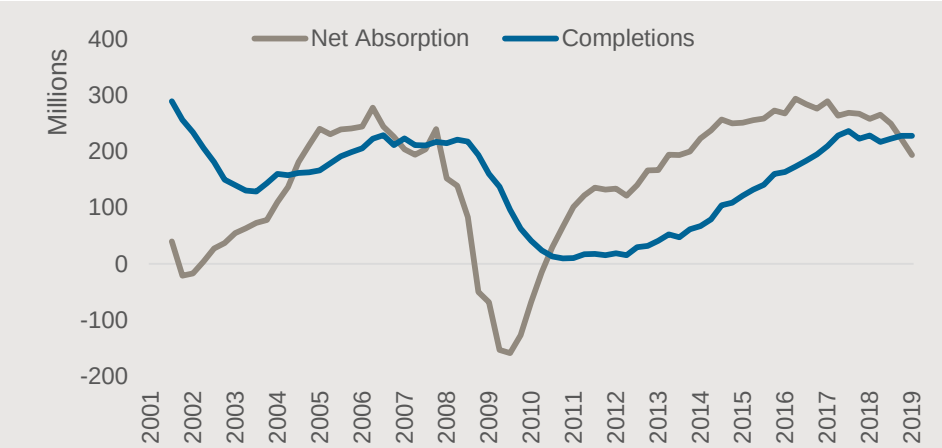
Sources: Top left chart: Bureau of Labor Statistics, as of December 2018; Top right: BOC and JPMAM, as of June 2019; Bottom left: BOC and JPMAM, as of March 2019; Bottom right: Green Street, as of April 2019

ALTs by J.P.Morgan Asset Management

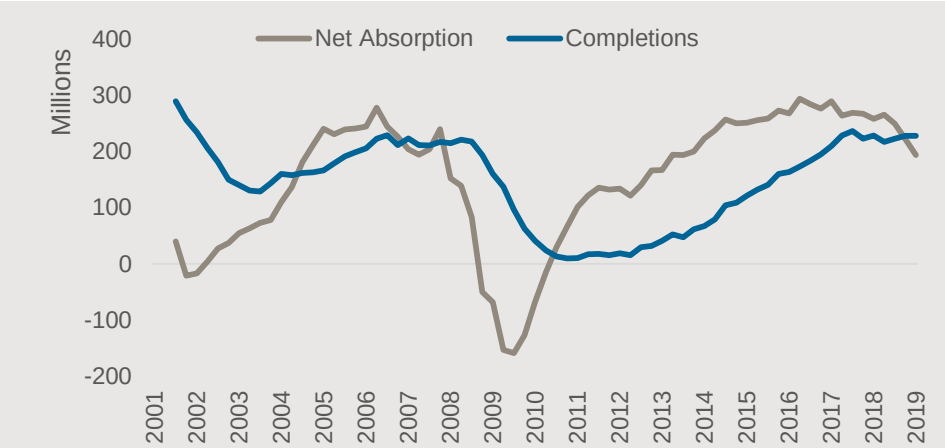
Industrial Sector

Supply has caught up to demand leading rent growth to moderate some; infill product continues to outperform

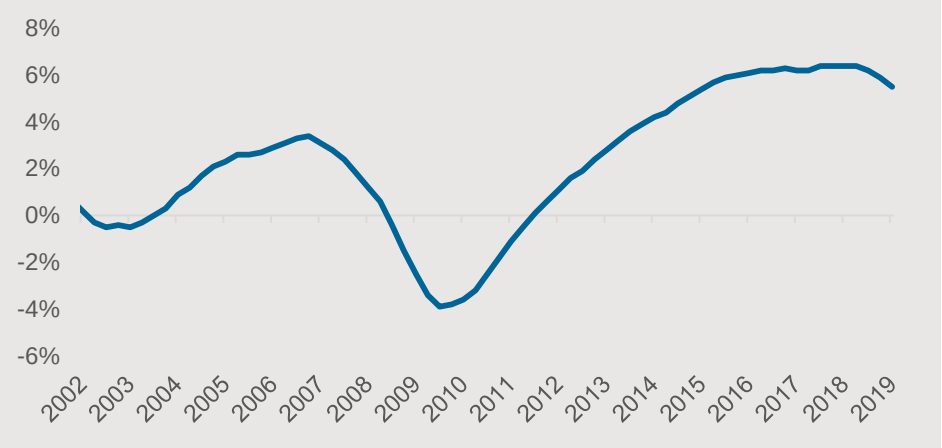
Supply versus demand (rolling four quarters, square feet)



Vacancy rate



Year over year rent growth



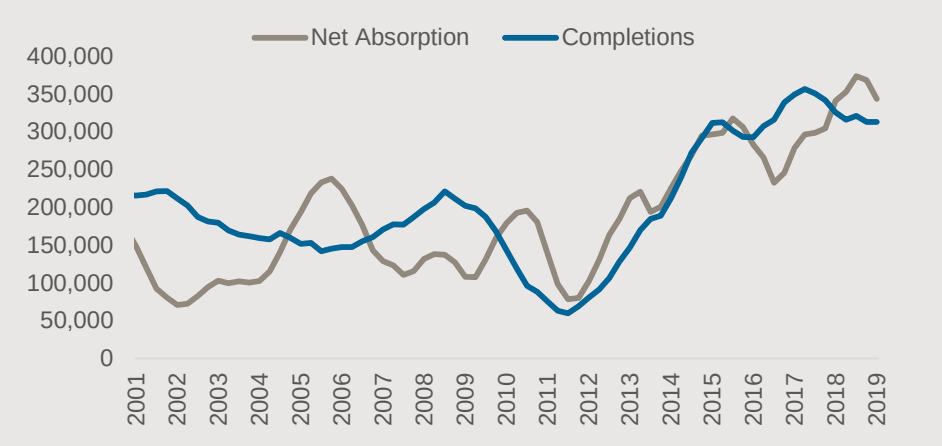
Infill vs rural rent premium

Sources: CoStar; as of June 2019

Multifamily Sector

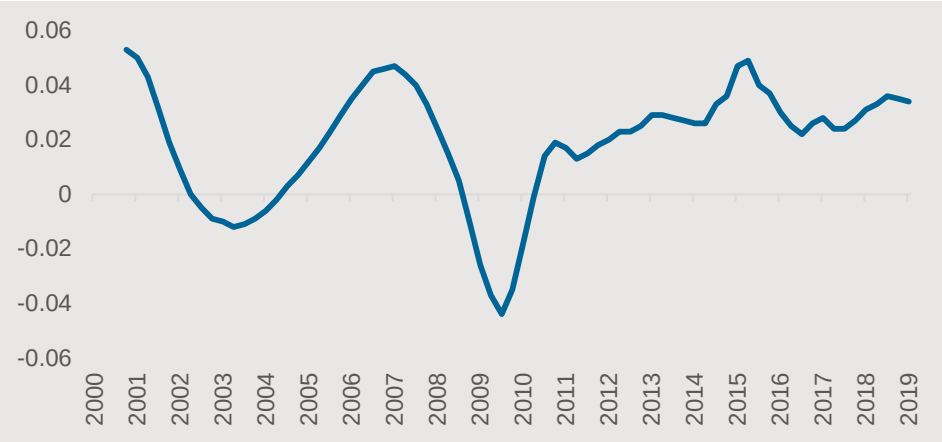
Multifamily completions seemed to have peaked; high home prices and rising rates support renting

Supply versus demand (rolling four quarters, units)



Vacancy rate

Year over year rent growth



Homeownership cost as a share of income

Sources: Top and bottom left charts: CoStar; as of June 2019; Bottom right: Moody's Analytics, as of April 2019

ALTs by J.P.Morgan Asset Management

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

- Calls for rent control may get stronger in urban, supply constrained markets.
- Taxes and rising mortgage interest rates favor rentals.
- Property taxes growth may reaccelerate.
- Luxury underperformance will continue.

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Appendix – Environment, Social and Governance (“ESG”) Overview

ESG Program Summary

Commitment to Sustainability

J.P. Morgan Asset Management – Real Estate Americas believes that continuous improvement of our assets with respect to environment, social, and governance (ESG) policies will ultimately improve the environment in which those assets exist and, more importantly, enhance their competitiveness and asset value.

We integrate ESG into every investment decision and have fully integrated these sustainability objectives into our overall business strategy. Sustainability issues are identified and quantified as part of our real estate asset investment due diligence process, not only as a prerequisite for responsible investing, but also as a tool to identify and mitigate potential risks.

Our ESG Objectives for Real Estate Americas are summarized as follows:

ENVIRONMENTAL

Conserving Resources

- Reduce, measure and report building energy, water, and waste within our control
- Improve performance and establish reduction targets
- Evaluate and implement low cost measures & capital improvements
- Evaluate and pursue ENERGY STAR and green building certifications

SOCIAL

Regularly engaging with our identified stakeholders:

- Investors
- Joint venture partners
- Employees
- Property managers
- Tenants
- Community
- Suppliers

GOVERNANCE

Leadership & Transparency

- Integrate and plan with leaders for effective implementation throughout our portfolios
- Transparently disclose ESG strategy and performance
- Lead the industry by example and guide accountable practices and outcomes

ESG considerations are one aspect of our decision making process. We continue to only make investments that we believe will be return-enhancing and accretive to our clients' portfolios.
Our ESG program is aligned with INREV, GRESB, GRI and UNPRI. Data provided herein has been reviewed by LORD Green Strategies and represents a snapshot of current performance.

ESG Performance

PRI – Direct Property

In 2019 JPMAM participated in the United Nations Principles for Responsible Investment, and direct property outranked peers with a score of A compared to a peer average of B.

PRI Principles for Responsible Investment

GRESB

SPF has participated in the annual GRESB Assessment since its inception, increasing its overall score from 52 in 2015 to 89 in 2019. In 2019, SPF ranked 3rd of 50 diversified funds in the United States, achieving 5 out of 5 Green Stars and placing in the top 15% of over 1,000 GRESB participants globally. The Fund continues to be one of the leaders in its peer group in implementation and measurement of ESG (Environmental, Social and Governance).

GRESB ★ ★ ★ ★ ★ 2019

3rd

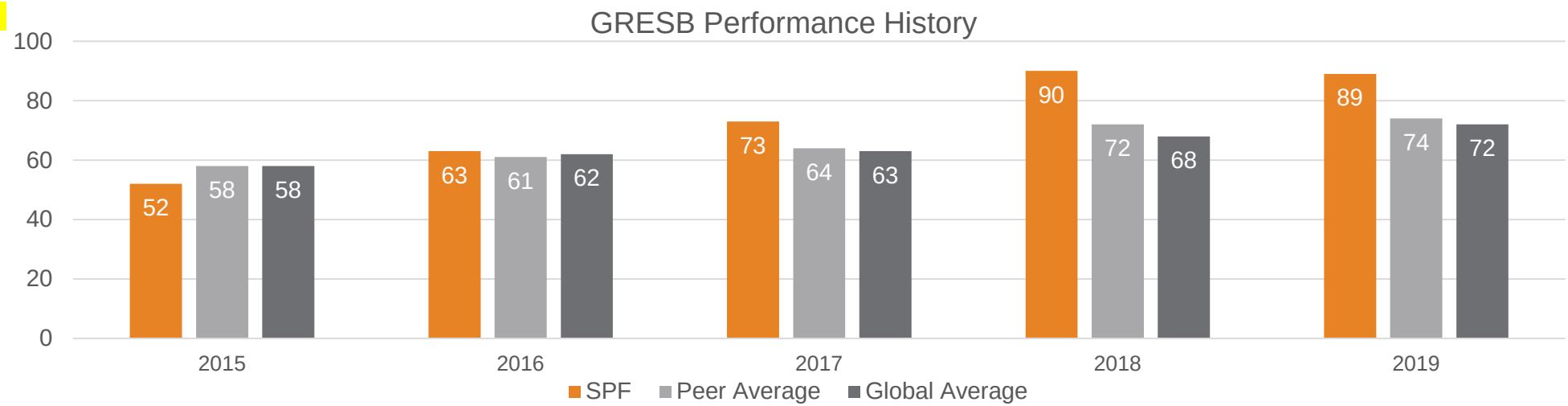
United States of America | Diversified | Non-listed

out of 47

89 / 100

GRESB Score — Green Star

GRESB Average 72 — Peer Average 74



UNPRI and GRESB ratings are not reliable indicators of current and/or future results or performance of the underlying assets. ESG considerations are one aspect of our decision making process. We continue to only make investments that we believe will be return-enhancing and accretive to our clients' portfolios. Our ESG program is aligned with INREV, GRESB, GRI and UNPRI. Data provided herein has been reviewed by LORD Green Strategies and represents a snapshot of current performance.

ESG Performance

PRI – Direct Property

JPMAM participated in the United Nations Principles for Responsible Investment, and direct property outranked peers with a score of A compared to a peer average of B.

PRI Principles for Responsible Investment

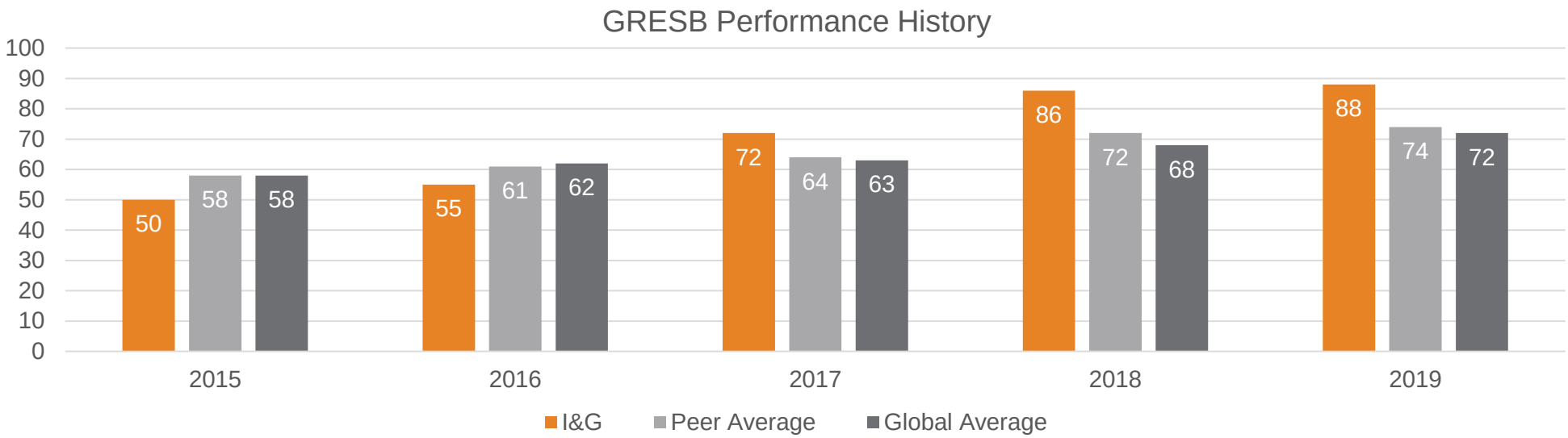
GRESB

J.P. Morgan US Core Plus (Income & Growth) has participated in the annual GRESB Assessment since 2014, increasing its overall score every year for the last five years. In 2019, I&G ranked 4th out of 50 diversified funds in the United States. The Fund also achieved 5 out of 5 Green Stars, placing in the top quintile of over 1,000 GRESB participants globally.

GRESB ★ ★ ★ ★ ★ 2019

4th — United States of America | Diversified | Non-listed — out of 47

88 / 100 — GRESB Score — Green Star — GRESB Average 72 — Peer Average 74



Our ESG program is aligned with INREV, GRESB, GRI and UNPRI. Data provided herein has been reviewed by LORD Green Strategies and represents a snapshot of current performance. [1]All rankings listed above for environmental, social and governance are for J.P. Morgan US Core Plus (Income & Growth) category. GRESB results are in no way an indicator of future performance or performance of the underlying assets.

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Appendix – Supplemental Exhibits

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Strategic Property Fund: Fee schedule effective October 1, 2019

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	0.80%
	Next USD250 million	0.70%
	Amounts thereafter	0.50%
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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Summary of Terms

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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 41.8 billion as of September 30, 2019
Net Asset Value	■	USD 31.4 billion as of September 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[,2,3]
Leverage Guideline	■	Portfolio – 35% / Asset Specific – 65%
Management Fee[4]	■	Client NAV < USD100 million: 1.00% per annum ("p.a.")
	■	Client NAV ≥ USD100m: 0.92% p.a.(first USD100m), 0.80% (next USD150m), 0.70% (next USD250m), 0.50% (amounts thereafter)
	■	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. 4 Fee schedule effective October 1, 2019.* **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 September 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,]:

Net Asset Value	Rate Schedule #1	Rate Schedule #2
USD 10 mm to < USD 100 mm	1.05	0.7875
USD 100 mm and above:		
First USD 50 mm	1.05	0.7875
Next USD 50 mm	0.90	0.6750
Next USD 50 mm	0.85	0.6375
Next USD 50 mm	0.80	0.6000
Amounts above USD 200 mm	0.75	0.5625

Rate Schedule #2: Opportunity to receive a three year 25% fee discount in exchange for accepting a concurrent three year soft lock during which a 4% repurchase discount will apply. First eligible quarter for clients to enter the soft lock begins on October 1, 2019. Offer available for election through September 30, 2020.

Note: For NAV's less than USD 10,000,000, Management Fee is 1.60% with no available soft lock option.

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 – SPF Schedule of Investments

SPF Office Investments

As of September 30, 2019

Investment Name	Location	Ownership	Square Footage (SF)	NAV (USD 000s)	% of Fund NAV
10 Hudson Yards	New York, NY	JV	1,759,482	208,825	0.7
101 Constitution	Washington, DC	JV	508,235	288,873	0.9
10-30 S. Wacker	Chicago, IL	JV	2,404,964	405,146	1.3
111 North Canal	Chicago, IL	WO	834,925	270,031	0.9
125 W55th Street	New York, NY	WO	586,538	323,055	1.0
1345 Avenue of the Americas	New York, NY	JV	1,849,562	715,923	2.3
1918 Eighth Avenue	Seattle, WA	WO	668,183	353,885	1.1
195 Broadway	New York, NY	JV	1,077,781	557,154	1.8
200 Fifth Avenue	New York, NY	JV	867,350	387,184	1.2
2000 Avenue of the Stars	Los Angeles, CA	JV	792,478	354,805	1.1
225 Franklin Street	Boston, MA	JV	941,619	194,326	0.6
60 State Street	Boston, MA	JV	902,777	177,941	0.6
818 Stewart Street	Seattle, WA	WO	239,232	142,084	0.5
Alliance Texas - Office	Fort Worth, TX	WO	115,202	16,164	0.1
Back Bay - 222 Berkeley	Boston, MA	JV	542,953	210,710	0.7
Back Bay - 500 Boylston	Boston, MA	JV	753,785	371,631	1.2
Brewery Blocks - Office	Portland, OR	WO	322,726	129,950	0.4
Century Plaza Towers	Los Angeles, CA	JV	2,328,739	789,076	2.5
China Basin	San Francisco, CA	JV	927,946	693,462	2.2
Franklin Park	Franklin, TN	WO	272,720	43,176	0.1
Landmark Center	Boston, MA	JV	983,190	643,792	2.1

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 Office Investments (cont'd)

As of September 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	370,206	1.2
McKinney & Olive	Dallas, TX	WO	535,767	226,397	0.7
Metropolitan Midtown - Office	Charlotte, NC	WO	170,293	60,004	0.2
One Memorial Drive	Cambridge, MA	JV	408,716	282,034	0.9
Park Place at Bay Meadows	San Mateo, CA	WO	256,087	222,439	0.7
Sunnyvale City Center	Sunnyvale, CA	WO	481,389	412,447	1.3
Sunnyvale Town Center	Sunnyvale, CA	WO	313,920	348,596	1.1
Sunnyvale Town Center - Block 3 Office	Sunnyvale, CA	JV	458,000	94,622	0.3
Terminus	Atlanta, GA	JV	1,226,333	147,934	0.5
The Crescent	Dallas, TX	WO	1,309,634	523,730	1.7
The Water Garden - SPF	Santa Monica, CA	JV	673,659	229,502	0.7
Trammell Crow Center	Dallas, TX	WO	1,166,279	385,046	1.2
Two Franklin Park - Office	Franklin, TN	WO	278,161	40,691	0.1
Van Ness Office/Retail	Boston, MA	JV	267,115	185,916	0.6
Water Garden II	Santa Monica, CA	WO	615,426	629,955	2.0
TOTAL Office (36 PROJECTS)			**28,929,682 sf**	**11,436,711**	**36.5**

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 September 30, 2019

Investment Name	Location	Ownership	Square Footage (SF)	NAV (USD 000s)	% of Fund NAV
2601 Internationale Parkway	Woodridge, IL	WO	356,621	29,786	0.1
Alliance Center North 1	Fort Worth, TX	JV	1,111,500	17,519	0.1
Alliance Texas - Industrial	Fort Worth, TX	WO	13,951,456	947,058	3.0
Big 5 Distribution Center	Riverside, CA	WO	953,132	90,334	0.3
Black Creek Build to Core	Various	JV	3,427,259	149,011	0.5
Black Creek Open End Fund	Various	JV	-	104,921	0.3
DBC / Osage Street Portfolio	Denver, CO	WO	772,560	100,548	0.3
Dugan Texas	Various, TX	JV	6,047,818	242,216	0.8
Gateway 673	Pontoon Beach, IL	WO	673,137	34,143	0.1
Greater Los Angeles - Mira Loma	Mira Loma, CA	WO	376,007	47,269	0.2
Greater Los Angeles Industrials	Various, CA	WO	2,714,916	428,616	1.4
Highway 4051	Grapevine, TX	WO	540,000	35,770	0.1
HUB 25	Denver, CO	WO	545,523	96,565	0.3
Kimball Business Park	Chino, CA	JV	1,030,727	176,826	0.6
Marina Crossings	Chicago, IL	JV	633,057	35,847	0.1
Marshfield Business Park	Rosedale, MD	WO	1,334,755	116,088	0.4
Maywood Park	Melrose Park, IL	WO	623,000	26,772	0.1
Metro Chicago Industrial Portfolio	Bolingbrook, IL	WO	81,086	7,472	0.0
Park West	Hebron, KY	WO	542,960	38,963	0.1
Pico Rivera	Pico Rivera, CA	JV	102,200	97,609	0.3
Pinnacle	Dallas, TX	JV	1,338,100	89,625	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).

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SPF Industrial Investments (cont'd)

As of September 30, 2019

Investment Name	Location	Ownership	Square Footage (SF)	NAV (USD 000s)	% of Fund NAV
PortSouth Bryla	Carteret, NJ	WO	459,500	99,899	0.3
Procter & Gamble Distribution Center	Edwardsville, IL	WO	2,119,452	112,154	0.4
RealTerm Portfolio	Various	JV	2,170,262	526,997	1.7
Sam Houston Center	Houston, TX	JV	833,720	14,680	0.0
South Bay Industrials	Compton, CA	JV	1,528,590	160,392	0.5
South Florida Logistics Center	Miami, FL	WO	1,643,052	397,278	1.3
Toyota Campus	Torrance , CA	JV	1,858,823	271,843	0.9
Vineyard Industrial I	Ontario, CA	WO	1,945,654	321,527	1.0
Vineyard Industrial II	Ontario, CA	WO	1,053,225	108,502	0.3
TOTAL Industrial (30 PROJECTS)			**50,768,092 sf**	**4,926,230**	**15.7**

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 Retail Investments

As of September 30, 2019

Investment Name	Location	Ownership	Square Footage (SF)	NAV (USD 000s)	% of Fund NAV
Brewery Blocks - Retail	Portland, OR	WO	119,226	50,697	0.2
Bridgewater Commons - SPF	Bridgewater, NJ	JV	663,093	89,440	0.3
Del Amo Fashion Center	Torrance, CA	JV	1,765,682	211,878	0.7
DSRG - SPF	Various	JV	8,034,204	1,022,426	3.3
Edens - SPF	Various	JV	14,784,000	1,186,198	3.8
Metropolitan Midtown - Retail	Charlotte, NC	WO	171,729	50,169	0.2
North Hills	Raleigh, NC	JV	809,180	87,663	0.3
NorthPark Center JV	Dallas, TX	JV	1,936,928	641,192	2.0
Ontario Mills	Ontario, CA	JV	1,303,834	477,855	1.5
Park Meadows Mall - SPF	Littleton, CO	JV	761,751	251,387	0.8
Perimeter Mall	Atlanta, GA	JV	968,065	93,696	0.3
River Oaks Retail/Office	Houston, TX	WO	371,417	449,940	1.4
Royal Hawaiian Center	Honolulu, HI	WO	328,075	932,416	3.0
Shadow Creek Ranch Town Center	Pearland, TX	JV	573,214	53,802	0.2
Shops at Merrick Park	Coral Gables, FL	JV	534,451	197,631	0.6
Sunnyvale Town Center - Retail	Sunnyvale, CA	JV	136,682	52,389	0.2
Towson Town Center - SPF	Towson, MD	JV	654,611	20,943	0.1
University Towne Center	San Diego, CA	JV	1,063,711	710,053	2.3
Valley Fair Mall	San Jose, CA	JV	733,474	1,314,714	4.2
Winter Park Village	Winter Park, FL	JV	461,825	37,139	0.1
TOTAL Retail (20 PROJECTS)			**36,175,152 sf**	**7,931,628**	**25.3**

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 Residential Investments

As of September 30, 2019

Investment Name	Location	Ownership	# Units	NAV (USD 000s)	% of Fund NAV
100 at Capitol Yards	Washington, DC	JV	246	27,648	0.1
12th and Otis	San Francisco, CA	JV	416	125,109	0.4
1330 Boylston	Boston, MA	JV	200	80,008	0.3
3500 Westlake	Austin, TX	WO	175	39,157	0.1
70 at Capitol Yards	Washington, DC	JV	448	43,685	0.1
850 Lake Shore Drive	Chicago, IL	WO	198	55,994	0.2
909 at Capitol Yards	Washington, DC	JV	237	26,815	0.1
Apollo on H Street	Washington, DC	JV	431	139,757	0.4
Ascent at City Center	Houston, TX	WO	160	43,314	0.1
Aspect	Fullerton, CA	WO	323	133,602	0.4
Beltway Portfolio	Various	JV	1628	125,558	0.4
Broadstone Bowles Crossing	Littleton, CO	JV	326	16,325	0.1
Broadstone Waterfront - WO	Scottsdale, AZ	WO	259	117,046	0.4
Cordoba	Doral, FL	WO	224	62,251	0.2
Cordoba Phase II	Doral, FL	WO	230	63,859	0.2
CSX	Washington, DC	JV	698	38,617	0.1
Domain at City Centre	Houston, TX	WO	370	96,317	0.3
Elizabeth Square	Charlotte, NC	WO	267	61,042	0.2
Fairways at Raccoon Creek WO	Littleton, CO	WO	360	94,875	0.3
Fenway Triangle - SPF	Boston, MA	JV	405	109,725	0.3
Gaslight Commons	South Orange, NJ	WO	200	81,319	0.3
Grand Isle	Murrieta, CA	JV	453	48,849	0.2

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 September 30, 2019

Investment Name	Location	Ownership	# Units	NAV (USD 000s)	% of Fund NAV
Grey House	Houston, TX	WO	279	74,439	0.2
Ink Block	Boston, MA	JV	315	129,268	0.4
Jacaranda	Fullerton, CA	WO	131	48,677	0.2
Laguna Niguel Apartments - SPF	Laguna Niguel, CA	JV	190	29,366	0.1
Lakeside at LaVillita	Irving, TX	WO	331	58,025	0.2
Landings at LaVillita	Irving, TX	WO	409	75,091	0.2
Memorial Park West	Houston, TX	JV	315	28,021	0.1
Midtown 5	Miami, FL	JV	400	68,761	0.2
Midtown 6	Miami, FL	JV	447	76,026	0.2
Midtown Green	Raleigh, NC	WO	214	48,668	0.2
Mosaic South End	Charlotte, NC	WO	269	63,683	0.2
Mountain Gate	Littleton, CO	WO	496	129,733	0.4
Mountain View	Mountain View, CA	JV	632	59,404	0.2
Outlook DTC	Denver, CO	WO	242	70,475	0.2
Palisade	San Diego, CA	JV	300	96,810	0.3
Parc Station	Hollywood, FL	WO	336	91,513	0.3
Park Lane Seaport Residential	Boston, MA	WO	465	273,155	0.9
Pasadena Apartments - SPF	Pasadena, CA	JV	98	17,936	0.1
Paseo at Winter Park	Winter Park, FL	WO	204	28,158	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.

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SPF Residential Investments (cont'd)

As of September 30, 2019

Investment Name	Location	Ownership	# Units	NAV (USD 000s)	% of Fund NAV
Polo Lakes Apartments	Wellington, FL	WO	366	83,828	0.3
Promenade Rio Vista	San Diego, CA	JV	970	299,656	1.0
Rancho Santa Margarita - SPF	Rancho Santa Margarita, CA	JV	166	18,398	0.1
Seacliff - SPF	Huntington Beach, CA	JV	271	40,688	0.1
St. Johns Wood Apartments	Reston, VA	WO	250	65,761	0.2
Stack House	Seattle, WA	WO	278	96,629	0.3
Stevenson Ranch	Stevenson Ranch, CA	JV	272	31,803	0.1
Strata	San Francisco, CA	WO	192	155,334	0.5
Sunnyvale Town Center - Residential	Sunnyvale, CA	JV	198	198,942	0.6
Temecula Phase I & II Apartments - SPF	Temecula, CA	JV	346	35,131	0.1
Terra Vista	Rancho Cucamonga, CA	JV	216	25,279	0.1
The Cameron	Franklin, TN	WO	328	89,318	0.3
The Capitol	New York, NY	WO	387	273,926	0.9
The Circle at Hermann Park - Amalfi	Houston, TX	WO	420	46,851	0.1
The Circle at Hermann Park - Esplanade	Houston, TX	WO	375	40,030	0.1
The Devon Four25	Raleigh, NC	WO	261	68,470	0.2
The District	Washington, DC	WO	125	81,871	0.3
The Hub	Brooklyn, NY	JV	750	119,132	0.4
The Laurel	Dallas, TX	JV	159	66,487	0.2
The Lofts CityCentre	Houston, TX	WO	250	24,020	0.1
The Lofts Portfolio	San Diego, CA	WO	458	180,113	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 September 30, 2019

Investment Name	Location	Ownership	# Units	NAV (USD 000s)	% of Fund NAV
The Louisa	Portland, OR	WO	242	58,962	0.2
The Parker	Chicago, IL	JV	227	114,660	0.4
The Reserve at 4S Ranch	San Diego, CA	WO	540	204,564	0.7
The Wilcox	Seattle, WA	WO	132	60,928	0.2
Third and Valley WO	South Orange, NJ	WO	215	85,270	0.3
Trinity Bluff	Fort Worth, TX	WO	304	48,824	0.2
Trinity District Wholly-Owned	Fort Worth, TX	WO	256	41,608	0.1
Valencia - SPF	Valencia, CA	JV	226	34,021	0.1
Van Ness Residential	Boston, MA	JV	172	62,916	0.2
Vantage	Jersey City, NJ	JV	448	106,920	0.3
Vantage - Phase II	Jersey City, NJ	JV	452	57,747	0.2
Venue	San Francisco, CA	WO	147	116,360	0.4
Via Las Colinas	Irving, TX	WO	784	145,826	0.5
Viridian	Greenwood Village, CO	WO	420	113,367	0.4
Washington Place Phase I	Newton, MA	JV	140	26,875	0.1
TOTAL Residential (77 PROJECTS)			**26,070 units**	**6,418,595**	**20.5**

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 Land Investments

As of September 30, 2019

Investment Name	Location	Ownership	Acres	NAV (USD 000s)	% of Fund NAV
Guasti Ontario	Ontario, CA	JV	55	28,735	0.1
Lincoln Yards	Chicago, IL	JV	27	161,827	0.5
Sunnyvale Town Center - Land	Sunnyvale, CA	JV	14	46,116	0.1
TOTAL Land (3 PROJECTS)			**96 acres**	**236,678**	**0.8**

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.

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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.

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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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Strategic Property Fund - Investment Risk Disclosure

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.

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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Loss of capital: Investors can lose up to the full amount of their invested capital.

Volatility: Investment strategies used by the investment adviser and/or investment instruments can be highly volatile.

Leverage: Funds may employ leverage, sometimes at significant levels, to enhance potential returns.

Dependence on manager: A Fund's success is dependent on the investment manager to develop and successfully implement investment strategies that meet investment objectives.

Limited transparency: With little or no public market coverage, investors must rely on the investment manager for periodic information. This information may be on a lag.

Conflicts of interest: The investment adviser and/or portfolio managers could be subject to various conflicts of interest, which could influence how those portfolio managers invest the Fund's assets.

Target Return: 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 Memorandum. 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.

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Strategic Property Fund
J.P. Morgan Asset Management – Real Estate Americas

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This communication sets out a brief overview of the proposed Strategic Property Fund Europe. The information is for background purposes only, preliminary in nature and subject to change, verification and updating. The proposed fund has not been launched and is still subject to finalization by the manager. There can be no assurance that the Fund will succeed in meeting its Investment Objective or Target Return. An investment in the Fund is intended for long-term Investors who can accept the significant risks associated with investing in illiquid securities. An investment in the Fund involves various risk factors, including the possibility of partial or total loss of the Fund capital, and prospective Investors should not subscribe unless they can readily bear the consequences of a complete loss of their investment.

Risk Associated with Investments In Real Estate Generally: An investment in the Fund is subject to certain risks associated with the ownership of real estate and the real estate industry in general, including: the burdens of ownership of real property; local, national and international economic conditions; the supply and demand for properties; the financial condition of tenants, buyers and sellers of properties; changes in interest rates and the availability of mortgage funds which may render the sale or refinancing of properties difficult or impracticable; changes in environmental laws and regulations, planning laws and other governmental rules and fiscal and monetary policies; environmental claims arising in respect of properties acquired with undisclosed or unknown environmental problems or as to which inadequate reserves have been established; changes in real property tax rates; changes in energy prices; negative developments in the economy that depress travel activity; uninsured casualties; force majeure acts, terrorist events, under-insured or uninsurable losses; and other factors which are beyond the reasonable control of the Fund and the Investment Adviser. In addition, as recent experience has demonstrated, real estate assets are subject to long-term cyclical trends that give rise to significant volatility in values.

Risks relating to Lack of Liquidity of Underlying Real Estate Investments: Although the Fund's Investments may generate some current income, investments will generally be illiquid due to any number of uncontrollable and unpredictable factors. It may be difficult from time to time for the Fund to realize, sell or dispose of an investment at an attractive price or at the appropriate time or in response to changing market conditions, or the Fund may otherwise be unable to complete a favorable exit strategy. The return of capital and the realization of gains, if any, will generally occur only upon the partial or complete disposal of an investment.

Confidentiality: This presentation was prepared exclusively for the benefit and internal use of the recipient in order to indicate, on a preliminary basis, the feasibility of a possible transaction or transactions and does not carry any right of publication or disclosure to any other party. This Booklet summarizes and is qualified in its entirety by information to be contained in the Memorandum, and in the event of conflict between this material and such information, the information contained in the Memorandum shall control. Neither this presentation nor any of its contents may be used for any other purpose without the prior written consent of JPMorgan. The information in this presentation is based upon management forecasts and reflects prevailing conditions and our views as of this date, all of which are subject to change. In preparing this presentation, the Investment Adviser has relied upon and assumed, without independent verification, the accuracy and completeness of all information available from public sources or which was provided to the Investment Adviser or which was otherwise reviewed by us. In addition, our analyses are not and do not purport to be appraisals of the assets, stock, or business of the Fund.

Eligible Investors: Only "Eligible Investors" as defined in the Memorandum may invest in the Fund. Amongst other things this requires investors to be aware of, to accept and to be able to bear the risks attaching to an investment in the Fund and to acknowledge that any recourse they may have is limited, in substance, to the assets of the Fund. U.S. investors in the Fund must be "Accredited Investors" for purposes of the U.S. Securities Act of 1933 and "Qualified Purchasers" for purposes of the U.S. Investment Company Act of 1940.

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Strategic Property Fund
J.P. Morgan Asset Management – Real Estate Americas

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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Strategic Property Fund
J.P. Morgan Asset Management – Real Estate Americas

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U.S. Real Estate Income and Growth Fund - Risks

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.

U.S. Real Estate Income and Growth Fund - Risks (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.

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U.S. Real Estate Income and Growth Fund - Important disclaimers

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THE MEDICAL DISABILITY RETIREMENT EXAM

THE WHO, WHAT, WHEN, WHERE, AND WHY

SCOTT A. KRASNER, MD, MPH, FACOEM
KRASNER MEDICAL CONSULTANTS

ABBOT AND COSTELLO

WHO'S ON FIRST

WELL IT HAPPENED
JUST AS
ABBOT & COSTELLO
PREDICTED
HU
14

SO LET'S BEGIN

CASE PRESENTATION

Woman who works at the City of Tucson is applying for Medical Disability Retirement Off work x 3 weeks due to emphysema, COPD,

Symptoms began 2016 following bout with flu; Seen by pulmonologist, treated with inhalers, oxygen. Able to do light housework, stationary bike, some home exercises, computer work at home.

Exam shows drove herself, has small O2 tank (10#) and large purse (10#); walks normally without needing to rest, no SOB; full ROM back, torso and extremities without difficulty; FVC=1.85 L FEV1=0.70 L

CASE PRESENTATION

Questions: Is she disabled?

Is she totally and permanently unable to engage in any gainful employment?

WHAT IS DISABILITY?

"An umbrella term for activity limitations and/or participation restrictions in an individual with a health condition, disorder or disease." (AMA Guides..6th ed.)

A medical condition that affects a person's ability to engage in tasks or activities

The difference between what a person can do vs what a person is required to do

Disability takes into account medical issues and non-medical issues (aptitude, intelligence, prior training, experience, knowledge)

WHO DEFINES DISABILITY?

Each disability system is different and each creates their own definition and criteria.

SOCIAL SECURITY DISABILITY SYSTEM

5 Steps of sequential evaluation

DISABLED NOT DISABLED

1. Is the claimant engaging in

Substantial Gainful Activity? ——Yes——— X

SOCIAL SECURITY DISABILITY SYSTEM

5 Steps of sequential evaluation

DISABLED NOT DISABLED

1. Is the claimant engaging in

   Substantial Gainful Activity? ——Yes——— X

2. Does claimant have significant

   Impairment? ————————No——— X

SOCIAL SECURITY DISABILITY SYSTEM

5 Steps of sequential evaluation

DISABLED NOT DISABLED

1. Is the claimant engaging in

Substantial Gainful Activity? ——Yes—— X

2. Does claimant have significant

Impairment? ————————No——— X

3. Does claimant meet or equal

X ——Yes——a listed Impairment?

SOCIAL SECURITY DISABILITY SYSTEM

5 Steps of sequential evaluation

DISABLED NOT DISABLED

1. Is the claimant engaging in

Substantial Gainful Activity? ——Yes—— X

2. Does claimant have significant

Impairment? ————————No——— X

3. Does claimant meet or equal

X ——Yes——a listed Impairment?

4. Does claimant's remaining function

permit past relevant work? ———Yes———X

SOCIAL SECURITY DISABILITY SYSTEM

5 Steps of sequential evaluation

DISABLED NOT DISABLED

1. Is the claimant engaging in

Substantial Gainful Activity? ——Yes—— X

2. Does claimant have significant

Impairment? ——————————No——— X

3. Does claimant meet or equal

X ——Yes——a listed Impairment?

4. Does claimant's remaining function

permit past relevant work? ——Yes———X

5. Does claimant retain the ability

X ——No—— to perform other work? ————Yes———X

SOCIAL SECURITY DISABILITY SYSTEM

HOW DOES SOCIAL SECURITY USE MEDICAL DISABILITY EXAMS?

Medical Disability Examiner (CE) provides a list of functional restrictions based on the medical condition at issue, then DES determines Step 4 and Step 5

DISABLED NOT DISABLED

4. Does claimant's remaining function

permit past relevant work? ——Yes——X

5. Does claimant retain the ability

X ——No—— to perform other work? ————Yes——X

C/E REPORT

ARIZONA DEPARTMENT OF ECONOMIC SECURITY
Disability Determination Services

PHYSICIAN'S TELEDICTATION: Friday May 12, 2000

FUNCTIONAL CAPABILITIES/WORK RESTRICTIONS:

I would recommend the following permanent functional work restrictions:

1. No lifting over 20 pounds maximum or repetitively over 10 pounds.
2. No pushing or pulling over 40 pounds.
3. He may stand up to one hour at a time and up to four to six hours in an eight-hour time.
4. He may walk up to one-half mile at a time.
5. He may bend, crouch and kneel on occasions but not frequently.
6. No ladder climbing but he may climb up to one flight of stairs per hour.

C/E REPORT

ARIZONA DEPARTMENT OF ECONOMIC SECURITY
Disability Determination Services

PHYSICIAN'S TELEDICTATION: January 10, 2007
Serial:

FUNCTIONAL CAPACITY ASSESSMENT:

She could return to any activities that she choses to. There is no limitation in lifting, ambulating, reaching, handling, speaking, or hearing.

WHAT THE DISABILITY EXAMINER NEEDS

1. Medical Records (usually the employee sends them directly to me at your request)

2. A cover letter addressing questions you want me to answer

3. A written job description (if the issue pertains to ability to perform that job)

WHAT THE DISABILITY EXAMINER CAN DO?

Determine if the patient's medical condition is permanent and stationary or if they need more time for treatment, and how long.

Determine "disability" in a 2-step process:

Step 1 – Assess functional restrictions based on the medical condition.

Step 2 - Determine how those restrictions compare with the specific job requirements.

Remember, disability is the difference between what the person <u>can</u> do and what the job <u>requires</u> them to do.

CASE PRESENTATION

Woman with COPD worked until 3 weeks ago, taking meds, oxygen

Step 1 - Functional Restrictions:

No lifting over 20# max, repetitively over 10#
No pushing/pulling over 30#
No standing for over 15 min at a time; 2hrs/8hr day
No walking over 100ft at a time; 1hr/8hr day
No ladder/stair climbing
May bend, crouch, squat on occasions
No operating motor vehicle or heavy machinery

CASE PRESENTATION

Woman with COPD worked until 3 weeks ago, taking meds, oxygen

Step 2 - Compare Functional Restrictions with Job Duties

Job description was reviewed

THEY DO MATCH

CASE PRESENTATION

Questions: Is she disabled?

Is she totally and permanently unable to engage in any gainful employment?

WHAT THE DISABILITY EXAMINER SHOULD NOT DO

Make the medical determination based on examiner's perceptions or biases of whether the claimant can work

Determine if they are totally and permanently unable to perform ANY gainful employment (as it will be based on perceptions and biases since it requires knowledge of ALL jobs, skill levels, aptitude, intelligence)

BUT, by giving those functional restrictions, that allows YOU to determine whether they are totally and permanently unable to perform any gainful employment or whether reasonable accommodations can be made.

ANY QUESTIONS?

City Of Tucson
Human Resources
Occupational Health & Leaves (OHL)
PO Box 27210, Tucson AZ 85726-7210
Phone: 520- 791-2619 Fax: 520- 791-4941

COT REASONABLE ACCOMMODATIONS

Americans with Disability Act (ADA)

Who is Eligible for ADA:

A **qualified individual with a disability** is a **person** who meets legitimate skill, experience, education, or other requirements of an employment position that he or she holds or seeks, and who can perform the "essential functions" of the position with or without reasonable accommodation.

Requiring the ability to perform "essential" functions assures that an individual will not be considered unqualified simply because of inability to perform marginal or incidental job functions. If the individual is qualified to perform essential job functions except for limitations caused by a disability, the employer must consider whether the individual could perform these functions with a reasonable accommodation.

If a written job description has been prepared in advance of advertising or interviewing applicants for a job, this will be considered as evidence, although not necessarily conclusive evidence, of the essential functions of the job.

City of Tucson Interactive Process:

Request - Employees can request an accommodation through their supervisor or chain of command; or by contacting HR-OHL directly. Requests can also be made when employees are referred to HR-OHL after being away from the essential functions of their position for 6 months, or when their condition is determined to be permanent. ***There is no requirement for employees to engage in the process.***

Application/Health Care Certification - Employees must complete an ADA application which may include a portion for **their** Health Care Provider to complete as well. Most cases require medical information from their Health Care Provider and in some cases, may require a pre-employment physical as well.

Next Steps - HR-OHL will begin with an initial discussion with the employee to ensure they have an understanding of the process. Thereafter, follow-up efforts are dictated by the type of accommodation being requested and may include, (but are not limited to): meetings, job site analysis, clarification/correspondence, research, etc.

Timeframe - There is no set time-frame in which to complete an accommodation, but we work expediently to ensure we appropriately explore all viable options.

Types of reasonable accommodations:

- **Modification** - Modification of the employee's current position to assist in performing all of the essential functions, (may include, but are not limited to: job restructuring, accessibility to existing facilities, temporary part-time or modified work schedules, acquisition or modification of equipment's/devices);

- **Reassignment (home department)** - Exploration of positions for reassignment within the home department that meet the following:
  - are at or below the current pay grade
  - the employee meets the minimum qualifications for
  - the employee is able to perform all of the essential functions, with or without accommodation
  - ***the position is open/available, budgeted and approved to fill***

- **Reassignment (within City of Tucson)** - Exploration of positions for reassignment outside the home department but within the City of Tucson that meet the following:
  - are at or below the current pay grade
  - the employee meets the minimum qualifications for
  - the employee is able to perform all of the essential functions, with or without accommodation
  - ***the position is open/available, budgeted and approved to fill***

Final Determination – If a reasonable accommodation can be made, a written Record of Accommodation is executed. If we are unable to reasonably accommodate an employee, we notify the employee and the department via verbal and written communication and refer the employee to the department to go over their employment options.

Information Not Printed

5.

Agenda item was not available at the time of distribution and therefore, has not been distributed electronically

A hard copy will be distributed at the meeting

MEMORANDUM

DATE: November 8, 2019

TO: The Board of Trustees
Tucson Supplemental Retirement System

FROM: Art Cuaron
Pension & Benefits Administrator

SUBJECT: 2020 TSRS Board Meeting Schedule

Listed below are the dates, times and locations for the 2020 Board meetings. I am seeking Board approval of the schedule for submission to the City Clerk's Office.

With the exception of the October Retreat and November/December (due to holidays) meetings, all monthly meetings are scheduled to be held at 8:30 a.m. on the 4th Thursday of each month in the 3rd floor east conference room located in City Hall. However, both the schedule and the location of these meetings are subject to change as conditions dictate, so please carefully check each month's agenda for possible time, date or location changes.

Dates	Time	Location
January 23rd	8:30 a.m.	**City Hall, 3rd Floor East Conference Room**
February 27th	8:30 a.m.	**City Hall, 3rd Floor East Conference Room**
March 26th	8:30 a.m.	**City Hall, 3rd Floor East Conference Room**
April 23rd	8:30 a.m.	**City Hall, 3rd Floor East Conference Room**
May 28th	8:30 a.m.	**City Hall, 3rd Floor East Conference Room**
June 25th	8:30 a.m.	**City Hall, 3rd Floor East Conference Room**
July 23rd	8:30 a.m.	**City Hall, 3rd Floor East Conference Room**
August 27th	8:30 a.m.	**City Hall, 3rd Floor East Conference Room**
September 24th	8:30 a m.	**City Hall, 3rd Floor East Conference Room**
October 23rd	8:30 a.m.	**Arizona Inn, 2200 East Elm St, Tucson, AZ**
November 19th	8:30 a.m.	**City Hall, 3rd Floor East Conference Room**
December 17th	8:30 a.m.	**City Hall, 3rd Floor East Conference Room**

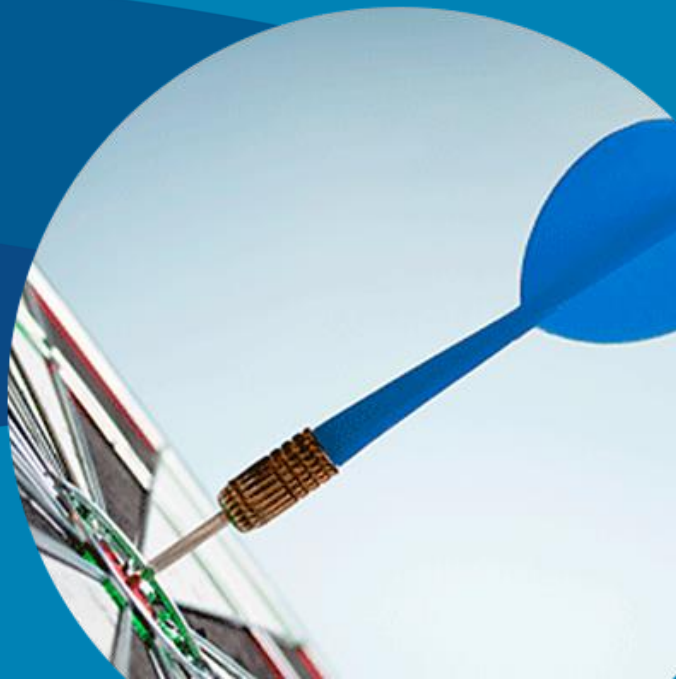
GRS Retirement Consulting

Draft

Tucson Supplemental Retirement System Actuarial Valuation as of July 1, 2019

November 15, 2019

Dana Woolfrey, FSA, FCA, EA, MAAA
Paul Wood, ASA, FCA, MAAA



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Fiscal Year Ending June 30, 2019

Draft

Summary of Results

- Assumption Changes Following Experience Study
- Modest Liability Losses and Asset Gains
- Another Year of Strong Funding Policy
  - Contribution levels expected to improve funding results each year
- 0.25% of pay employee contribution increases for those with variable rates

- End result = results down slightly relative to the prior valuation, but better than estimated results at time of experience study

GRS Retirement Consulting

Draft

Key Assumption Changes

- Reduce price inflation from 3.00% to 2.50%
- Reduce investment return from 7.25% to 7.00%
  - > Increase real return from 4.25% to 4.50%
- Update base mortality tables and incorporate generational mortality
- There were other minor adjustments, but these are the big impact items

GRS Retirement Consulting

Draft

Pension Funding Equation

Over time, for a plan to be sustainable:

Contributions (C)+
Investment Earnings (I)
Must be sufficient to provide for
Benefit Payments (B) +
Expenses (E)

$$C + I >= B + E$$

Assumptions help us manage the equation and the timing of contributions. Plan costs are determined by *actual* investment earnings, *actual* benefit payments (provisions and participant behavior) and *actual* expenses.

GRS Retirement Consulting

Primary Valuation Results
Funded Ratio

Draft

Funded Status Summary ($ in millions)		
Valuation Date	**June 30, 2019**	**June 30, 2018**
Accrued Liability	$1,129.5	$1,054.0
Actuarial Value of Assets (smoothed)	822.6	803.4
Unfunded Accrued Liability	$306.9	$250.5
Funded Ratio (AVA basis)	72.83%	76.23%
Market Value of Assets	$836.6	$822.9
Unfunded Accrued Liability	$292.9	$231.1
Funded Ratio (MVA basis)	74.07%	78.08%

- 2018 funded ratio after experience study was 72.3%

GRS Retirement Consulting

Primary Valuation Results
Actuarial Contribution Rates

Draft

- Increased over the prior year
- But slightly less than the estimate at the time of the experience study
  - Strong funding policy
    - Each year the employer contributes 27.50% there will be downward pressure on actuarial requirement based on 20-year open amortization
  - Decreasing normal costs from new hires

GRS Retirement Consulting

Primary Valuation Results
Actuarial Contribution Rates

Draft

Exhibit B.4 Tucson Supplemental Retirement System Development of the Actuarially Determined Contribution			
Fiscal Year Beginning[1]	**July 1, 2019**	**July 1, 2018**	**July 1, 2018**
		After Assumption Changes	**Before Assumption Changes**
1. Total Normal Cost	11.83%	11.96%	10.97%
2. Total Contribution to the Unfunded Actuarial Accrued Liability[2]	17.71%	18.61%	15.46%
3. Administrative Expenses	0.74%	0.63%	0.63%
4. Total Computed Contribution	30.28%	31.20%	27.06%
5. Member Financed Portion[3]	5.34%	5.33%	5.07%
6. City Financed Portion[4]	24.94%	25.87%	21.99%

[1] *One-year lag*
[2] *20-year level %*
[3] *Blended across tiers*
[4] *Prior to round up policy and application of 27.5% minimum.*

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Primary Valuation Results

Actuarial Contribution Rates

Draft

Member and City Rates by Tier for Fiscal Year Beginning July 1, 2020			
Tier	Member Contribution*	City Contribution*	Total Contribution
Hired Prior to July 1, 2006	5.00%	25.28%	30.28%
Hired between July 1, 2006 and June 30, 2011	6.95%	23.33%	30.28%
Hired after June 30, 2011	5.33%	24.95%	30.28%
Blended Across Tiers	5.34%	24.94%	30.28%

**Prior to round up policy and application of 27.5% minimum.*

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Primary Valuation Results
Actuarial Contribution Rates

Draft

- Recommended employee rates increase from 6.75% to 7.00% and from 5.25% to 5.50% for variable tiers

FY 21 Recommended Rates
Based on TSRS Funding Policy
(full description of the TSRS funding policy may be found in Section I)

Employee Rates	Actuarial Rate (50% of Normal Cost)	Round up to nearest .25%	FY 21 Board Recommended Rates	FY 20 Adopted Rates
Tier				
Hired prior to 7/1/2006	5.00%*	n/a	5.00%	5.00%
Hired 7/1/2006 to 6/30/2011	6.95%	7.00%	7.00%	6.75%
Hired after 6/30/2011	5.33%**	5.50%	5.50%	5.25%

**Rate set in ordinance at 5.00%*
*** Minimum 5% rate*

Employer Rates		Round up to nearest .50%	FY 21 Board Recommended Rates	FY 20 Adopted Rates
Tier				
Hired prior to 7/1/2006	25.28%	n/a		
Hired 7/1/2006 to 6/30/2011	23.33%	n/a		
Hired after 6/30/2011	24.95%	n/a		
Blended Rate	24.94%	n/a	27.50%*	27.50%

**Minimum 27.5% recommended rate*

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LONG TERM PROJECTIONS

15-Year Projection – 27.5% Minimum

Current Funding Policy

Draft

Actuarial Valuation Date	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Unfunded AAL (UAAL)	Funded Ratio	Covered Payroll	Projected City Actuarial Contribution	Actual City Contribution
6/30/2019	$823	$1,129	$307	72.8%	$124	24.94%	27.50%
6/30/2020	844	1,142	298	73.9%	126	23.84%	27.50%
6/30/2021	872	1,152	280	75.7%	130	22.27%	27.50%
6/30/2022	890	1,161	270	76.7%	133	21.22%	27.50%
6/30/2023	906	1,168	262	77.6%	137	20.22%	27.50%
6/30/2024	923	1,173	250	78.7%	141	19.11%	27.50%
6/30/2025	940	1,177	237	79.9%	145	17.95%	27.50%
6/30/2026	959	1,180	221	81.3%	150	16.75%	27.50%
6/30/2027	979	1,182	203	82.8%	155	15.51%	27.50%
6/30/2028	1,000	1,183	183	84.5%	160	14.22%	27.50%
6/30/2029	1,023	1,183	160	86.5%	165	12.89%	27.50%
6/30/2030	1,049	1,183	135	88.6%	170	11.51%	27.50%
6/30/2031	1,077	1,183	106	91.1%	176	10.09%	27.50%
6/30/2032	1,109	1,183	74	93.8%	181	8.61%	27.50%
6/30/2033	1,145	1,183	38	96.8%	187	7.09%	26.53%
6/30/2034	1,184	1,184	0	100.0%	193	5.58%	5.58%

- Assumptions consistent with valuation. Assumes stable active population. Assumes City contributes 27.5% of pay

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15-Year Projection - Contribute Actuarial

Draft

Contribution Based on 20-Year Open Amortization

Actuarial Valuation Date	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Unfunded AAL (UAAL)	Funded Ratio	Covered Payroll	Projected City Actuarial Contribution	Actual City Contribution
6/30/2019	$823	$1,129	$307	72.8%	$124	24.94%	24.94%
6/30/2020	841	1,142	301	73.7%	126	24.03%	24.03%
6/30/2021	864	1,152	288	75.0%	130	22.72%	22.72%
6/30/2022	875	1,161	285	75.4%	133	22.04%	22.04%
6/30/2023	882	1,168	285	75.6%	137	21.47%	21.47%
6/30/2024	889	1,173	284	75.8%	141	20.85%	20.85%
6/30/2025	895	1,177	283	76.0%	145	20.24%	20.24%
6/30/2026	899	1,180	281	76.2%	150	19.65%	19.65%
6/30/2027	902	1,182	280	76.3%	155	19.08%	19.08%
6/30/2028	905	1,183	278	76.5%	160	18.54%	18.54%
6/30/2029	907	1,183	277	76.6%	165	18.02%	18.02%
6/30/2030	908	1,183	276	76.7%	170	17.52%	17.52%
6/30/2031	909	1,183	274	76.8%	176	17.04%	17.04%
6/30/2032	910	1,183	273	76.9%	181	16.58%	16.58%
6/30/2033	912	1,183	271	77.1%	187	16.14%	16.14%
6/30/2034	914	1,184	270	77.2%	193	15.72%	15.72%

- Assumptions consistent with valuation. Assumes stable active population. Assumes City contributes Actuarial Contribution Shown.

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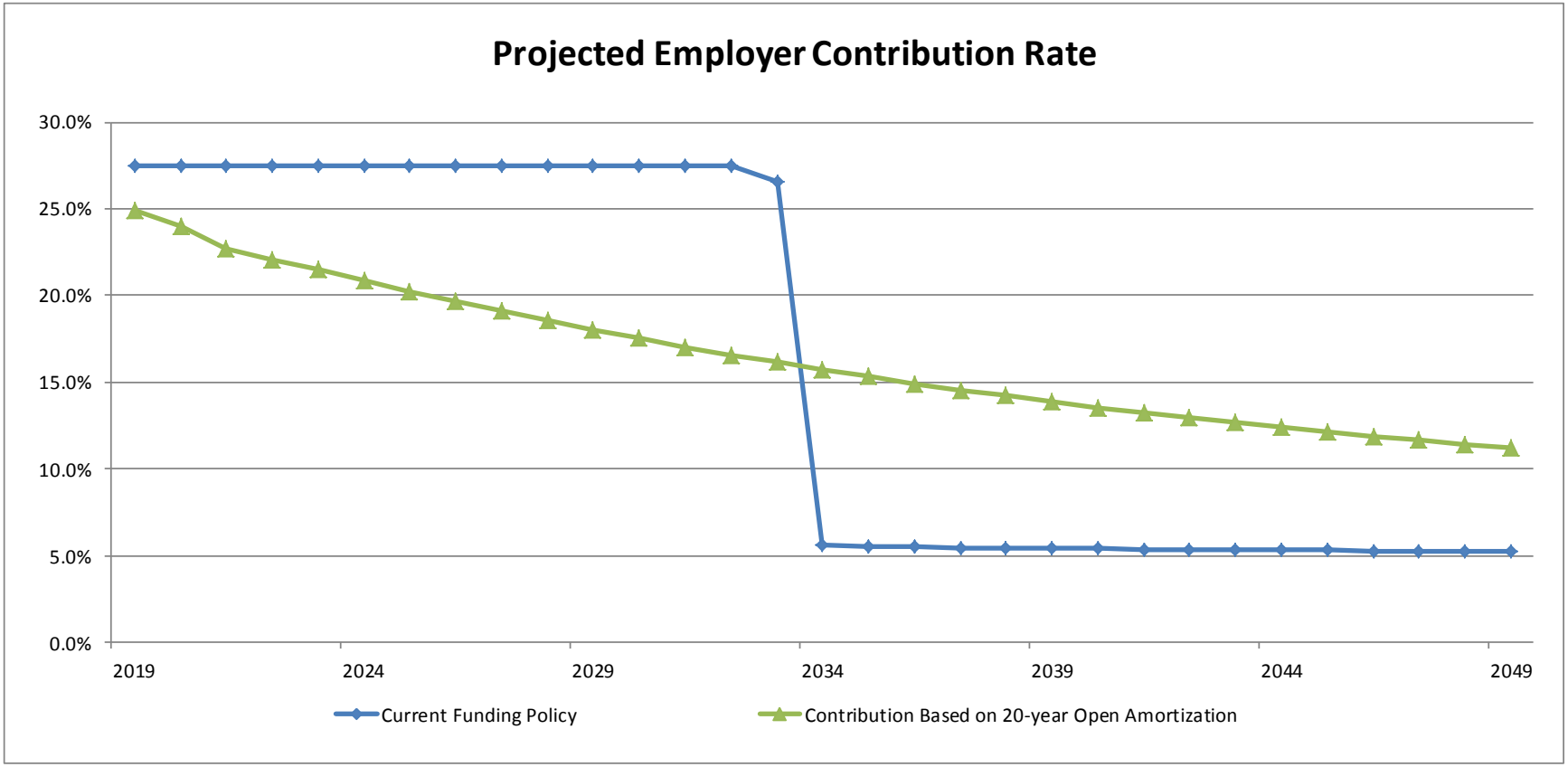
30-Year Projection
Employer Contribution Rate

Draft



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30-Year Projection
Funded Ratio

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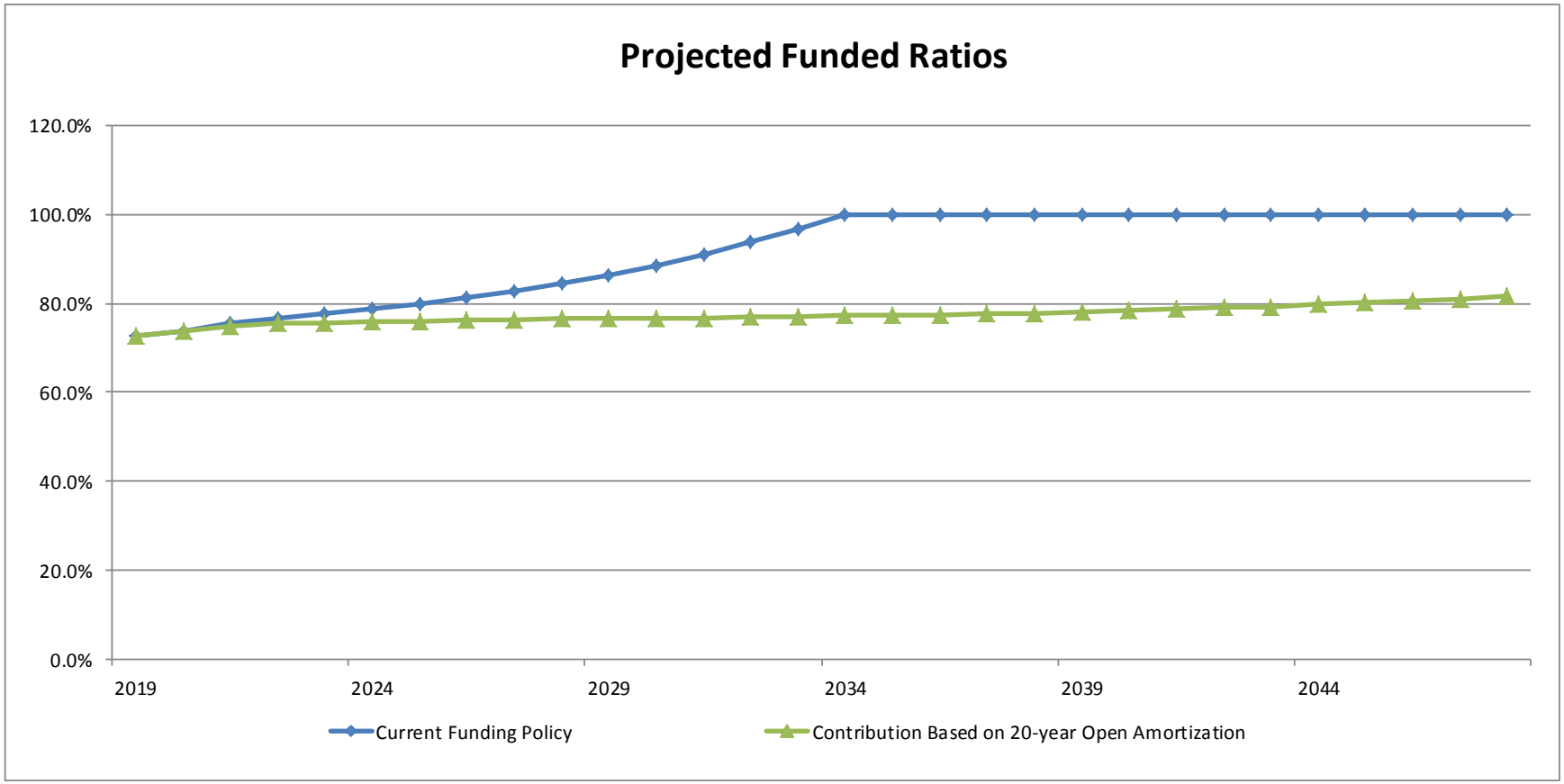

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Long Term Projections

Stress Testing

Draft

- Stress testing of the plan can show how the contributions and funded status react under various return scenarios
- Also gives insight into the effectiveness of the funding policy in the face of volatile markets
- Showing the following two projection sets
  - Impact of under or over-performance
    - 50bp in either direction
  - Repeat of the last 12 years of returns
    - Captures the impact of the Great Recession
    - Average return over the 12 year period was 6.1%
    - Returns after year 12 are assumed to be 7.0%

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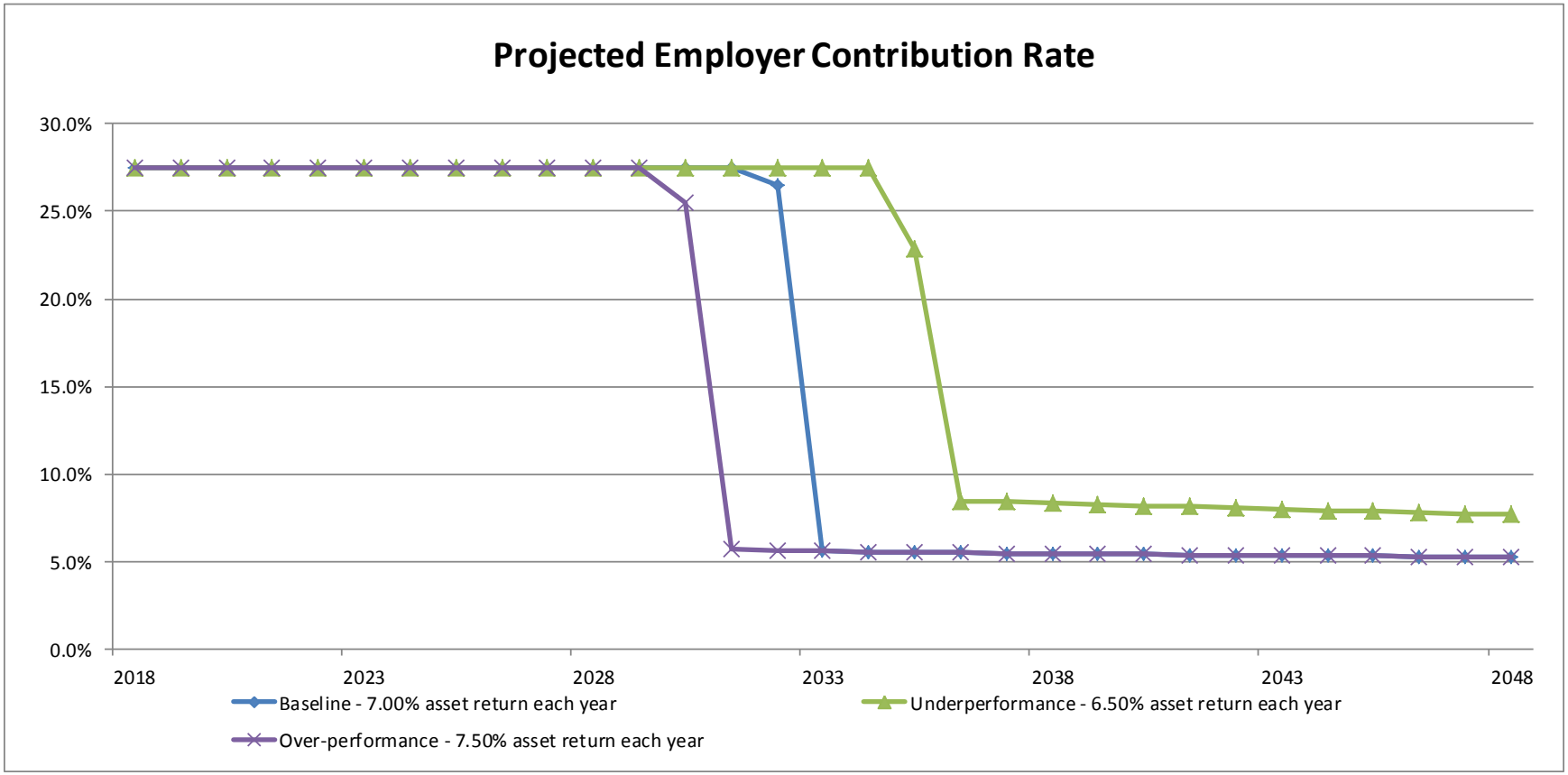
Long Term Projections

Stress Testing – Impact of Under or Over-Performance



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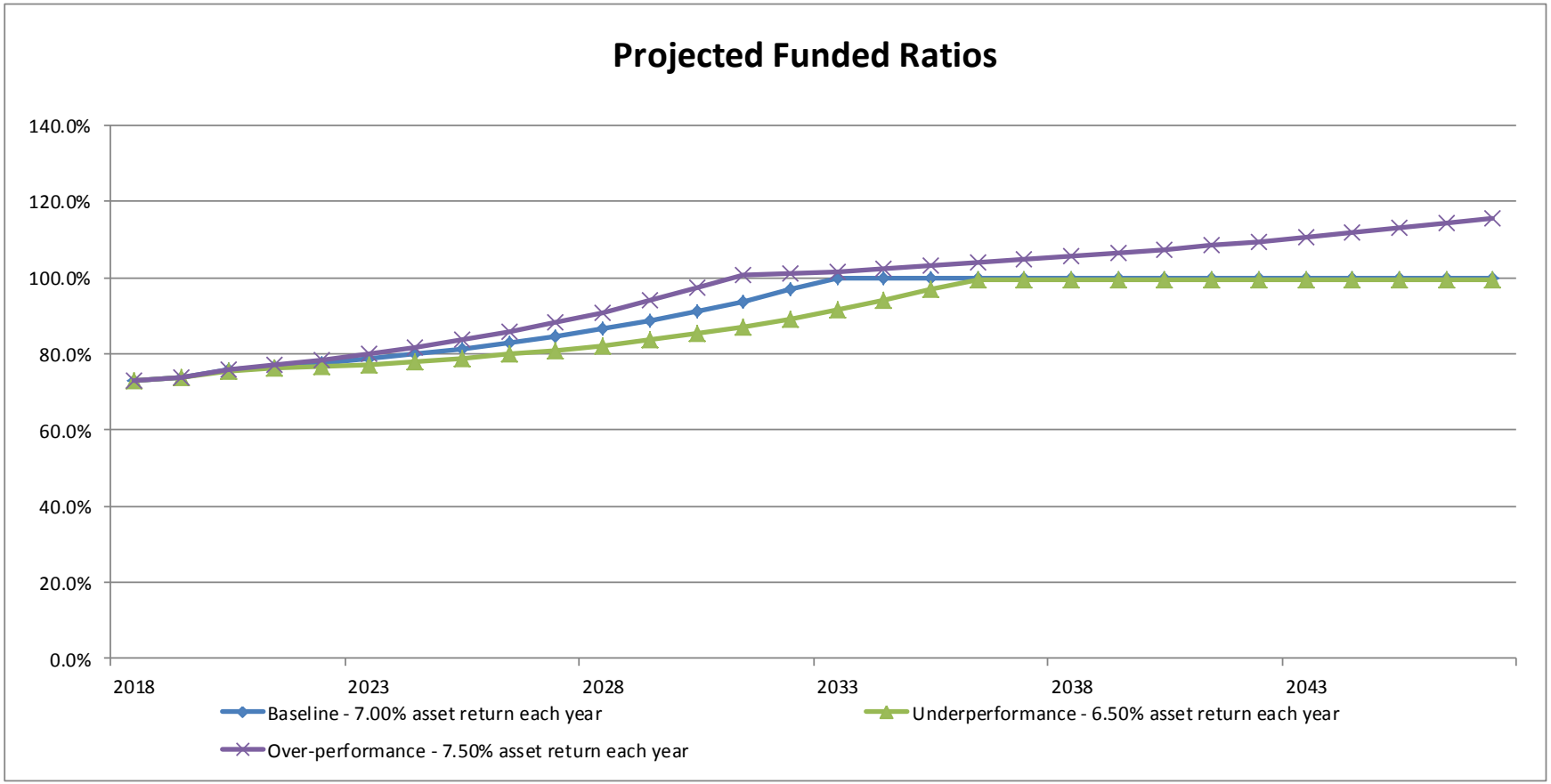
Long Term Projections

Stress Testing – Impact of Under or Over-Performance



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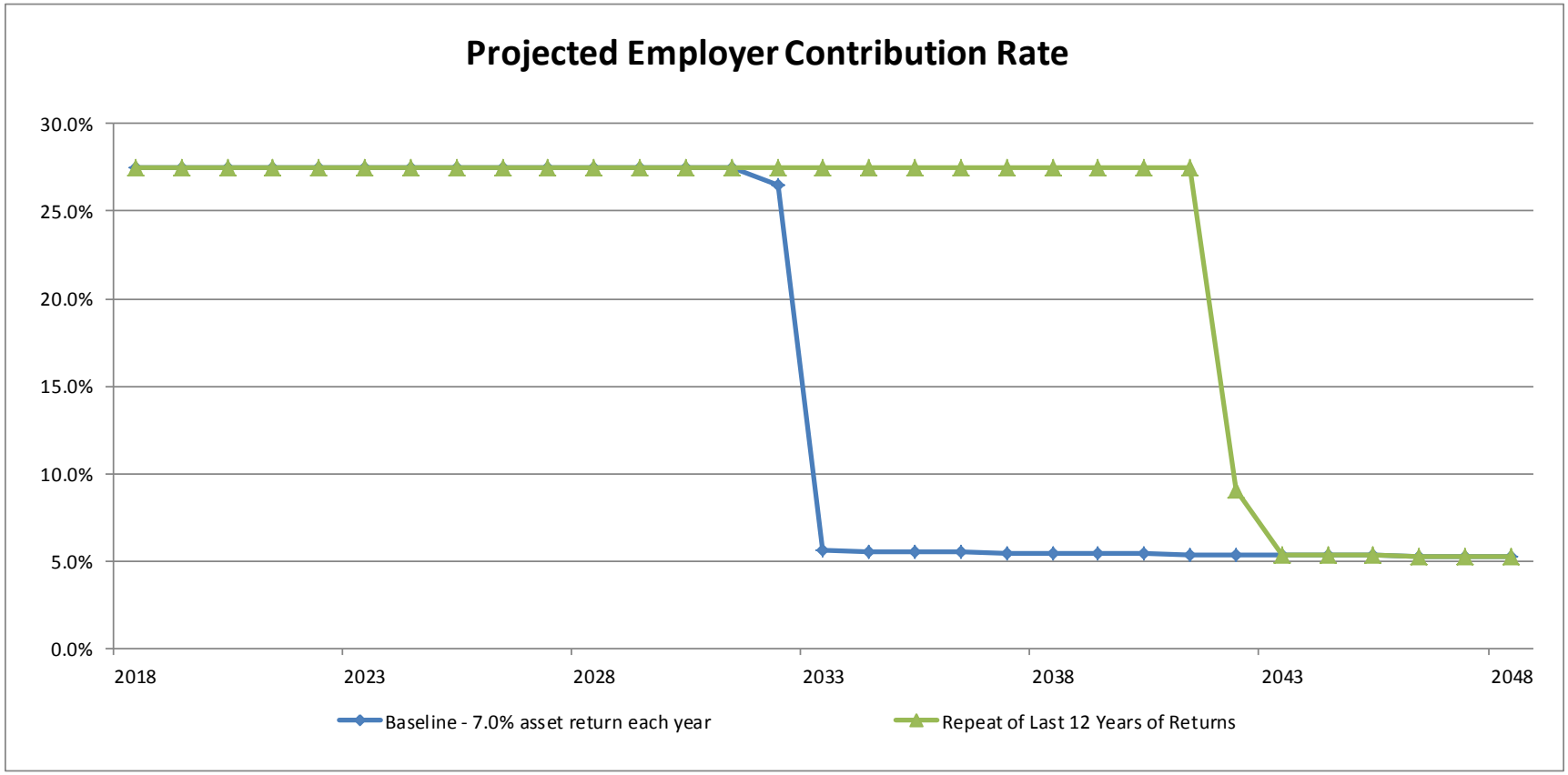
Long Term Projections

Stress Testing – Repeat of Last 12 Years of Returns



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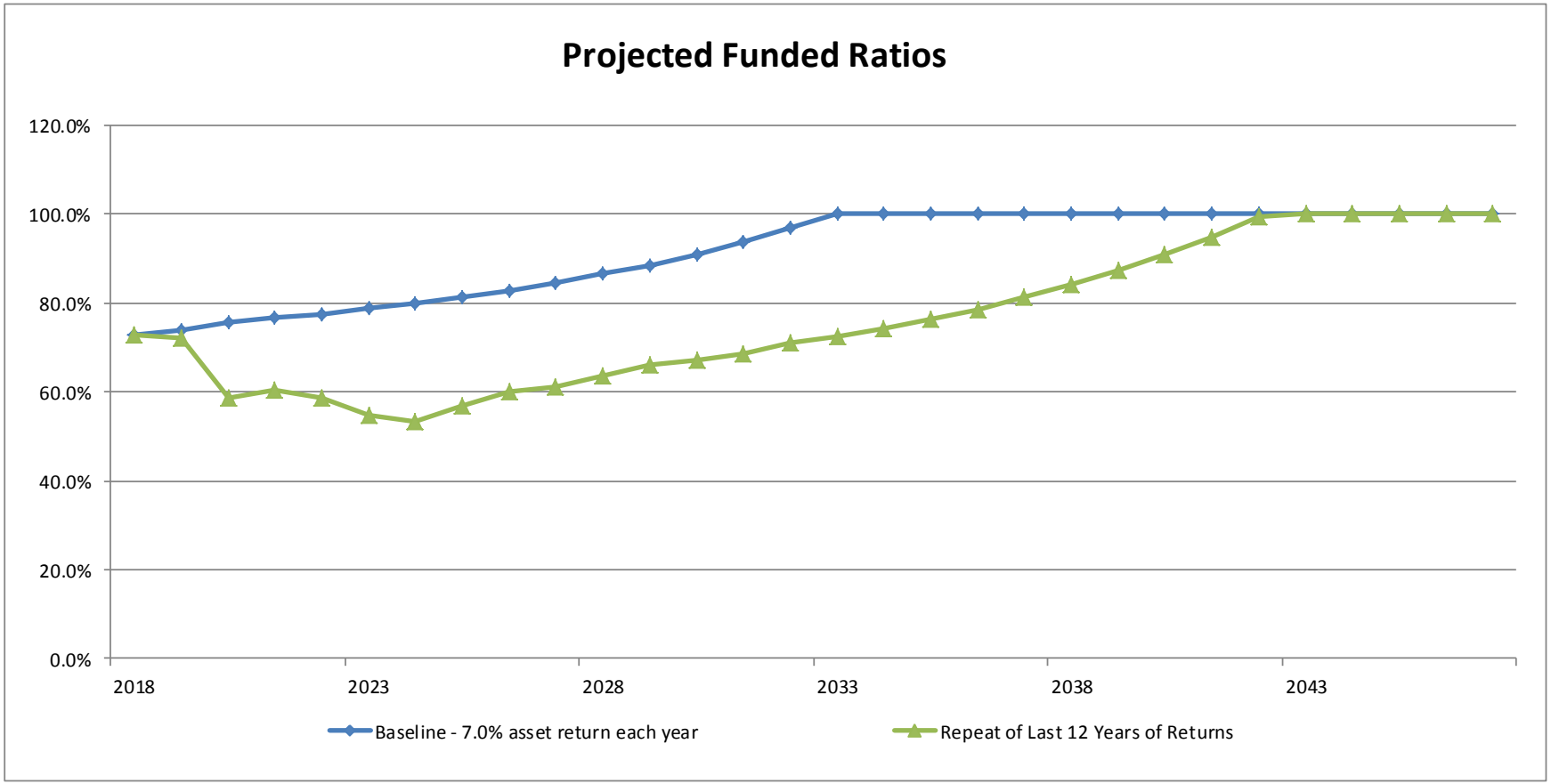
Long Term Projections

Stress Testing – Repeat of Last 12 Years of Returns



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Long Term Projections

Stochastic Scenarios

- Projections on prior slides were straight line, or "deterministic", projections
  - Do not illustrate the range of possible outcomes
- Also ran thousands of trials to help illustrate the range of outcomes that could occur
  - Generally referred to as stochastic projections
- Can lead to more informed decision making or, at a minimum, more robust expectations

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Long Term Projections

Stochastic Scenarios – Compound Annual Return

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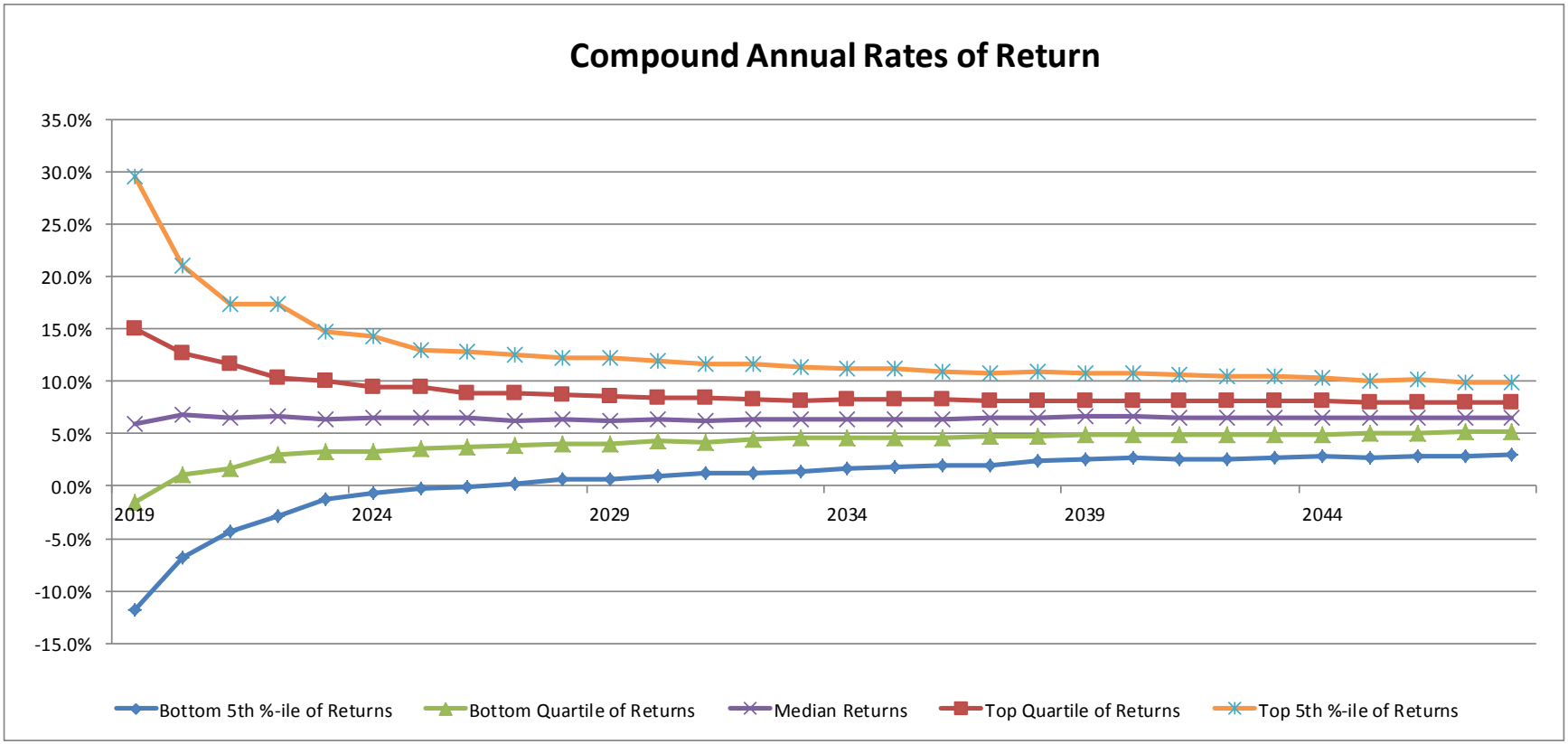

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Long Term Projections

Stochastic Scenarios – Projected Contribution Rates

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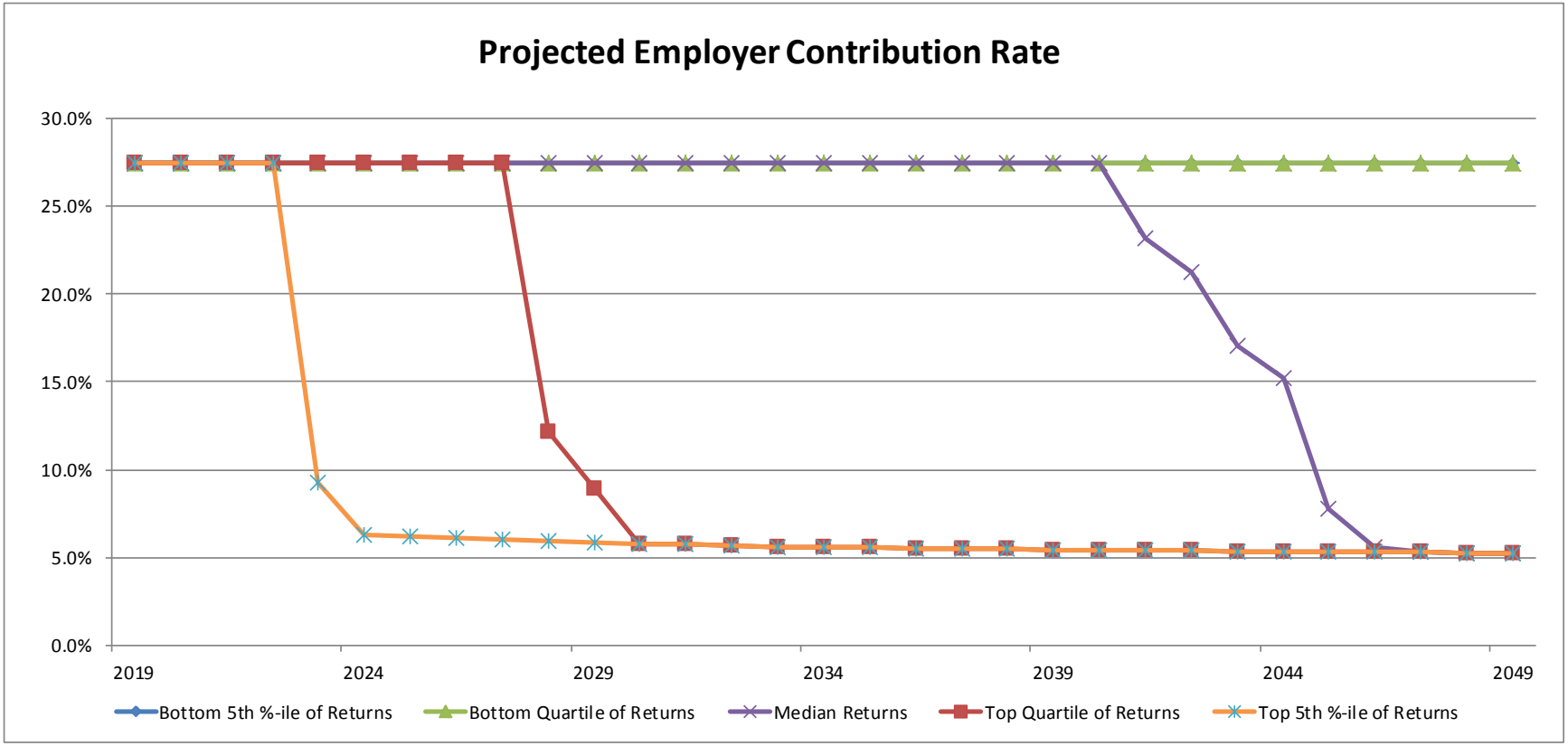

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Long Term Projections

Stochastic Scenarios – Projected Funded Ratios

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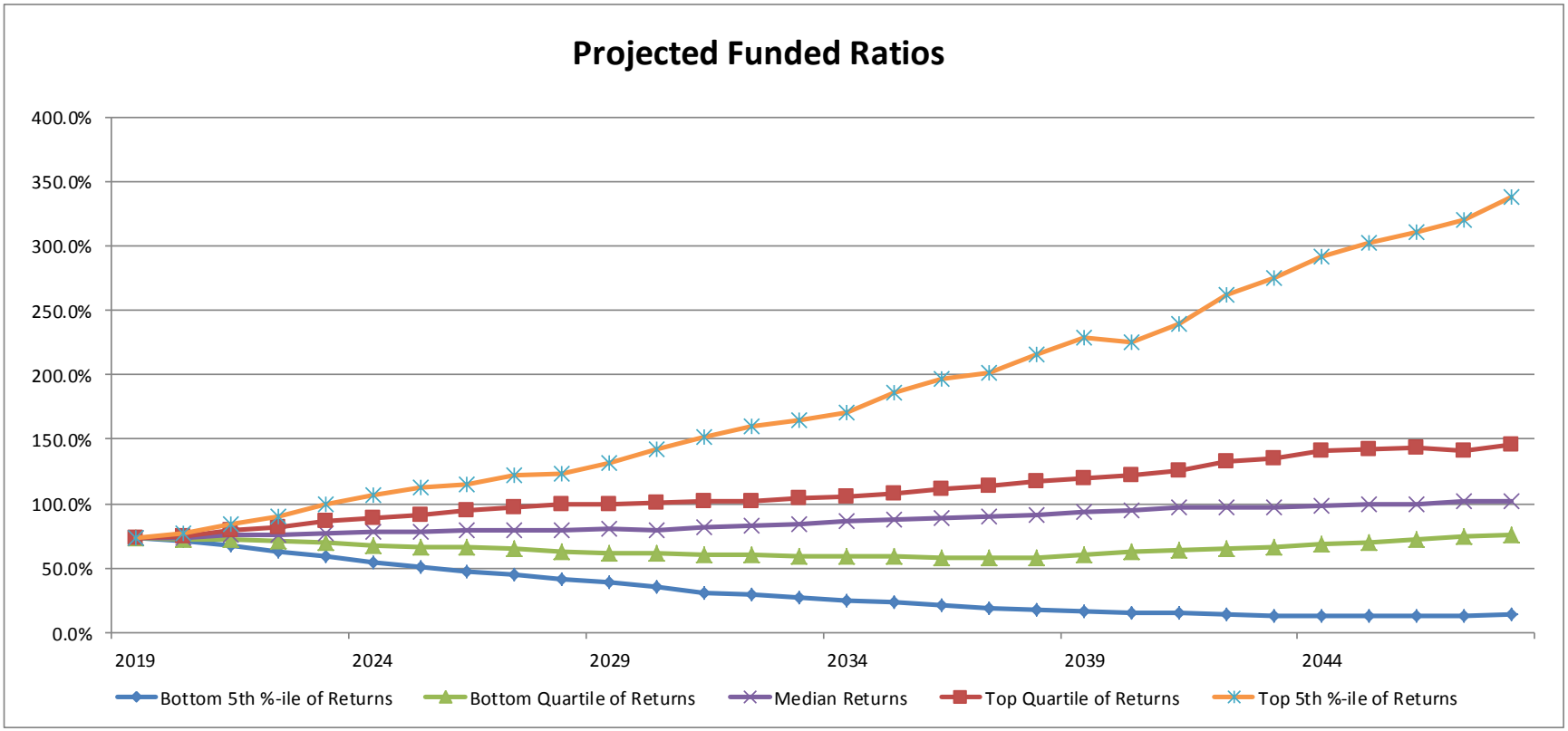

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Summary

- Assumption changes increased expected costs
  - But plan still expected to be sustainable and on upward funding trajectory
- Strong funding policy meant assumption changes could be incorporated without increase to City contribution
  - Employee rates increase due to changes in normal cost rates
- Sticking to funding policy (27.5% city minimum) is as important as ever
  - Keep plan on full funding path
  - Provide for protection against adverse deviation as plan becomes better funded and more distance between actuarial determined contribution and 27.5%

Tucson Supplemental Retirement System

ACTUARIAL VALUATION REPORT AS OF

June 30, 2019

Draft

GRS Retirement Consulting

P: 720.274.7270 | F: 303.694.0633 | www.grsconsulting.com

October 17, 2019

The Board of Trustees
Tucson Supplemental Retirement System
Tucson, Arizona

Re: Actuarial Valuation of the Tucson Supplemental Retirement System as of June 30, 2019

Dear Board Members:

We are pleased to present the report on the actuarial valuation of the Tucson Supplemental Retirement System as of June 30, 2019.

This report presents the results of the June 30, 2019 actuarial valuation of the Tucson Supplemental Retirement System. The report describes the current actuarial condition of the Tucson Supplemental Retirement System, determines recommended annual employer and employee contribution rates, and analyzes changes in these required rates. This report should not be relied on for any purpose other than the purpose described in the primary communication. Information needed to comply with Statements No. 67 and 68 is provided in a separate accounting report.

Draft

We certify that the information included herein and contained in the June 30, 2019 Actuarial Valuation Report is accurate and fairly presents the actuarial position of the Tucson Supplemental Retirement System as of the valuation date.

Contribution Rates

There are no recommended changes to the contribution rates for FY 2021 for the employer rate or the employee rate for those hired prior to July 1, 2006. Based on the TSRS funding policy, the recommended employer rate will remain at 27.5%, and the recommended employee rates will remain at 5.00% for the members hired prior to July 1, 2006. We do recommend an increase to the employee rates from 6.75% to 7.00% for the Tier I variable class and from 5.25% to 5.50% for the tier II variable class. Full details of these calculations are in the report.

Financing Objectives

The employer contributions, when combined with the contributions made by members, are intended to cover the Actuarially Determined Contribution (ADC), which is the sum of the Normal Cost plus a 20-year open level percent-of-pay amortization payment of the Unfunded Actuarial Accrued Liability (UAAL). If the contributions made are equal to the ADC, and if all actuarial assumptions are met, there will still be an unfunded accrued liability at the end of the 20-year period. This is due to “open” amortization – an amortization method that resets the payment period to 20 years with each valuation. However, the Board has adopted a funding policy which rounds up the employee and City contribution rates, and in addition, sets a 27.50% minimum on the City contribution rate until full funding is reached. Based on this funding policy, the System is projected to reach full funding in 2034.

7900 East Union Avenue | Suite 650 | Denver, Colorado 80237-2746

Progress Toward Realization of Financing Objectives

The UAAL/(surplus) and the funded ratio (ratio of the actuarial value of assets to the actuarial accrued liability) illustrate the progress toward the realization of certain financing objectives. Based on the actuarial valuation as of June 30, 2019, the Plan has an unfunded liability of $306.88 million and a funded ratio of 72.8%.

The decrease in the funded ratio, from 76.2% to 72.8%, is primarily due to assumption changes. Contributions in excess of the ADC helped improve the funded ratio. A funded ratio less than 100% indicates an actuarially determined contribution that will require a normal cost and an amortization payment. If the contributions equal the ADC, and if all assumptions are met, the funded ratio should improve over time.

The Total Actuarially Determined Contribution as a percentage of pay based on the actuarial valuation as of July 1, 2019 is 30.28% compared to the total contribution rate in the prior year of 27.06%. This total rate, net of the employee contributions, is used in setting City rates for the fiscal year beginning July 1, 2020 (FY 2021).

The contribution rate in this report is determined using the actuarial assumptions and methods disclosed in Section G of this report. This report does not include an assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the System's financial condition.

Benefit Provisions

Draft

All of the benefit provisions reflected in this valuation are those which were in effect on June 30, 2019. There were no changes to the benefit provisions since the prior valuation. The benefit provisions are summarized in Section D of this Report.

Assumptions and Methods

The Board has sole authority to determine the actuarial assumptions used for the Plan. The assumptions that are based upon the actuary's recommendations are internally consistent and are reasonably based on the actual past experience of the Plan.

The assumptions have been updated since the prior valuation as follows:

Economic Assumption Updates:

- Inflation reduced from 3.00% to 2.50%
- Productivity component of the salary scale has been increased from 0% to 0.5%
- Investment return assumption reduced from 7.25% to 7.00%

Demographic Assumption Updates:

- Updated the mortality tables to the RP-2014 mortality tables (specific to healthy employees, healthy retirees, and disabled retirees for the pre-retirement, post-retirement and post-disablement assumptions, respectively) and a fully generational approach using the ultimate rates of the MP-2018 Projection Scales.

- Slightly Increased service-based termination rates for active members with less than five years of service. Increase age-based termination rates by 5% of current rates.
- Slightly reduce early retirement and Rule of retirement rates. Modify age-based pattern of rates for those not qualifying for "Rule of" based on observed experience.

The current assumptions were adopted by the Board in 2019 for first use in the June 30, 2019 valuation following a regularly scheduled experience study. The rationale for all of the current assumptions is included in that report, dated January 8, 2019.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. The actuarial calculations presented in this Report are intended to provide information for rational decision making.

Data

The valuation was based upon information as of June 30, 2019, furnished by Tucson Supplemental Retirement System staff, concerning Plan benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by Tucson Supplemental Retirement System staff.

Draft

Certification

All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code, and ERISA.

The signing actuaries are independent of the plan sponsor. Dana Woolfrey is an Enrolled Actuary and both Dana Woolfrey and Paul Wood are Members of the American Academy of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries. Finally, both of the undersigned are experienced in performing valuations for large public retirement systems.

Respectfully submitted,

Gabriel, Roeder, Smith & Company

Dana Woolfrey, FSA, FCA, EA, MAAA
Consultant

Paul Wood, ASA, FCA, MAAA
Consultant

Draft

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SECTION A

EXECUTIVE SUMMARY

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Actuarial Valuation

Valuations are prepared annually, as of July 1 of each year, the first day of the fiscal year. The primary purposes of the valuation report are to measure the plan's liabilities, to determine the required contribution rates and to analyze changes in the Tucson Supplemental Retirement System's actuarial position.

In addition, the report provides summaries of the member data, financial data, plan provisions, and actuarial assumptions and methods.

Assumption Changes

Assumptions were changed since the prior valuation in conjunction with a recent experience study. The impact of these assumption changes on the June 30, 2018 valuation results is shown on page A-6. The assumption changes increased the actuarial accrued liability by $57.3 million as of June 30, 2018 and the Total Actuarially Determined Contribution by 4.1%. The primary sources of these increases to expected costs were the change to the discount rate from 7.25% to 7.00% and the updated mortality assumptions.

Experience During the Year

As shown on page B-5, the expected accrued liability as of June 30, 2019 was $1,124.5 million. The actual accrued liability was $1,129.5 million, and the plan experienced a liability loss of $5.0 million during fiscal year 2019, primarily due to salary increases being more than expected and retiree mortality experience. The plan experienced an asset gain of $1.4 million during fiscal year 2019. Please see page B-5 for further information.

Draft

Financial Position

On both a market value and an actuarial value basis the funded ratio decreased from June 30, 2018 to June 30, 2019, primarily due to assumption changes.

Funded Status Summary ($ in millions)		
Valuation Date	**June 30, 2019**	**June 30, 2018**
Accrued Liability	$1,129.5	$1,054.0
Actuarial Value of Assets (smoothed)	822.6	803.4
Unfunded Accrued Liability	$306.9	$250.5
Funded Ratio (AVA basis)	72.83%	76.23%
Market Value of Assets	$836.6	$822.9
Unfunded Accrued Liability	$292.9	$231.1
Funded Ratio (MVA basis)	74.07%	78.08%

Financing Objectives and Funding Policy

The financing objective of the Retirement System is to establish and receive contributions, expressed as percent of active member payroll, which will remain approximately level from year to year and thereby minimize inter-generational cost transfers.

The Tucson Supplemental Retirement System is supported by member contributions, employer contributions, and investment return from retirement system assets. Currently, members hired prior to July 1, 2006 contribute a flat rate, while members hired after June 30, 2006 are subject to variable rates that are 50% of their tiers' normal cost, subject to a floor of 5.0%. The rates are outlined in the table below. These rates are further subject to a 5.00% floor and a roundup policy rounding the to next 0.25% percent - in this case, making the rates for fiscal year 2021, 5.00%, 7.00%, and 5.50%, respectively.

	Actuarial (Non Rounded) Rates	
Employee Group	**FY 2020***	**FY 2021***
Employees hired prior to July 1, 2006	5.00%	5.00%
Tier I Variable - employees hired after June 30, 2006, before July 1, 2011	6.42%	6.95%
Tier II Variable - employees hired after June 30, 2011	4.78%	5.33%

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**Before application of 5.0% floor or roundup policy.*

Total contributions which satisfy the funding objective are determined by the annual actuarial valuation and are sufficient to:

(1) cover the normal cost (the actuarial present value of benefits allocated to the current year by the actuarial cost method described in Section C); and

(2) finance over a period of future years the annual payment of the unfunded actuarial accrued liability (the actuarial present value of benefits not covered by valuation assets and anticipated future normal costs); and

(3) cover administrative expenses of the System.

It is assumed that the investment return assumption of 7.00% is net of investment expenses. The additional explicit administrative expense charge to the contribution rate is applied to the recommended employer contribution.

The Total Actuarially Determined Contribution which is used to set rates for fiscal year 2021 increased from 27.06% as of the prior valuation to 30.28% as of the current valuation. Assumption changes increased the liability. This resulted in higher actuarial contribution requirements for fiscal year 2021.

Contribution Requirement Summary **All Numbers Reported Middle of Year, Percent of Pay**		
Fiscal Year Beginning	**July 1, 2020**	**July 1, 2019**
Total Actuarial Determined Contribution	30.28%	27.06%
Estimated Member Contribution	5.34%	5.07%
Net Annual Required Contribution	24.94%	21.99%

Normal Cost by Tier	
Aggregate Total Normal Cost	11.83%
Tier I Normal Cost (Hired before July 1, 2006)	12.50%
Tier I Normal Cost (Hired between July 1, 2006 and June 30, 2011)	13.90%
Tier II Normal Cost (Hired after June 30, 2011)	10.66%

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Member and City Rates by Tier for Fiscal Year Beginning July 1, 2020			
Tier	Member Contribution*	City Contribution*	Total Contribution
Hired Prior to July 1, 2006	5.00%	25.28%	30.28%
Hired between July 1, 2006 and June 30, 2011	6.95%	23.33%	30.28%
Hired after June 30, 2011	5.33%	24.95%	30.28%
Blended Across Tiers	5.34%	24.94%	30.28%

*Prior to application of roundup policy and funding policy minimums. It is anticipated that the three member groups will contribute 5.00%, 7.00%, and 5.50%, respectively. It is anticipated that the City will contribute 27.50% of pay, in accordance with the funding policy minimum.

The recommended rates, with the application of the administrative expenses and the round up policy, are illustrated below:

FY 21 Recommended Rates
Based on TSRS Funding Policy

(full description of the TSRS funding policy may be found in Section I)

Employee Rates	Actuarial Rate (50% of Normal Cost)	Round up to nearest .25%	FY 21 Board Recommended Rates	FY 20 Adopted Rates
Tier				
Hired prior to 7/1/2006	5.00%*	n/a	5.00%	5.00%
Hired 7/1/2006 to 6/30/2011	6.95%	7.00%	7.00%	6.75%
Hired after 6/30/2011	5.33%**	5.50%	5.50%	5.25%

**Rate set in ordinance at 5.00%*
*** Minimum 5% rate*

Employer Rates		Round up to nearest .50%	FY 21 Board Recommended Rates	FY 20 Adopted Rates
Tier				
Hired prior to 7/1/2006	25.28%	n/a		
Hired 7/1/2006 to 6/30/2011	23.33%	n/a		
Hired after 6/30/2011	24.95%	n/a		
Blended Rate	24.94%	n/a	27.50%*	27.50%

**Minimum 27.5% recommended rate*

Draft

Exhibit A.1
Tucson Supplemental Retirement System
Executive Summary

	June 30, 2019	June 30, 2018 After Assumption Changes	June 30, 2018 Before Assumptions Changes
1. **Actuarially Determined Contribution**			
a. Total	30.28%	31.20%	27.06%
b. Blended Member %	5.34%	5.33%	5.07%
c. Blended Net Employer %	24.94%	25.87%	21.99%
2. **Funded Status**			
a. Actuarial Accrued Liability	$ 1,129,491,900	$ 1,111,311,225	$ 1,053,987,024
b. Actuarial Value of Assets (AVA)	822,611,897	803,439,269	803,439,269
c. Unfunded Liability (AVA-basis)	306,880,003	307,871,956	250,547,755
d. Funded Ratio (AVA-basis)	72.83%	72.30%	76.23%
e. Market Value of Assets (MVA)	$ 836,583,028	$ 822,916,171	$ 822,916,171
f. Unfunded Liability (MVA-basis)	292,908,872	288,395,054	231,070,853
g. Funded Ratio (MVA-basis)	74.07%	74.05%	78.08%
3. **Summary of Census Data**			
a. Actives			
i. Counts	2,508		2,455
ii. Total Annual Covered Payroll	$ 123,822,602		$ 118,152,118
iii. Average Covered Payroll	49,371		48,127
iv. Average Age	47.7		47.9
v. Average Service	11.5		12.0
b. Members with Refunds Due Counts	151		90
c. Deferred Vested Member Counts	328		312
d. Retired Member Counts	2,539		2,492
e. Beneficiary Counts	357		335
f. Disabled Retiree Counts	148		151
g. Alternate Payees	57		53
h. Total Members Included in Valuation	6,088		5,888

Draft

SECTION B

VALUATION RESULTS

Draft

Exhibit B.1

Tucson Supplemental Retirement System

Actuarial Valuation Results

Actuarial Accrued Liability

	June 30, 2019	June 30, 2018
1. **Active Members**		
a. Retirement Benefits	$ 315,844,675	$ 299,090,497
b. Withdrawal Benefits	6,961,496	7,075,086
c. Disability Benefits	1,942,498	1,681,367
d. Death Benefits	4,292,889	5,612,204
e. Total	$ 329,041,558	$ 313,459,154
2. **Members with Deferred Benefits**	$ 25,932,128	$ 23,388,756
3. **Members Receiving Benefits**	$ 774,206,327	$ 716,751,118
4. **Non-Vested Terminated Members Due Refund**	$ 311,887	$ 387,996
5. **Total**	$ 1,129,491,900	$ 1,053,987,024
6. **Actuarial Value of Assets**	$ 822,611,897	$ 803,439,269
7. **Unfunded Actuarial Accrued Liability**	$ 306,880,003	$ 250,547,755

Draft

Exhibit B.2 Tucson Supplemental Retirement System Actuarial Valuation Results Normal Cost		
	July 1, 2019	**July 1, 2018**
1. **Normal Cost Rate**		
a. Retirement Benefits	9.14 %	8.52 %
b. Withdrawal Benefits	2.23	1.97
c. Disability Benefits	0.28	0.24
d. Death Benefits	0.18	0.24
e. Total	11.83 %	10.97 %

Draft

Exhibit B.3

Tucson Supplemental Retirement System

Actuarial Valuation Results

Present Value of Projected Benefits

	June 30, 2019	June 30, 2018
1. **Active Members**		
a. Retirement Benefits	$ 388,573,329	$ 360,755,093
b. Withdrawal Benefits	26,417,799	22,581,106
c. Disability Benefits	4,575,901	3,702,018
d. Death Benefits	5,759,522	7,485,272
e. Total	$ 425,326,551	$ 394,523,489
2. **Members with Deferred Benefits**	$ 25,932,128	$ 23,388,756
3. **Members Receiving Benefits**	$ 774,206,327	$ 716,751,118
4. **Non-Vested Terminated Members Due Refund**	$ 311,887	$ 387,996
5. **Total**	$ 1,225,776,893	$ 1,135,051,359

Draft

Exhibit B.4
Tucson Supplemental Retirement System
Development of the Actuarially Determined Contribution

Fiscal Year Beginning[1]	July 1, 2019	July 1, 2018
1. Total Normal Cost	11.83%	10.97%
2. Total Contribution to the Unfunded Actuarial Accrued Liability[2]	17.71%	15.46%
3. Administrative Expenses	0.74%	0.63%
4. Total Computed Contribution	30.28%	27.06%
5. Member Financed Portion[3]	5.34%	5.07%
6. City Financed Portion[4]	24.94%	21.99%

[1]*One-year lag in contribution timing. Contribution rates developed for the fiscal year beginning July 1, 2019 are used to set the actual contribution rates for fiscal year beginning July 1, 2020.*

[2] *Financed as a level percent of active member payroll over a period of 20 years from June 30, 2019.*

[3] *This percentage reflects the fact that members hired prior to July 1, 2006 contributed 5.00% of pay per year and members hired between July 1, 2006 and June 30, 2011 (Tier I variable class) and for those hired after July 1, 2011 (Tier II variable class), employee contributions are 50% of the respective Normal Cost for each class with a floor of 5.0%. The employee contribution rates, before application of the floor or roundup policy, for fiscal year 2021 are 6.95% and 5.33%, respectively.*

[4]*Prior to round up policy and application of 27.5% minimum.*

Draft

Exhibit B.5
Tucson Supplemental Retirement System
Plan Experience for Fiscal Year 2019

	Liabilities	
1.	Actuarial Accrued Liability at June 30, 2018	$ 1,053,987,024
2.	Normal Cost during Fiscal Year 2019	14,130,993
3.	Benefit Payments during Fiscal Year 2019	(76,586,216)
4.	Change in Actuarial Accrued Liability Due to Assumption Changes	57,324,201
5.	Change in Actuarial Accrued Liability Due to Provision Changes	0
6.	Interest on Items 1-5 to End of Year	75,605,853
7.	Expected Actuarial Accrued Liability at June 30, 2019	1,124,461,855
8.	Actual Actuarial Accrued Liability at June 30, 2019	1,129,491,900
9.	Liability Gain/(Loss)	(5,030,045)
	Assets	
10.	Actuarial Value of Assets at June 30, 2018	$ 803,439,269
11.	Benefit Payments and Administrative Expenses during Fiscal Year 2019	(77,507,281)
12.	Contributions during Fiscal Year 2019	40,368,681
13.	Interest on Items 10-12 to End of Year	54,940,898
14.	Expected Actuarial Value of Assets at June 30, 2019	821,241,567
15.	Actual Actuarial Value of Assets at June 30, 2019	822,611,897
16.	Asset Gain/(Loss)	1,370,330
	Total	
17.	Total Gain/(Loss)	**$ (3,659,715)**

Draft

SECTION C

PLAN ASSETS

Draft

Exhibit C.1
Tucson Supplemental Retirement System
Statement of Plan Net Assets

	June 30, 2019	June 30, 2018
Assets		
Short-term investments	$ 28,647,513	$ 57,068,883
Receivables		
Accounts Receivable - Sale of Investments	$ 10,386,466	$ 1,327,828
Accrued Interest and Other Dividends	2,007,094	2,025,147
Contributions	0	0
Total Receivables	$ 12,393,560	$ 3,352,975
Investments		
Fixed income securities	$ 214,261,755	192,779,554
Domestic equity	275,104,869	280,855,925
International equity	208,519,269	214,019,103
Real estate investments	77,625,268	51,120,910
Other	39,059,474	61,281,985
Total Investments	$ 814,570,635	$ 800,057,477
Total assets	$ 855,611,708	$ 860,479,335
Liabilities and net assets held in trust for benefits		
Accounts payable	19,028,680	36,845,818
Total payables	19,028,680	36,845,818
Net assets held in trust for pension benefits	$ 836,583,028	$ 823,633,517

Draft

Exhibit C.2
Tucson Supplemental Retirement System
Statement of Changes in Plan Net Assets

	Year Ended June 30, 2019	Year Ended June 30, 2018
Additions to Net Assets Attributed to:		
Contributions		
Employer contributions	$32,589,204	$32,410,717
Plan members contributions	7,779,477	8,680,024
Total	40,368,681	41,090,741
Net Investment Income		
Net appreciation in fair value of investments	40,058,019	63,800,052
Interest and dividends	14,516,767	12,878,739
Other	123,500	219,121
	54,698,286	76,897,912
Total additions	95,066,967	117,988,653
Deductions to Net Assets Attributed to:		
Benefit payments	74,928,771	72,445,792
Refunds	1,657,445	3,172,406
Investment expenses	4,610,176	8,651,467
Administrative expenses	921,065	745,754
Other	0	0
Total deductions	82,117,457	85,015,419
Change in net assets	12,949,510	32,973,234
Net assets held in trust for benefits:		
Beginning of year	823,633,518	789,942,937
End of year	$ 836,583,028	$ 822,916,171
Revised for final assets	N/A	$ 823,633,518

Draft

Exhibit C.3
Tucson Supplemental Retirement System
Development of the Actuarial Value of Assets

	Item		Year Ending June 30, 2019
1.	Market value of assets, at beginning of year		823,633,518
2.	Net new investments		
	a. Contributions received for prior plan year	$	40,368,681
	b. Benefits paid and administrative expenses		(77,507,281)
	c. Net	$	(37,138,600)
3.	Market value of assets, at end of year	$	836,583,028
4.	Net MVA earnings [(3) - (1) - (2c)]	$	50,088,110
5.	Assumed investment return rate		7.00%
6.	Expected return [(5)*(1)+(5)*(2c)/2]	$	56,354,495
7.	Excess return [(4) - (6)]	$	(6,266,385)
8.	Deferred amounts for fiscal year ending June 30,		

	Year	Gain/(Loss)	Percent Deferred	Amount Deferred
a.	2019	(6,266,385)	80%	(5,013,108)
b.	2018	12,254,236	60%	7,352,542
c.	2017	46,380,470	40%	18,552,188
d.	2016	(34,602,453)	20%	(6,920,491)
e.	2015	(21,568,941)	0%	0
f.	Total	(3,803,073)		13,971,131

9.	Actuarial value of assets (Item 3 - Item 8f)	$	822,611,897

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Exhibit C.4 Average Annual Rates of Investment Return		
Fiscal Year Ended June 30,	**Actuarial Value**	**Market Value***
2013	4.1 %	14.3 %
2014	13.8	19.1
2015	12.1	4.3
2016	8.0	2.5
2017	10.0	13.8
2018	9.4	8.8
2019	7.2	6.2

**Market value numbers are based on actuarial estimate using beginning of year market value, end of year market value, and the assumption that all cash flows occur at middle of year. Other calculations of this number, such as those provided by the investment consultant, may be different.*

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SECTION D

SUMMARY OF BENEFIT PROVISIONS

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SUMMARY OF BENEFIT PROVISIONS

JUNE 30, 2019

NORMAL RETIREMENT (NO REDUCTION FACTOR)

Eligibility :

Tier 1 – Members hired before July 1, 2011. Age 62, or a combination of age and creditable service equal to 80 (for those hired on or after July 1, 2009, eligibility at age 62 requires a minimum of 5 years of accrued service).

Tier 2 – Members hired on or after July 1, 2011. Age 65 with 5 years of service or a combination of age and creditable service equal to 85 and the attainment of age 60.

Amount - Creditable service times 2.25% of average final compensation for Tier 1 and 2.00% of average final compensation for Tier 2.

Average Final Compensation - The average monthly creditable compensation for the period of 36 consecutive months during which the member's creditable compensation was the highest during the 120 months immediately preceding the date of retirement for Tier 1 and 60 consecutive months during which the member's creditable compensation was the highest during the 120 months immediately preceding the date of retirement for Tier 2. Effective July 1, 2000, accrued unused sick leave at the final salary shall be substituted for an equal number of hours at the beginning of the 36 month period for Tier 1.

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EARLY RETIREMENT (REDUCTION FACTOR)

Eligibility - Age 55 with 20 or more years of creditable service for Tier 1 and age 60 with 20 or more years of creditable service tor Tier 2.

Amount - An amount computed as for normal retirement but reduced by 1/2 of 1% per month for each month (6% per year) retirement precedes normal retirement.

DEFERRED RETIREMENT (VESTED TERMINATION)

Eligibility - 5 or more years of accrued service. Deferred retirement benefits for terminated vested employee becomes automatic at age 62 (age 65 for Tier 2) or when a combination of age and creditable service equals 80 (85 with the attainment of age 60 for Tier 2), unless the member elects to withdraw the employee contribution account in lieu of a deferred retirement benefit. In addition to the eligibility listed above, the term-vested member may choose an Early Retirement (minimum age of 55 for Tier 1 and 60 for Tier 2 and minimum service of 20 yrs) subject to the same reduction – reduced by ½ of 1% per month for each month (6% per year) retirement precedes normal retirement eligibility.

Amount - An amount computed as for normal retirement.

Disability Retirement

Eligibility - Eligibility requires 10 or more years of credited service and a disability that is total and permanent.

Amount - An amount computed as for normal retirement. Disability Retirement Benefits are offset, if the combination of all employer-provided benefits exceeds 100% of the members adjusted income base, then members pension benefit from TSRS is reduced so income does not exceed the 100% maximum allowed.

Pre-Retirement Survivor Benefits

Eligibility - 5 or more years of accrued service and not eligible to retire.

Amount - Lump sum payment equal to twice the member's contributions, with interest.

Eligibility - After attaining eligibility for retirement, in the event the member dies prior to submitting an application for retirement benefits:

Amount - If the member is married, a default provision allows the member's spouse to elect to receive either a lump sum payment of twice the member's contributions account, or receive a lifetime annuity benefit determined as if the member had elected a joint & last survivor benefit of 100% survivor annuity prior to death. If the member is not married and has named a single non-spousal beneficiary, the beneficiary may elect to receive either a lump sum payment of twice the member's contributions account, or receive a 15 year annuity benefit determined as if the member elected payment of a 15 year term certain annuity. If the member has named multiple designated beneficiaries, a lump sum refund of the member's account balance will be paid to the named beneficiaries.

Draft

Other Termination Benefits

Eligibility - Termination of employment without eligibility for any other benefit.

Amount - Accumulated contributions and interest in members account at time of termination.

Employee Contributions

As of July 1, 2017, interest is credited to member accumulated contributions accounts as compound interest two times per year at an annual interest rate of 3.0%. For those hired prior to July 1, 2006, employee contributions are 5.00% of salary. For those hired between July 1, 2006 and June 30, 2011 (Tier I variable class) and for those hired after July 1, 2011 (Tier II variable class), employee contributions are 50% of the respective Normal Cost for each class, with a floor of 5.0%. The employee contributions

for the Tier I and Tier II variable classes for FY 19/20 are 6.95% and 5.33%, respectively, before application of the floor or roundup policy.

CITY CONTRIBUTIONS

City Contributions are actuarially determined; which together with employee contributions and investment earnings will fund the obligations of the System in accordance with generally accepted actuarial principles. (please refer to the Funding Policy in Section I of this report).

POST-RETIREMENT ADJUSTMENTS

The TSRS Board has established formal policies to determine whether the system shall fund an annual supplemental post-retirement benefit payment to retired members and beneficiaries.

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SECTION E

SUMMARY OF PARTICIPANT DATA

Draft

Exhibit E.1

Tucson Supplemental Retirement System

Summary of Census Data

	July 1, 2019	July 1, 2018
1. **Active Members**		
a. Counts	2,508	2,455
b. Annual Covered Payroll	$ 123,822,602	$ 118,152,118
c. Average Annual Compensation	$ 49,371	$ 48,127
d. Average Age	47.7	47.9
e. Average Service	11.5	12.0
f. Accumulated Member Contributions with Interest	$ 115,885,693	$ 119,808,187
2. **NonVested Members with Refunds Due**		
a. Counts	151	90
b. Amount of Refunds Due	$ 311,887	$ 387,996
3. **Deferred Vested Members**		
a. Counts	328	312
b. Annual Deferred Benefits	$ 3,884,542	$ 3,757,546
c. Average Benefit	$ 11,843	$ 12,043
4. **Retired Members**		
a. Counts	2,539	2,492
b. Annual Benefits	$ 68,423,050	$ 66,583,023
c. Average Benefit	$ 26,949	$ 26,719
5. **Beneficiaries**		
a. Counts	357	335
b. Annual Benefits	$ 4,512,634	$ 4,142,427
c. Average Benefit	$ 12,640	$ 12,365
6. **Disabled Retirees**		
a. Counts	148	151
b. Annual Benefits	$ 1,965,862	$ 1,998,283
c. Average Benefit	$ 13,283	$ 13,234
7. **Alternate Payees**	57	53
8. Total Members Included in Valuation	6,088	5,888

Draft

Exhibit E.2
Summary of Changes in Participant Status
During Fiscal Year 2019

	Active Participants	Terminated Vested	Terminated Non-vested	Retirees	Disabled Retirees	Beneficiaries	Alternate Payees	Total
A. Number as of June 30, 2018	2,455	312	90	2,492	151	335	53	5,888
1. Age Retirements	(95)	(16)		111				0
2. Disability Retirements	(2)				2			0
3. Deceased	(5)	(1)		(63)	(3)	(9)		(81)
5. Terminated - Deferred	(43)	45	(1)		(1)			0
6. Terminated - Due Refund	(102)		102					0
7. Cashouts	(90)	(9)	(39)					(138)
8. Rehired as Active	5	(3)	(1)	(1)				0
9. New Hires	386					32	4	422
10. Expired Benefits					(1)	(1)		(2)
11. Data Adjustments	(1)							(1)
B. Number as of June 30, 2019	2,508	328	151	2,539	148	357	57	6,088

Draft

Exhibit E.3
Active Member Counts by Age and Service
as of July 1, 2019

Age	Service							
	0-4	5-9	10-14	15-19	20-24	25-29	Over 30	Total
Under 20	7	0	0	0	0	0	0	7
20-24	59	0	0	0	0	0	0	59
25-29	132	19	0	0	0	0	0	151
30-34	123	53	14	0	0	0	0	190
35-39	132	64	51	17	0	0	0	264
40-44	108	66	66	44	16	0	0	300
45-49	87	53	81	71	89	11	0	392
50-54	78	44	62	67	85	36	6	378
55-59	66	49	63	67	56	34	27	362
60-64	45	33	51	59	59	28	27	302
65-69	16	12	11	13	8	6	17	83
Over 70	4	1	6	2	2	1	4	20
Total	857	394	405	340	315	116	81	2,508

Draft

Exhibit E.4
Active Member Average Salary by Age and Service
as of July 1, 2019

Age	Service							
	0-4	5-9	10-14	15-19	20-24	25-29	Over 30	Total
Under 20	31,866	*	*	*	*	*	*	31,866
20-24	$34,559	*	*	*	*	*	*	$34,559
25-29	36,906	45,656	*	*	*	*	*	38,007
30-34	41,372	43,520	43,735	*	*	*	*	42,145
35-39	45,168	48,505	47,143	46,167	*	*	*	46,423
40-44	42,821	44,894	46,658	53,370	56,074	*	*	46,376
45-49	44,924	47,978	51,871	52,750	53,438	50,850	*	50,289
50-54	49,882	49,069	53,498	50,294	56,273	62,241	62,823	53,273
55-59	50,194	48,364	44,456	53,097	56,997	63,915	57,836	52,396
60-64	46,786	51,070	46,738	55,403	54,251	68,528	72,343	54,688
65-69	52,978	49,868	64,921	50,022	50,310	81,678	74,393	59,852
Over 70	*	*	68,550	*	*	*	*	67,196
Total	$43,284	47,315	49,196	52,491	55,192	64,604	67,105	$49,371

Draft

**Data excluded when cell contains less than five active members.*

SECTION F

HISTORICAL SCHEDULES

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Exhibit F.1
Tucson Supplemental Retirement System
Schedule of Funding Progress
$ in thousands

Actuarial Valuation Date	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Unfunded AAL (UAAL)	Funded Ratio	Covered Payroll	UAAL as a Percentage of Covered Payroll
(1)	(2)	(3)	(4)=(3)-(2)	(5)=(2)/(3)	(6)	(7)=(4)/(6)
6/30/1991	$ 164,268	$ 175,537	$ 11,269	93.6%	$86,830	13.0%
6/30/1992	179,570	187,812	8,242	95.6%	86,205	9.6%
6/30/1993	197,282	208,024	10,742	94.8%	92,867	11.6%
6/30/1994	213,541	230,026	16,485	92.8%	94,180	17.5%
6/30/1995	237,713	249,049	11,336	95.4%	99,847	11.4%
6/30/1996	266,740	269,186	2,446	99.1%	105,230	2.3%
6/30/1997	304,684	297,490	(7,194)	102.4%	110,189	-6.5%
6/30/1998	353,057	348,966	(4,090)	101.2%	113,729	-3.6%
6/30/1999	402,875	400,224	(2,651)	100.7%	126,817	-2.1%
6/30/2000	453,954	437,750	(16,204)	103.7%	134,088	-12.1%
6/30/2001[1]	470,672	486,702	16,030	96.7%	145,059	11.1%
6/30/2001[2]	470,672	495,359	24,687	95.0%	145,059	17.0%
6/30/2002	463,102	553,947	90,845	83.6%	153,580	59.2%
6/30/2003	458,857	601,173	142,316	76.3%	143,164	99.4%
6/30/2004	494,987	645,351	150,364	76.7%	149,782	100.4%
6/30/2005	538,789	693,871	155,082	77.6%	162,149	95.6%
6/30/2006[1]	588,228	734,377	146,149	80.1%	155,855	93.8%
6/30/2006[2]	588,228	735,793	147,565	79.9%	155,855	94.7%
6/30/2007[1]	634,763	758,427	123,663	83.7%	159,250	77.7%
6/30/2007[2,3]	634,763	763,539	128,776	83.1%	159,250	80.9%
6/30/2008	650,227	822,205	171,978	79.1%	153,982	111.7%
6/30/2009	665,298	859,485	194,187	77.4%	149,925	129.5%
6/30/2010	641,819	904,480	262,662	71.0%	141,459	185.7%
6/30/2011	624,665	928,609	303,944	67.3%	121,631	249.9%
6/30/2012	597,107	940,939	343,832	63.5%	125,003	275.1%
6/30/2013	600,330	948,562	348,232	63.3%	125,858	276.7%
` 6/30/2014	655,998	1,012,393	356,396	64.8%	126,639	281.4%
6/30/2015	706,774	1,021,378	314,604	69.2%	123,415	254.9%
6/30/2016	732,927	1,030,695	297,768	71.1%	115,183	258.5%
6/30/2017	767,988	1,036,687	268,699	74.1%	117,006	229.6%
6/30/2018	803,439	1,053,987	250,548	76.2%	118,152	212.1%
6/30/2019	822,612	1,129,492	306,880	72.8%	123,823	247.8%

[1] *Before benefit changes.*
[2] *After benefit changes.*
[3] *Reflects an ad hoc pension increase.*

Draft

The funded status measure may be appropriate for assessing the need for future contributions. The funded status is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

Exhibit F.2
Tucson Supplemental Retirement System
Schedule of Employer Contributions

Fiscal Year Ended June 30,	Annual Determined Contribution	Actual City Contribution	Percentage Contributed
1996	8.55 %	8.18 %	95.67 %
1997	8.05	8.38	104.10
1998	8.05	8.38	104.10
1999	7.41	7.91	106.75
2000	6.07	7.35	121.09
2001	6.77	7.35	108.57
2002	6.30	7.35	116.67
2003	8.41	8.41	100.00
2004	11.17	11.17	100.00
2005	14.06	14.06	100.00
2006	14.83	14.83	100.00
2007	15.04	15.04	100.00
2008	15.21	15.21	100.00
2009	14.37	14.37	100.00
2010	16.84	16.84	100.00
2011	18.02	18.02	100.00
2012	23.38	23.38	100.00
2013	28.77	28.77	100.00
2014	27.09	27.09	100.00
2015	26.95	27.50	102.04
2016	27.03	27.50	101.74
2017	25.52	27.50	107.76
2018	25.78	27.50	106.67
2019	23.48	27.50	117.12
2020	21.99	N/A	N/A
2021	24.94	N/A	N/A

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Exhibit F.3
Tucson Supplemental Retirement System
Schedule of Retirees and Beneficiaries Added to and Removed from Rolls

	Added to Rolls		Removed from Rolls		Rolls End of Year				
Fiscal Year	Number	Annual Allowances	Number	Annual Allowances	Number		Annual Allowance	Average Annual Allowance	Percentage Increase in Allowance
6/30/2005	68	$3,498,948	42	$485,633	1,791	$	31,990,842	17,796	
6/30/2006	101	$2,335,032	53	$656,383	1,878	$	35,092,308	18,686	4.61%
6/30/2007	213	$6,055,096	36	$403,347	2,018	$	39,883,032	19,764	5.77%
6/30/2008	313	$10,001,857	24	$395,246	2,307	$	49,489,643	21,452	8.54%
6/30/2009	112	$2,005,399	54	$684,115	2,365	$	50,810,927	21,485	0.15%
6/30/2010	141	$3,089,275	56	$784,935	2,450	$	53,115,267	21,680	0.91%
6/30/2011	332	$9,880,306	73	$1,284,997	2,709	$	61,710,576	22,780	5.07%
6/30/2012	64	$1,084,848	69	$1,057,560	2,704	$	61,737,864	22,832	0.23%
6/30/2013	96	$2,027,292	81	$1,216,923	2,719	$	62,548,233	23,004	0.75%
6/30/2014	114	$2,635,101	69	$907,497	2,764	$	64,275,837	23,255	1.09%
6/30/2015	127	$3,157,078	82	$1,299,698	2,809	$	66,133,217	23,543	1.24%
6/30/2016	214	$5,463,524	78	$1,339,953	2,945	$	70,256,788	23,856	1.33%
6/30/2017	124	$2,912,641	95	$1,644,499	2,974	$	71,524,930	24,050	0.81%
6/30/2018	136	$3,062,324	79	$1,261,813	3,031	$	73,325,441	24,192	0.59%
6/30/2019	149	$3,665,023	79	$1,449,493	3,101	$	75,540,971	24,360	0.70%

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Exhibit F.4
Tucson Supplemental Retirement System
Comparative Schedule of Annual Pension Benefits Paid

Year Ending June 30	Retired Members	Annual Pensions	% Increase	No. of Active Per Retired	Pensions as % of Active Payroll	Average Pensions	Actuarial Present Value of Pensions	Expected Removals No.	Expected Removals Pensions
1989 [1]	780	$ 5,344,719	17.6 %	4.2 [2]	6.6 %	$ 6,852	$ 46,556,352	26.6	$ 133,860
1990	832	6,488,714	21.4	3.9	7.5	7,799	57,430,128	28.5	150,864
1991 [1]	918	8,111,103	25.0	3.5	9.3	8,836	72,419,436	29.8	172,608
1992	965	9,010,345	11.1	3.3	10.5	9,337	80,342,604	32.3	208,068
1993 [1]	989	9,704,929	7.7	3.3	10.5	9,813	85,832,484	34.3	235,068
1994	1,035	10,612,612	9.4	3.2	11.3	10,254	95,449,308	35.8	263,340
1995 [1]	1,065	11,429,402	7.7	3.1	11.4	10,732	102,511,728	35.8	270,600
1996	1,105	12,236,298	7.1	3.1	11.6	11,074	109,572,672	37.7	302,952
1997 [1]	1,156	13,391,185	9.4	3.0	12.2	11,594	119,508,312	39.4	325,440
1998	1,208	14,479,476	8.1	2.9	12.7	11,986	129,345,816	42.4	370,344
1999 [1]	1,260	15,721,865	8.6	2.8	12.4	12,478	139,805,832	44.2	402,504
2000 [1]	1,301	16,966,042	7.9	2.8	12.7	13,041	150,527,136	46.2	445,464
2001 [1]	1,355	18,505,247	9.1	2.7	12.8	13,657	161,740,968	47.1	484,776
2002 [1]	1,442	21,273,162	15.0	2.5	13.9	14,753	187,508,568	53.3	622,236
2003 [1]	1,742	29,767,500	39.9	1.9	20.8	17,088	275,193,384	58.2	742,908
2004 [1]	1,753	30,491,864	2.4	2.0	20.4	17,394	286,698,084	55.7	717,888
2005 [1]	1,793	32,027,305	5.0	2.0	19.8	17,862	298,395,396	58.3	781,152
2006 [1]	1,878	35,091,468	9.6	1.7	22.5	18,686	326,828,088	61.1	857,760
2007 [1]	2,018	39,883,032	13.7	1.6	25.0	19,764	371,497,680	66.3	977,328
2008	2,307	49,489,643	24.1	1.4	32.1	21,452	473,240,976	74.4	1,134,019
2009	2,365	50,810,927	2.7	1.3	33.9	21,485	494,923,021	63.8	994,553
2010	2,450	53,115,267	4.5	1.2	37.5	21,680	525,200,232	58.9	948,815
2011	2,709	61,710,576	16.2	1.0	50.7	22,780	614,497,202	63.5	1,059,171
2012	2,704	61,737,864	0.0	1.0	49.4	22,832	607,450,331	66.1	1,125,302
2013	2,719	62,548,233	1.3	1.0	49.7	23,004	609,558,963	69.0	1,200,744
2014	2,764	64,275,837	2.8	1.0	50.8	23,255	647,811,688	70.4	1,219,112
2015	2,809	66,133,217	2.9	0.9	53.6	23,543	661,292,061	73.7	1,301,409
2016	2,945	70,256,788	6.2	0.8	61.0	23,856	699,577,704	75.9	1,392,573
2017	2,974	71,524,930	1.8	0.8	61.1	24,050	706,495,829	77.4	1,457,270
2018	3,031	73,325,441	2.5	0.8	62.1	24,192	716,751,118	80.8	1,555,043
2019	3,101	75,540,971	3.0	0.8	61.0	24,360	774,206,327	78.3	1,550,696

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[1] *Includes ad-hoc cost-of-living increases.*
[2] *Reflects increase in the number of active members as a result of an amendment which eliminated the one year service requirement for participation in the Retirement System.*

Exhibit F.5
Tucson Supplemental Retirement System
Solvency Test

Valuation Date	Aggregate Accrued Liabilities For (1) Active Member Contributions	(2) Retirants and Beneficiaries	(3) Active Member (Employer Financed Portion)	Valuation Assets	Portion of Accrued Liabilities Covered by Reported Assets (1)	(2)	(3)
6/30/1991	$ 44,496,039	$ 72,419,436	$ 86,372,322	$164,268,134	100.0 %	100.0 %	54.8 %
6/30/1992	49,238,019	80,342,604	86,902,648	179,569,858	100.0	100.0	57.5
6/30/1993	55,146,786	85,832,484	98,492,344	197,281,861	100.0	100.0	57.2
6/30/1994	60,424,161	95,449,308	105,838,311	213,540,661	100.0	100.0	54.5
6/30/1995	66,316,408	102,511,728	113,211,848	237,712,863	100.0	100.0	60.8
6/30/1996	72,294,235	109,572,672	118,739,900	266,740,007	100.0	100.0	71.5
6/30/1997	78,991,358	119,508,312	128,878,531	304,684,444	100.0	100.0	82.4
6/30/1998	85,106,175	129,345,816	134,514,294	353,056,577	100.0	100.0	103.0
6/30/1999	92,367,491	139,805,832	168,050,794	402,875,158	100.0	100.0	101.6
6/30/2000	100,413,022	150,527,136	186,809,583	453,953,722	100.0	100.0	108.7
6/30/2001	108,696,394	161,740,968	224,921,223	470,671,667	100.0	100.0	89.0
6/30/2002	118,913,979	187,508,568	247,524,186	463,101,526	100.0	100.0	63.3
6/30/2003	110,195,709	275,193,384	215,784,329	458,856,831	100.0	100.0	34.0
6/30/2004	123,643,527	286,698,084	235,009,321	494,986,798	100.0	100.0	36.0
6/30/2005	135,346,297	298,395,396	260,129,138	538,788,828	100.0	100.0	40.4
6/30/2006	140,387,532	326,828,088	268,577,863	588,227,845	100.0	100.0	45.1
6/30/2007	136,028,896	371,497,680	256,012,354	634,763,193	100.0	100.0	49.7
6/30/2008	125,331,432	473,240,976	223,632,380	650,227,215	100.0	100.0	23.1
6/30/2009	133,633,947	494,923,021	230,928,190	665,298,494	100.0	100.0	15.9
6/30/2010	140,224,998	525,200,232	239,055,106	641,818,551	100.0	95.5	0.0
6/30/2011	119,049,097	614,497,202	195,062,492	624,664,880	100.0	82.3	0.0
6/30/2012	122,240,396	607,450,331	211,247,995	597,106,511	100.0	78.2	0.0
6/30/2013	138,342,388	609,558,963	200,661,102	600,330,066	100.0	75.8	0.0
6/30/2014	142,418,791	647,811,688	222,162,858	655,997,802	100.0	79.3	0.0
6/30/2015	143,648,835	661,292,061	216,436,668	706,773,630	100.0	85.2	0.0
6/30/2016	133,200,540	699,577,704	197,916,702	732,926,710	100.0	85.7	0.0
6/30/2017	133,917,363	706,495,829	196,274,125	767,988,402	100.0	89.7	0.0
6/30/2018	138,420,705	716,751,118	198,815,201	803,439,269	100.0	92.8	0.0
6/30/2019	135,645,102	774,206,327	219,640,471	822,611,897	100.0	88.7	0.0

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SECTION G

ACTUARIAL ASSUMPTIONS AND METHODS

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SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS

I. Valuation Date

The valuation date is July 1st of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. Actuarial Cost Method

The actuarial valuation uses the Entry Age Normal actuarial cost method. Under this method, the employer contribution rate is the sum of (i) the employer normal cost rate, and (ii) a rate that will amortize the unfunded actuarial liability.

1. The valuation is prepared on the projected benefit basis. The present value of each participant's expected benefit payable at retirement or termination is determined, based on age, service, sex, compensation, and the interest rate assumed to be earned in the future (7.00%). The calculations take into account the probability of a participant's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his terminating with a service benefit. Future salary increases are also anticipated. The present value of the expected benefits payable on account of the active participants is added to the present value of the expected future payments to retired participants and beneficiaries to obtain the present value of all expected benefits payable from the Plan on account of the present group of participants and beneficiaries.

Draft

2. The employer contributions required to support the benefits of the Plan are determined following a level funding approach, and consist of a normal cost contribution and an accrued liability contribution.

3. The normal contribution is determined using the Entry Age Normal method. Under this method, a calculation is made to determine the average uniform and constant percentage rate of employer contribution which, if applied to the compensation of each new participant during the entire period of his anticipated covered service, would be required in addition to the contributions of the participant to meet the cost of all benefits payable on their behalf. Effective July 1, 2013 the TSRS funding policy requires the computation of normal cost separately for those members in Tier 1 and Tier 2 (the variable rate tiers).

4. The unfunded accrued liability contributions are determined by subtracting the actuarial value of assets from the actuarial accrued liability and amortizing the result over 20 years from the valuation date as a level percentage of pay. It is assumed that payments are made throughout the year.

5. Administrative expenses for the recent year will be added to the employer normal cost in the current valuation and will be reflected in the recommended employer rate for the upcoming fiscal year.

III. Actuarial Value of Assets

The actuarial value of assets is based on recognizing gains and losses over a five-year period where gains and losses are determined by comparing the projected market value return (based on the prior year's market value of assets, cash flows during the year and expected investment returns on those amounts) to the actual market investment return.

IV. Actuarial Assumptions

A. Economic Assumptions

1. Investment return: 7.00% per annum, compounded annually, composed of an assumed 2.50% inflation rate and a 4.50% real rate of return. This rate represents the assumed return, net of all investment expenses.

2. Salary increase rate:

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Sample Attained Service	Percentage Increase in Salary with Less than Five Years of Service		
	Merit/ Productivity	Inflation	Total
0	3.50 %	2.50 %	6.00 %
1	3.50	2.50	6.00
2	3.00	2.50	5.50
3	2.75	2.50	5.25
4	2.50	2.50	5.00

Sample Attained Age	Percentage Increase in Salary with Five or More Years of Service		
	Merit/ Productivity	Inflation	Total
25	3.00 %	2.50 %	5.50 %
30	2.75	2.50	5.25
35	2.40	2.50	4.90
40	1.70	2.50	4.20
45	1.10	2.50	3.60
50	0.75	2.50	3.25
55	0.50	2.50	3.00
60	0.50	2.50	3.00
65	0.50	2.50	3.00

3. Payroll growth rate: In the amortization of the unfunded actuarial accrued liability, payroll is assumed to increase 3.00% per year. This increase rate is primarily due to the effect of inflation on salaries, with no allowance for future membership growth.

B. Demographic Assumptions

1. Mortality rates – Healthy Pre-Retirement Mortality RP-2014 Employee Mortality Tables projected with the ultimate rates of the MP-2018 projection scale. Healthy Post-Retirement Mortality RP-2014 Healthy Annnuitant Mortality Tables projected with the ultimate rates of the MP-2018 projection scale. Disabled Mortality RP-2014 Disabled Mortality Tables projected with the ultimate rates of the MP-2018 projection scale. Mortality rates were adjusted to include margin for future mortality improvement as described in the table name above. Sample 2019 rates shown below:

Sample Attained Ages	Probability of Death Pre-Retirement	
	Men	Women
20	0.04 %	0.02 %
25	0.05	0.02
30	0.04	0.02
35	0.05	0.03
40	0.06	0.04
45	0.09	0.06
50	0.16	0.10
55	0.27	0.16
60	0.45	0.23
65	0.79	0.35
70	1.32	0.60
75	2.21	1.02
80	3.69	1.75
85	7.19	4.49
90	13.12	9.86

Sample Attained Ages	Probability of Death Post-Retirement	
	Men	Women
20	0.04 %	0.02 %
25	0.06	0.03
30	0.08	0.06
35	0.12	0.10
40	0.17	0.14
45	0.26	0.20
50	0.39	0.26
55	0.55	0.34
60	0.74	0.49
65	1.05	0.77
70	1.59	1.22
75	2.55	1.99
80	4.25	3.31
85	7.37	5.75
90	12.97	10.22

Sample Attained Ages	Probability of Death Post-Disability	
	Men	Women
20	0.05 %	0.02 %
25	0.19	0.08
30	0.47	0.22
35	0.82	0.40
40	1.21	0.63
45	1.60	0.87
50	1.94	1.13
55	2.22	1.38
60	2.53	1.62
65	3.01	1.98
70	3.84	2.68
75	5.16	3.90
80	7.29	5.80
85	10.78	8.60
90	16.51	12.66

Draft

3. Disability rates. Sample rates shown below:

Sample Attained Ages	Probability of Disablement Next Year	
	Men	Women
25	0.01 %	0.01 %
30	0.07	0.07
35	0.09	0.09
40	0.14	0.14
45	0.17	0.17
50	0.25	0.25
55	0.36	0.36
60	0.48	0.48

4. Termination rates (for causes other than death, disability or retirement): Termination rates are based on service and age. Termination rates are not applied after a member becomes eligible for a retirement benefit. Rates are shown:

Draft

Sample Attained Age	Years of Credible Service	Probability of Termination
Any	0	19.00 %
	1	14.00
	2	11.00
	3	9.00
	4	9.00
20	5 & over	7.40
25		7.40
30		6.98
35		4.88
40		3.83
45		3.10
50		2.68
55		2.57

5. Forfeiture rates: The percentages below represent the probability that a vested terminated member will take a refund of contributions rather than receive a deferred annuity benefit.

Sample Ages	% of Vested Terminating Members Choosing Refund at Termination
Under 30	50 %
30	45
35	40
40	35
45	30
50	25
55	20
60 and Over	0

6. Retirement rates for Tier 1. For those ages 62+, the Rule of 80 retirement rates only applies if the Rule of 80 is attained by age 62.

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Attained Age	Tier 1 Members Percentage of Those Eligible Retiring During the Year		
	Rule of 80	Age Based	Early
50-54	24.0 %		
55-59	24.0		6.0 %
60	24.0		
61	24.0		
62	24.0	33.0 %	
63-65	24.0	18.0	
66	24.0	40.0	
67-69	24.0	30.0	
70 & Over	100.0	100.0	

Retirement rates for Tier 2. For those ages 65+, the Rule of 85 retirement rates only applies if the Rule of 85 is attained by age 65.

Attained Age	Tier 2 Members Percentage of Those Eligible Retiring During the Year		
	Rule of 80	Age Based	Early
60	24.0 %		6.0 %
61	24.0		6.0
62	24.0		6.0
63	24.0		6.0
64	24.0		6.0
65	24.0	18.0 %	
66	24.0	40.0	
67-69	24.0	30.0	
70 & Over	100.0	100.0	

Deferred vested members are assumed to retire at age first eligibility for unreduced benefits.

Draft

C. Other Assumptions

1. Percent married: 80% of employees are assumed to be married.
2. Age difference: Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.
3. Cost of living adjustment: None.
4. Optional forms: Members are assumed to elect the normal form of benefit.
5. Current and future deferred vested participants are assumed to retire at the earlier of age 62 and eligibility for rule of 80 for tier 1 and the earlier of age 65 and eligibility for the rules of 85 (but at least 60) for Tier 2.
6. Administrative expenses: Administrative expenses are added to the employer normal cost , before application of the round up policy.
7. Pay increase timing: End of year.
8. Decrement timing: Decrements of all types are assumed to occur mid-year.
9. Eligibility testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

10. Decrement relativity: Decrement rates are used directly, without adjustment for multiple decrement table effects.

11. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.

12. Benefit and Eligibility Service due to Accrued Sick and Vacation Leave at Retirement and Termination: Tier 1 Members are assumed to have an additional 0.019 years per year of benefit and eligibility service at early or normal retirement and termination due to accrued sick and vacation leave. This assumption was developed using sick and vacation leave and service amounts for active members included in the actuarial valuation as of June 30, 2013.

Draft

SECTION H

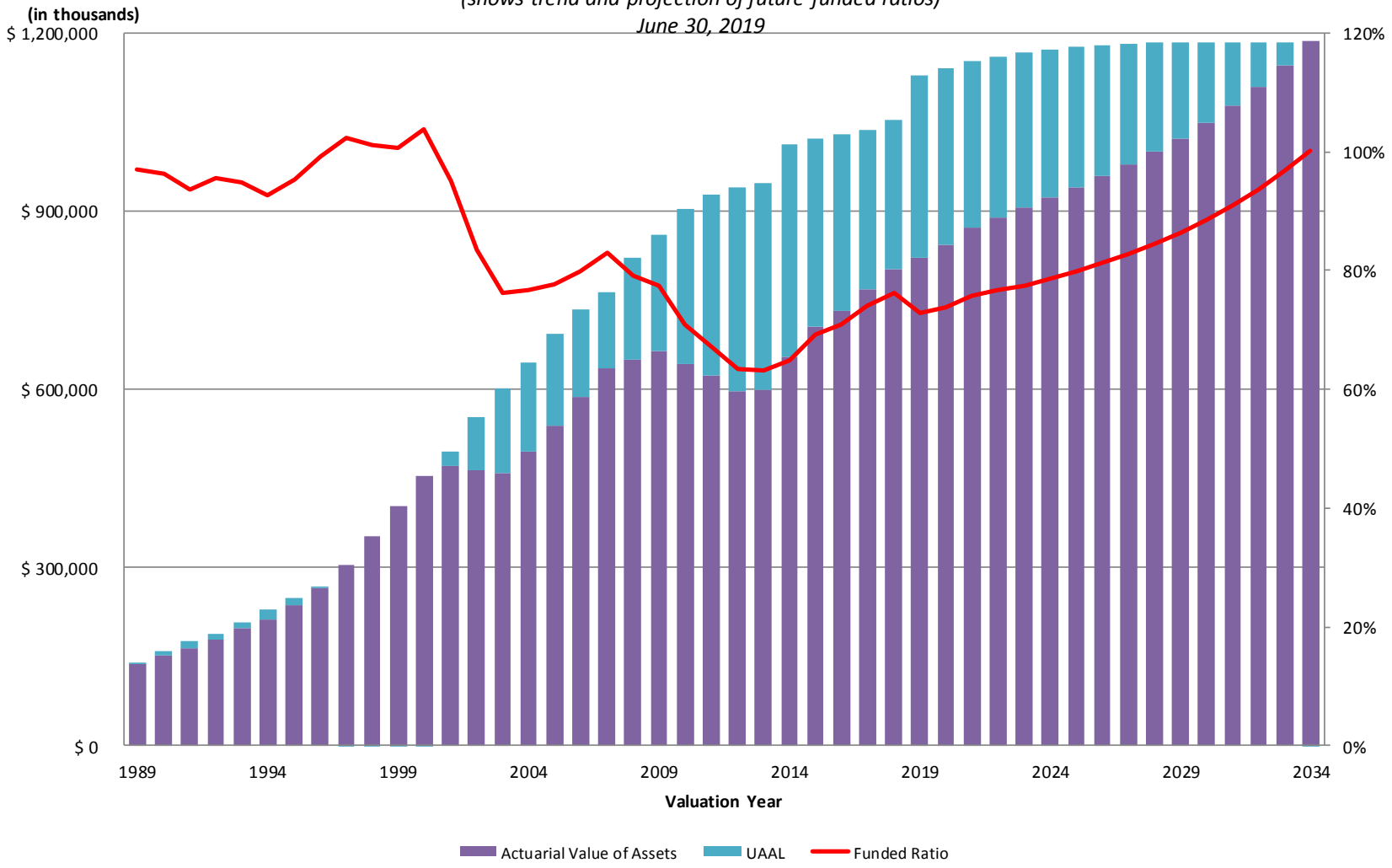
30-YEAR DETERMINISTIC PROJECTIONS

Draft

Tucson Supplemental Retirement System
Historical and Projected Funding Results

(shows trend and projection of future funded ratios)

June 30, 2019



Funding policy reflects 27.50% of pay minimum City contribution until full funding is reached.

SECTION I

FUNDING POLICY OF THE TSRS BOARD

Draft

Basis for variable employee contribution rates

Effective July 1, 2013 the contribution requirement for members hired after July 1, 2006 was changed from 40% of the Actuarial Required Contribution (or "ARC," as defined below) to a range of 50% to 100% of the normal cost of their given tier. In no event shall the variable contribution tier members contribute less than 5% of pay as set forth in TCC §22-34(a) and (b). Members hired prior to 7/1/2006 contribute 5% of pay.

Amortization Policy

The Board has adopted a 20 year open, level percent of pay amortization policy. A single unfunded amount is determined with each actuarial valuation, and that amount is then amortized over a 20 year period, assuming that the contribution amounts will remain level as a percent of the total payroll (so the dollar amount of the contribution is assumed to grow each year). The Board's amortization policy was most recently revised effective July 1, 2013, and later updated effective June 30, 2016.

Administrative Expenses

The annual administrative expenses incurred by the System, based on the administrative operating budget approved by the Board in advance of the fiscal year and determined as of the end of the fiscal year, shall be included in the calculation of the Actuarially Determined Contribution in accordance with sound actuarial principles. Administrative expenses paid by the System and included in the calculation of the ADC shall be reasonable and appropriate, and shall include staff salaries and related overhead expenses, actuarial, legal and other professional consulting fees, accounting charges, compliance expenses, and other fees and expenses necessary for the efficient administration of the System. Investment fees and expenses shall not be included in the calculation of the ADC.

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Contribution Rounding Policy

I. Member Contribution Rates: Member Contributions for Legacy Members, Tier I Members and Tier II Members shall be determined by the TSRS actuary pursuant to TCC Section 22-34: members hired prior to July 1, 2006 (the "Legacy Members"), members hired between July 1, 2006 and June 30, 2011 ("Tier I Members") and members hired on or after July 1, 2011 ("Tier II Members"). The actuarially determined Member Contribution rate for each group shall be referred to as the "Calculated Rate" for the applicable group.

   The Board will then review the Calculated Rate for each member group and set the "Charged Rate" for the upcoming fiscal year. The Charged Rate will equal the Calculated Rate, rounded up to the nearest 0.25. The Charged Rate for a member group shall never be less than the Calculated Rate for that member group (for that same fiscal year). The Charged Rate for the legacy members is set at 5.00%.

II. City Contribution Rates: The City Contribution rate for a particular fiscal year equals the difference between the Actuarially Determined Contribution and the Member Contribution rate(s). TCC §22-30(t).

Because there are three different Member Contribution rates, the TSRS actuary shall calculate a City Contribution rate for each member group and a blended City Contribution rate for the entire member population. In no event shall the blended City Contribution rate for the entire member population be less than the City Contribution rate for any member group. The City Contribution rates calculated by the TSRS actuary are referred to as the "Calculated Rates."

The Board will then review the Calculated Rates and set the "Charged Rate" for the City Contribution for the upcoming fiscal year. The Charged Rate will equal the blended Calculated City Contribution rate, rounded up to the nearest 0.50. The Charged Rate shall be rounded up to the nearest 0.50 instead of the nearest 0.25 because the Charged Rate is a blended rate. The Charged Rate shall never be less than the Calculated Rate for any member group for that same fiscal year.

III. Funded Status of TSRS: It is the goal of the Board to increase the funded status of TSRS. The Board anticipates that Calculated Rates for both Member Contributions and City Contributions may decrease from time to time, based on various actuarial factors. The Board will not recommend a decrease in the Charged Rate for Member and/or City Contributions until such point as TSRS is fully funded because the unfunded accrued liability has been extinguished, and the Calculated Rates for Member and City Contributions represent the payment of the normal cost of benefits only. Moreover, the Board shall recommend a decrease in the Charged Rates for Member Contributions only to the extent that the Charged Rates for Tier I Member Contributions and Tier II Member Contributions decrease simultaneously, in the same percentage of pay.

Draft

SECTION J

RISKS ASSOCIATED WITH MEASURING THE ACCRUED LIABILITY

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Risks Associated With Measuring the Accrued Liability and Actuarially Determined Contribution

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

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

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

Draft

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

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the

plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The computed contribution rate shown on Exhibit B.4 may be considered as a minimum contribution rate that complies with the Board's funding policy. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	June 30, 2019	June 30, 2018
Ratio of the market value of assets to total payroll	6.8	7.0
Ratio of actuarial accrued laibility to payroll	9.1	8.9
Ratio of actives to retirees and beneficiaries	0.8	0.8
Ratio of net cash flows to market value of assets	-5%	-5%
Duration of the actuarial accrued liability	10.6	10.0

Draft

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 4.0 times the payroll, a return on assets 5% different than assumed would equal 20% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 5.5 times the payroll, a change in liability 2% other than assumed would equal 11% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Ratio of Actives to Retirees and Beneficiaries

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

Ratio of Net Cash Flow to Market Value of Assets

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

Duration of Actuarial Accrued Liability

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return were lowered 1%.

Additional Risk Assessment

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

Draft

Callan

November 15, 2019

Tucson Supplemental Retirement System

Active versus Passive Management in Core Fixed Income

Gordie Weightman, CFA
Senior Vice President

Paul Erlendson
Senior Vice President

Overview

- TSRS has a 27% target allocation to fixed income, which ranks 47th percentile versus other public defined benefit plans.
- The fixed income portfolio is invested equally in two mandates: one active and one passive
  - PIMCO manages a custom separate account portfolio with a benchmark of 25% mortgages, 25% investment grade credit, 25% high yield and 25% emerging markets debt.
  - BlackRock is passively managed to the Bloomberg Barclays U.S. Aggregate Bond Index

Role of Fixed Income

- Fixed income is typically a low-risk, diversifying asset for the equity allocation rather than a primary source of additional return
  - Bonds offer protection in the short run
  - Dependable income provides comfort in economic downturns or sudden market corrections
- The fixed income allocation is the primary diversifier for the current exposure to public equities
- How should fixed income be structured to fulfill competing goals of safety, diversification, liquidity, and returns?
  - Government securities provide the best liquidity and downside protection
  - Credit is riskier than government securities, but historically produces relatively higher returns and may provide diversification
    - *The lowest quality credit has the highest volatility and correlation with equity markets*
  - Duration
    - *The Bloomberg Barclays Aggregate Index has extended duration, or heightened interest rate risk*
  - Global
    - *Provides a larger and more diverse opportunity set*

Active Investing in Fixed Income

Pros and Cons

Core: Attempts to add modest amounts of value over the return of the Bloomberg Aggregate index with a limited amount of tracking error

- Pros
  - Expectation of value added by modest interest rate, sector, and security management
  - Low tracking error
- Cons
  - Active core managers can underperform during times of equity market stress due to low Treasury and Government allocations

Core Plus: Attempts to add value over the index with relatively high tracking error due in part to the use of non-index securities such as high yield credit, emerging markets debt and global bonds

- Pros
  - Managers have generally added value over the index net of fees
  - Use tactical allocation to non-index securities when their valuations make them attractive
  - Portfolios tend to have higher yields than the index
- Cons
  - Higher tracking error may not be consistent with risk tolerance of fixed income investors
  - Non-index securities tend to have higher correlations to equities limiting the amount of overall portfolio diversification
  - Correlations can increase during equity downturns

Passive Investing in Fixed Income

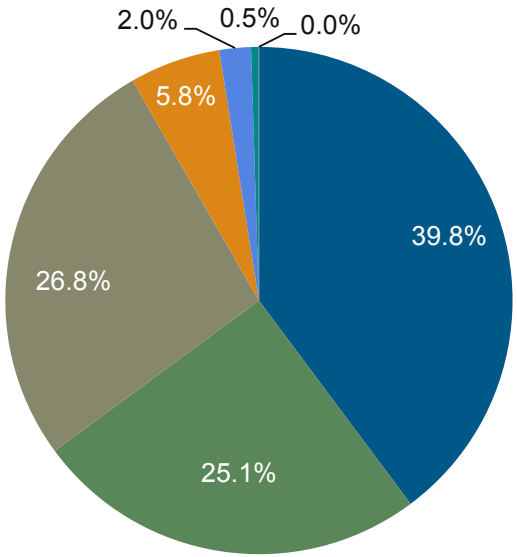
Pros and Cons

- Passive core: replicates the return of the underlying index
- Pros
  - Virtually no tracking error
  - Low cost
  - Large Treasury allocation expected to perform well when equities perform poorly
  - Provides liquidity for cash flows, rebalancing, and transitions
  - Simple to monitor
- Cons
  - Lacks the potential to add value over the index
  - Large Treasury allocation likely to be a drag on returns in normal markets due to low yields

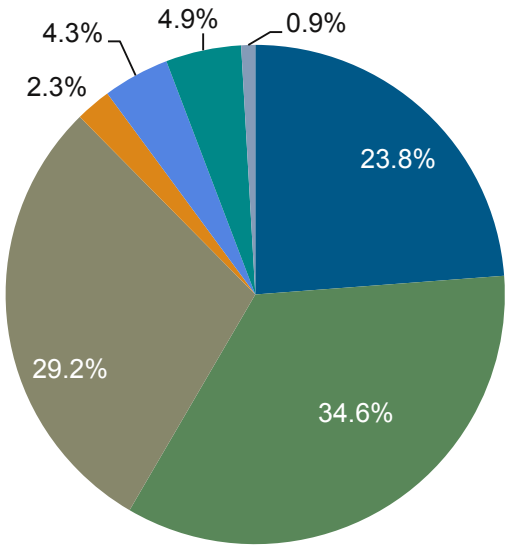
Active vs. Passive Sector Exposure

As of September 30, 2019

Bloomberg Aggregate Index



Callan Core Bond Fixed Income Peer Group Average



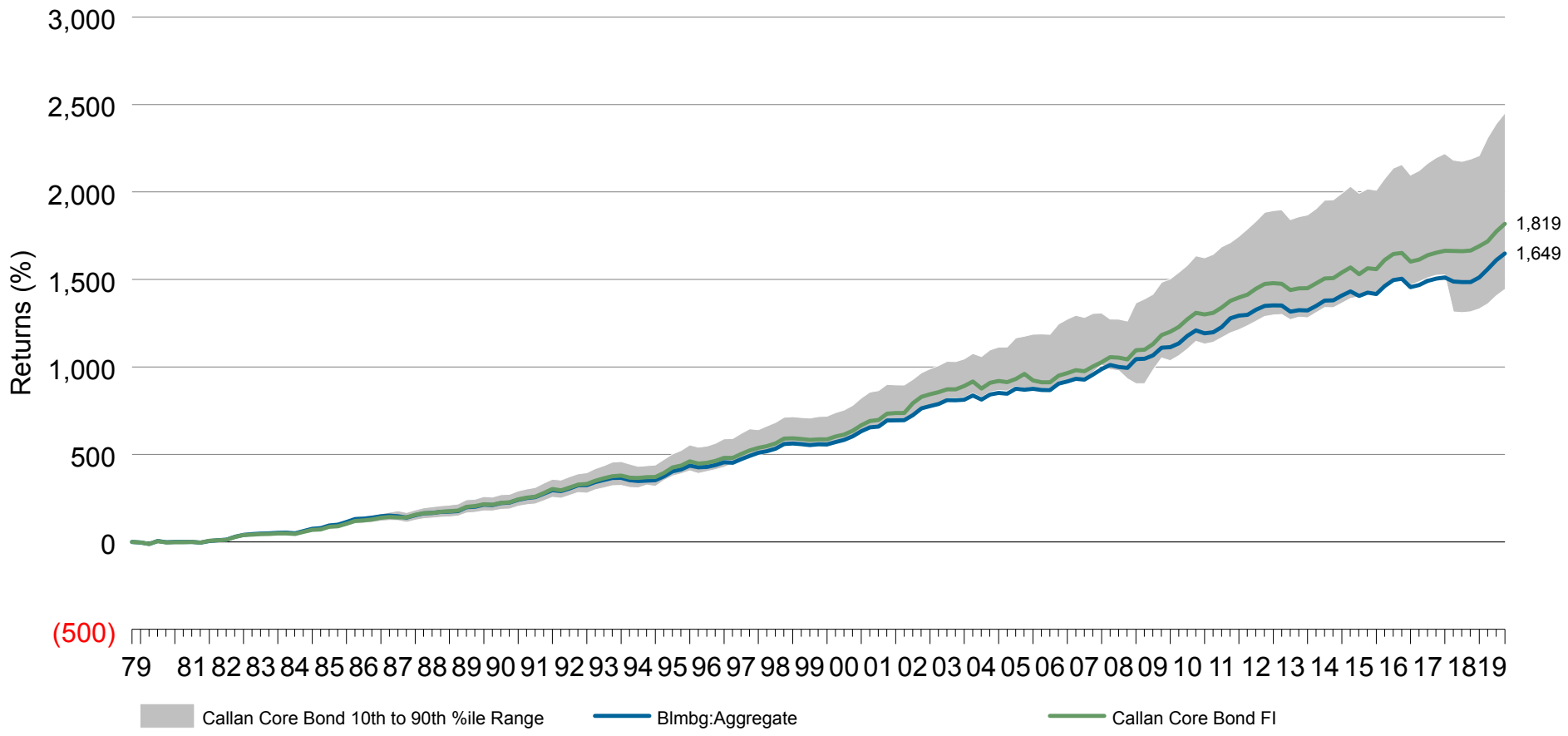
U.S. Treasuries | Corporate | Agency RMBS | Gov't Related | CMBS | Asset Backed | Other

- Active core fixed income managers generally invest in more credit sensitive sectors in lieu of Treasuries.

Cumulative Returns of Core Fixed Income

Passive Index vs. Active Peer Group

Returns for 40 Years Ended September 30, 2019

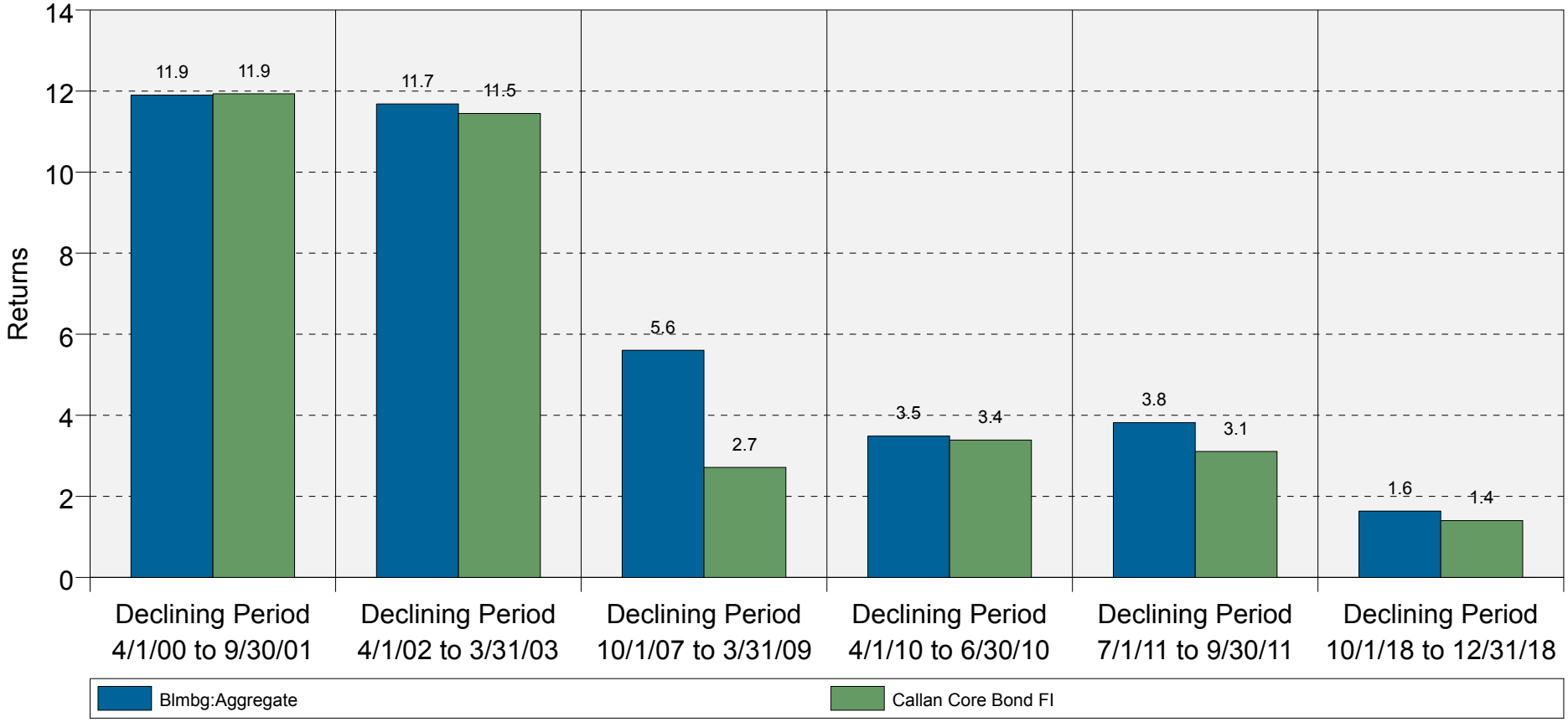


- Actively managed core bond strategies have historically outperformed the Bloomberg Aggregate Index.

Callan Core Bond FI represents the cumulative return of the median manager in the peer group during each of the 145 cumulative periods measured

Fixed Income Returns During Declining Equity Periods

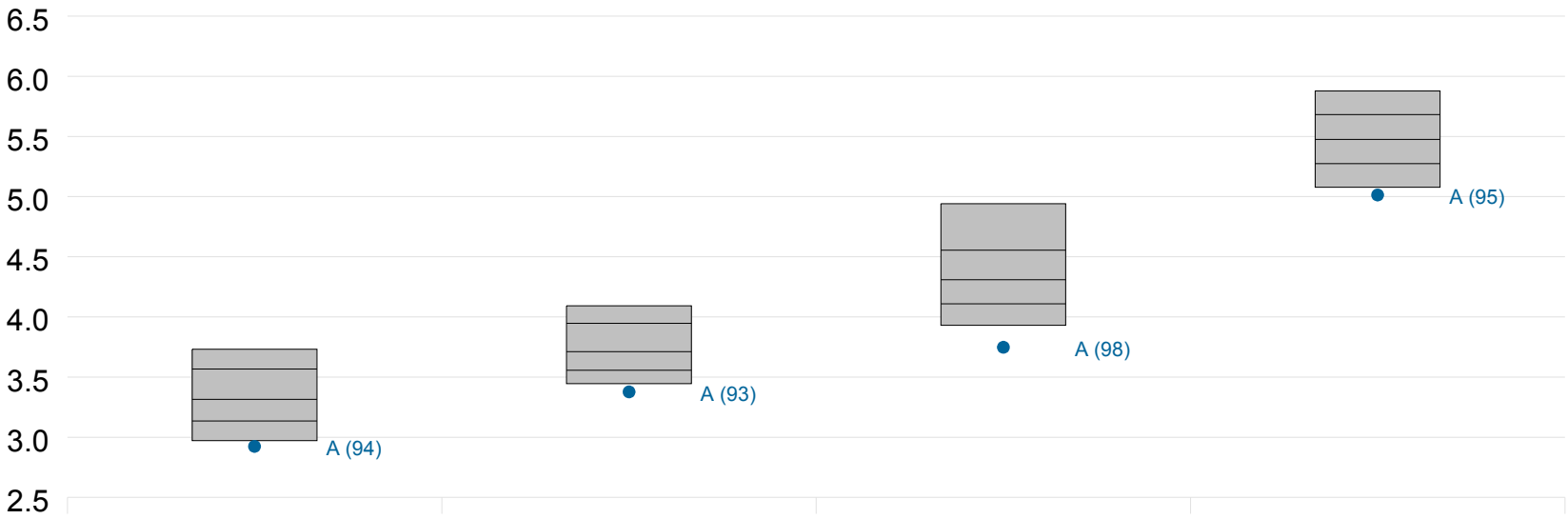
Returns During Domestic Equity Declining Periods 20 Years Ended September 30, 2019



- Active core bond fixed income managers tend to take more credit risk, and therefore underperform the passive index during times of equity market dislocation.
- However, active managers still provide protection and diversification in down equity markets.

Passive Benchmark Compared to Active Core Bond Manager Peer Group

Returns for Periods Ended September 30, 2019 Group: Callan Core Bond Fixed Income



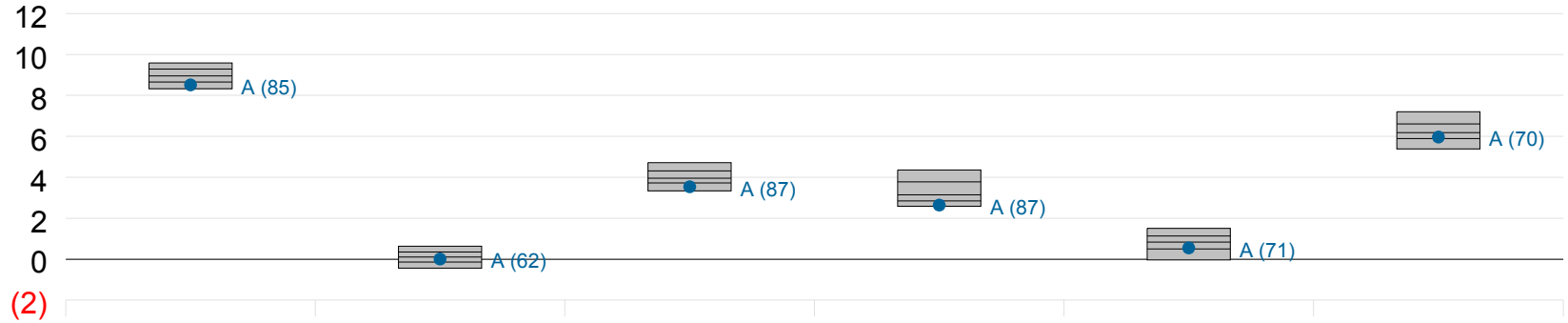
	Last 3 Years	Last 5 Years	Last 10 Years	Last 20 Years
10th Percentile	3.73	4.09	4.94	5.88
25th Percentile	3.57	3.95	4.56	5.68
Median	**3.32**	**3.71**	**4.31**	**5.48**
75th Percentile	3.14	3.56	4.11	5.27
90th Percentile	2.97	3.45	3.93	5.08
Blmbg:Aggregate ● A	2.92	3.38	3.75	5.01

- Most active core bond managers have demonstrated their ability to outperform the index over multiple time periods.

Passive Benchmark Compared to Active Core Bond Manager Peer Group

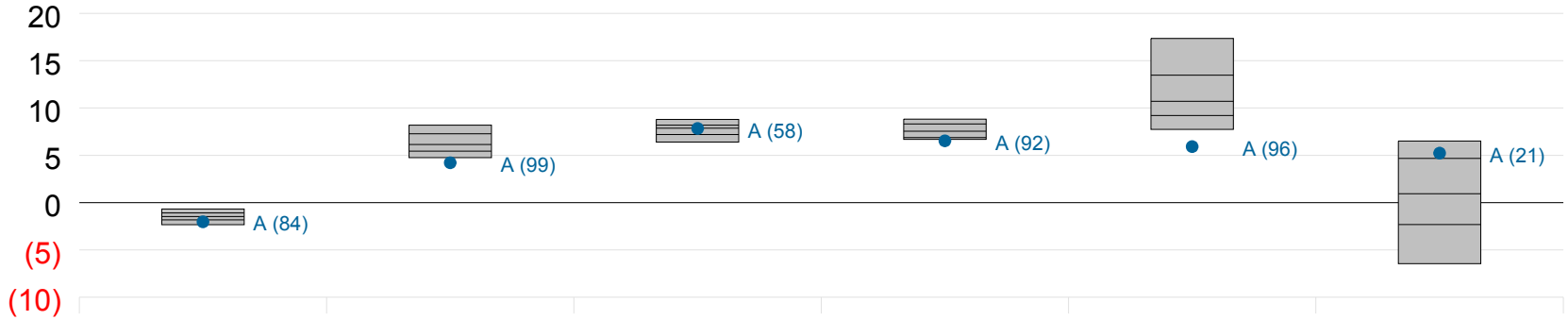
Calendar Year Returns vs. Callan Core Bond Peer Group

Calendar Year Returns from 2014 to YTD 2019



	3 Qtrs. 2019	2018	2017	2016	2015	2014
Median	8.95	0.11	3.96	3.14	0.84	6.19
Blmbg:Aggregate ● A	8.52	0.01	3.54	2.65	0.55	5.97

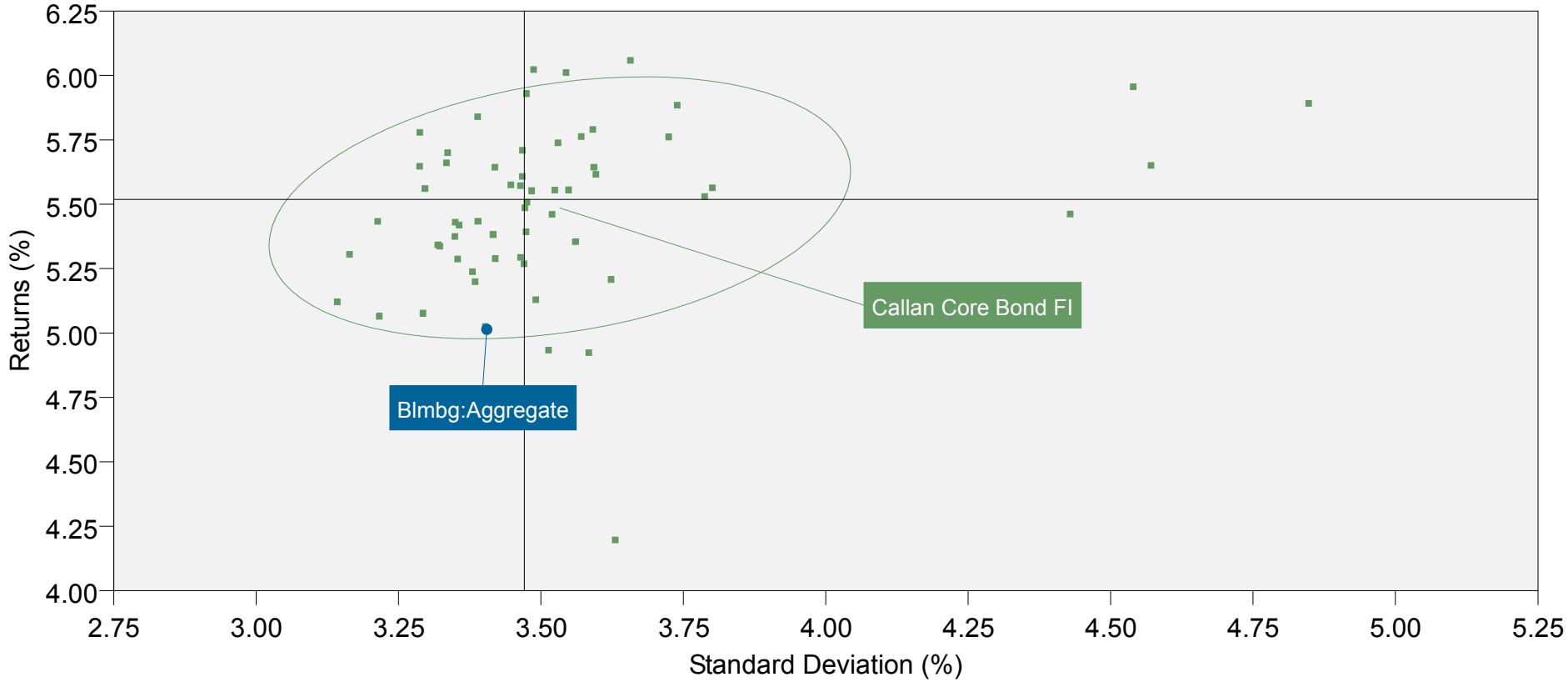
Calendar Year Returns from 2008 to 2013



	2013	2012	2011	2010	2009	2008
Median	(1.47)	6.16	7.87	7.56	10.71	0.96
Blmbg:Aggregate ● A	(2.02)	4.21	7.84	6.54	5.93	5.24

Risk vs Reward of Fixed Income Strategies

Scatter Chart for 20 Years Ended September 30, 2019



- The Bloomberg Aggregate Index has produced a lower return with slightly lower volatility than the median member in the Callan Core Bond FI peer group.

The cross hairs represent the median manager in the Callan Core Bond FI peer group

Characteristics and Performance Statistics

Characteristics as of September 30, 2019

	Effective Yield	Effective Duration	Quality Rating	Wtd. Average Life
Blmbg:Aggregate	2.26	5.78	AA+	7.92
Callan Core Bond FI	2.46	5.78	AA	7.84

Trailing 20-Year Statistics as of September 30, 2019

	Returns	Standard Deviation	Sharpe Ratio	Correlation	Max Drawdown
Blmbg:Aggregate	5.01	3.41	0.94	(0.10)	(3.83)
Callan Core Bond FI	5.52	3.47	1.06	(0.04)	(4.83)

Correlation is measured against the S&P 500

- Core fixed income strategies tend to take on additional credit risk compared to the Bloomberg Aggregate. This is evidenced by the slightly lower quality rating (AA for the peer group versus AA+ for the index).

- As a result of the modestly higher credit risk, active core bond strategies have been compensated with higher returns at slightly higher volatility levels, resulting in a higher Sharpe Ratio overall.
  - The max drawdown of active strategies is higher than the index, as is the correlation to equities

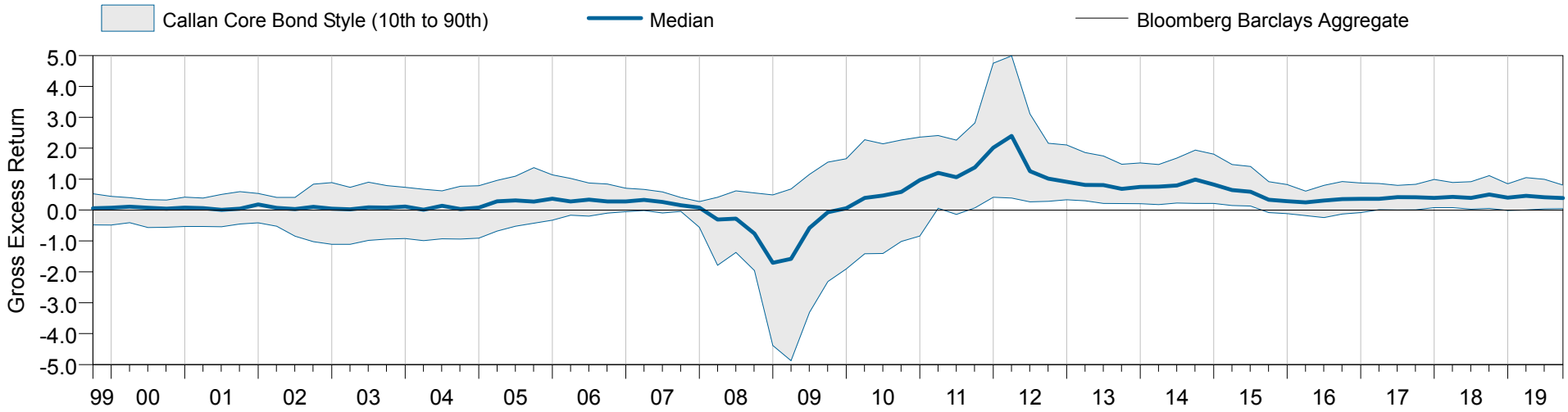
Core Bond Style vs. Bloomberg Barclays Aggregate

How often Manager Beat Benchmark by more than Fee Hurdle in Rolling 3-Year Periods over last 20 Years

Fee Hurdle	0.20%	0.25%	0.30%	0.35%	0.40%	0.45%	0.50%	0.55%	0.60%	0.65%
Median	61%	61%	51%	45%	35%	29%	26%	25%	23%	23%
45th Percentile	63%	63%	59%	53%	48%	34%	31%	29%	28%	25%
40th Percentile	73%	65%	61%	59%	54%	46%	38%	30%	28%	28%
35th Percentile	81%	74%	69%	60%	58%	53%	50%	39%	34%	28%
30th Percentile	88%	80%	74%	65%	61%	58%	55%	53%	44%	40%
25th Percentile	93%	86%	80%	74%	69%	65%	61%	59%	54%	49%

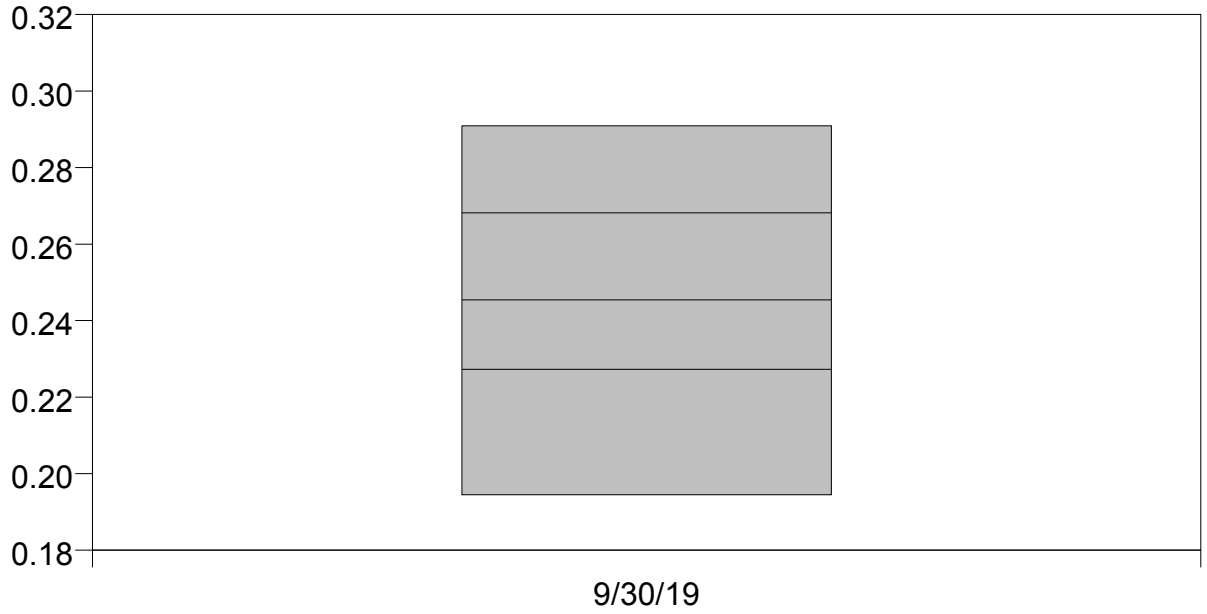
Average Annualized 3-Year Excess Return (gross) – Median Manager: 0.34%

Rolling 3-Year Gross Excess Return relative to Bloomberg Barclays Aggregate for 20 Years ended September 30, 2019



Active Management Fees for Core Bond Mandates

Effective Annual Fee for a $110,000,000 Mandate for Periods Ended September 30, 2019
Group: Callan Core Bond Fixed Income



	9/30/19
10th Percentile	0.29
25th Percentile	0.27
Median	**0.25**
75th Percentile	0.23
90th Percentile	0.19

- The median fee for a $110 million active core bond separate account mandate is 0.25%; the range is 0.19% - 0.29%.
- TSRS currently pays BlackRock 0.06% to run the Bloomberg Barclays Index strategy.

Callan

Callan LLC
600 Montgomery Street, Suite 800
San Francisco, CA 94111
Main 415.974.5060

www.callan.com

Memorandum

To: Tucson Supplemental Retirement System ("TSRS")
From: Callan Real Assets Consulting
CC: Paul Erlendson, Gordie Weightman
Date: November 1, 2019
Subject: TSRS Infrastructure Portfolio Update

Existing TSRS Infrastructure Portfolio

Callan has been monitoring TSRS's closed end infrastructure portfolio and in regular contact with the two managers: Steel River and Macquarie. Guidance received by Callan from both managers is that TSRS can expect significant proceeds to be returned before year-end 2019 from asset sales, although two large assets have not completed their sale process and may require more time. Furthermore, it will take a few more years for the managers to complete the wind-down of those funds.[1]

The table below shows the June 30, 2019 NAV for TSRS's investment in both funds.

Fund	NAV	Liquidity Expected
Macquarie European Infrastructure	$12,707,974 TSRS Portfolio: 1.52%	• 90% of NAV to be returned in Q4 2019, following sale of Brussels Airport. • Fund completion and remainder of value expected by 2021, barring no delays from sale of last small asset.
Steel River Infrastructure	$26,255,691 TSRS Portfolio: 3.14%	• Significant sale and distribution activity expected in 2H 2019, circa 30% of NAV. Last asset ("Peoples Gas") representing ~65% of NAV is pending sale. The asset could be sold in Q4 2019 and proceeds returned in early 2020 (subject to any escrow / closing capital requirements). • The fund could be completed and all value distributed by 2021 with the current sale process. Any delay in this sale process could extend fund life by one to three or more years.

Open-End Infrastructure Funds: Commitments and Capital Deployment Expectations

Callan has spoken with TSRS about adding open-end infrastructure fund(s) to maintain its exposure to the sector. These kind of perpetual vehicles are common in the institutional real estate sector (e.g. TSRS' existing JP Morgan real estate fund investments) and allow investors to maintain exposure to a diversified portfolio of investments over a long time horizon. This helps the investor maintain their allocation (without the reinvestment risk of entering/exiting closed end funds), collect periodic income and benefit from long-term appreciation in the portfolio. Investors can choose to collect, or reinvest, the periodic income. Investors can exit these funds by registering their interest with the fund manager, who manages in-bound and out-bound investor activity. Investors who commit to an open-end infrastructure fund can expect to wait for six to eighteen months following commitment before their capital is called. Infrastructure transactions are large in size and the managers' deal pipeline can be 'lumpy'.

[1] All closed-end funds specify a fund life as part of their fund structure (typically 10 or 12 years), however these fund lives are often extended for an additional one to two (or more years). For example, as part of the investment sale process, a fund manager may be required to keep reserves for potential adjustments and contingent liabilities.

Callan

Callan LLC
600 Montgomery Street
Suite 800
San Francisco, CA 94111

Main 415.974.5060
Fax 415.291.4014

www.callan.com

Memorandum

To: Tucson Supplemental Retirement System ("TSRS")
From: Callan Real Assets Consulting
CC: Paul Erlendson, Gordie Weightman
Date: November 1, 2019
Subject: Open End Infrastructure Search

Open-End Infrastructure Search Update

Callan recently completed an open-end infrastructure fund search to provide options for TSRS to maintain its exposure to the sector though perpetual vehicles. These kind of perpetual vehicles are common in the institutional real estate sector (e.g. TSRS' existing JP Morgan real estate fund investments) and allow investors to maintain exposure to a diversified portfolio of investments over a long time horizon. This helps maintain the investors' allocation (without the reinvestment risk of entering/exiting closed end funds), collect periodic income and benefit from long-term appreciation in the portfolio. Investors can choose to collect, or reinvest, the periodic income. Investors can exit these funds by registering their interest with the fund manager, who manages in-bound and out-bound investor activity.

The universe of open-end infrastructure funds is relatively small, although growing. Initially Callan reviewed nine funds and eliminated four because those funds were relatively smaller and/or had insufficient track records compared to the peer set. One fund will not be open to new investors until 2021 and was removed from consideration at this time. Four funds were presented to Callan's Manager Search Committee on October 7, 2019. Two funds were recommended for TSRS to interview: IFM's Global Infrastructure Fund ("GIF") and JP Morgan's Infrastructure Investments Fund ("IIF").

The following table contains a high-level comparison of the two offerings.

	IFM – Global Infrastructure Fund	**JP Morgan – Infrastructure Investments Fund**
Organization / Staffing	IFM was founded by Australian pension funds, to invest in infrastructure, in 1994. IFM has over 360 employees that are focused on infrastructure across its existing platforms, with 65 infrastructure investment specialists.	J.P. Morgan is a large asset manager, with a global footprint. The team is large and has diverse experience.
Experience, Asset & Client Base	The IFM Global Infrastructure Fund had a NAV of $23 billion as of Q2 2019, with 335 institutional investor clients. The Global Fund has been operating since 2004 and is one of the longest-operating funds in the sector. In addition to this Fund, the Manager has infrastructure debt offerings and an Australian-only infrastructure fund.	The Fund size was $12 billion in Q2 2019, with over 517 investors. The Fund has been operating since 2007 and is one of the longest-operating funds in the sector. In addition to this Fund, the Manager has significant other real assets offerings, including real estate and transportation funds.
Investment Strategy	The Fund's primary focus is in Europe and the Americas and across all major sub-sectors of infrastructure, mostly	The Fund targets infrastructure and infrastructure-related assets located primarily in the US, Canada,

	IFM – Global Infrastructure Fund	JP Morgan – Infrastructure Investments Fund
	in existing, or "brownfield", assets, though development or "greenfield" opportunities will be considered.	Western Europe and Australia, and secondarily in other OECD[1] countries.
Diversification	The existing portfolio comprises 16 assets with a high concentration of transport assets (e.g. airport, port and toll roads). The Fund's portfolio is diversified across regions, with 36% in N. America, 25% in Continental Europe (including Turkey), 21% in the U.K., 16% in other OECD-Americas countries and the balance in non-OECD countries (e.g. Peru/Chile). The Manager reports that it is very close to making a large MLP investment in the US, which will increase sector diversity as well as the share of US investments in the portfolio.	The existing portfolio comprises 19 assets. There is a high concentration of renewables assets, followed by utilities and transport. The Fund's portfolio is diversified across regions, with 33% in N. America, 35% in Continental Europe, 21% in the U.K, 7% in Australia and the balance in multi-region portfolios. The Manager is close to acquiring a Texas utility (El Paso Electric Company) which will increase sector diversity, as well as the share of US investments in the portfolio.
Track Record/ Performance	IFM's performance was the strongest among all candidates considered.	In the past five years, US Dollar ("USD") investors have experienced negative impacts from currency, in-part due to the pressure on sterling.
PRI/ESG	IFM is a signatory of the UN Principles of Responsible Investment.[2]	J.P. Morgan is a signatory of the UN Principles of Responsible Investment.
Fees	IFM's fee structure is the most attractive of all strategies considered. There is no fee on undrawn capital and a management fee of 0.77% on drawn commitments less than $300 million. There is also an incentive fee of 10% over an 8% per annum return hurdle. There is catch-up feature. (The Manager is allowed to collect 10% of all profits above an 8% preferred return to the investor. The Fund allows the Manager to 'catch-up' by collecting 33.3% of all performance above 8% until the Manager has received 10% of all returns above the 8%. After that all profits are allocated 90% to the investor and 10% to the Manager) In the past, as the Fund size increased, IFM has rebated	J.P. Morgan's expected fee load is more than the IFM, although the Fund does not have a Manager catch-up feature. There is no fee on undrawn capital and a management fee of 1% on drawn commitments under $100 million. The Manager will only receive their 15% pro-rata share of excess profits above the 7% preferred return. Performance fees are limited to 13.5% of all excess profits. J.P. Morgan has recently communicated it will reduce the fund fee rate as the fund size increases.

[1] Organization for Economic Co-operation and Development ("OECD"): 36 member countries that represent circa 80% of world trade. Members are Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey and the United States.

[2] UN Principles for Responsible Investment (PRI) are a set of six principles that provide a global standard for responsible investing as it relates to environmental, social and corporate governance (ESG) factors. https://www.unpri.org/

	IFM – Global Infrastructure Fund	JP Morgan – Infrastructure Investments Fund
	fees investors to reflect the larger overall fee income.	
Redemption Policy	No formal lock-up period (e.g. no minimum required investment period). Investor requests to redeem, or exit the fund, have typically been met one quarter after request. Minimal redemption activity over the life of the Fund; circa $150 million over the last five years.	Four year soft lock-up. If a client submits redemption within 4 years of the anniversary of their capital drawn down a 4% discount is applied to the redeemed amount. (Note: the 4% is distributed to the Fund, which benefits Fund investors, not the Manager.) The Manager has paid out $2 billion in redemptions during the life of the Fund.
Yield / Dividend Distributions	Typically paid semi-annually. Investors have the option to retain this yield, or re-invest into the fund. Investors can change this election on an annual basis. Currently 75-80% of investors re-invest their yield.	Typically paid quarterly. Investors have the option to retain this yield, or re-invest into the fund. Investors can change this election with 60 days' notice to the Manager. Currently 38% of investors re-invest their yield.
Hedging	IFM only offers new U.S. investors a USD-hedged vehicle.	JP Morgan offers USD investors both an unhedged and hedged vehicle. The hedged vehicle launched in 2019.
Capital call timing	The Fund generally holds new investor closings quarterly. The Fund has a sizeable in-bound queue ($4.6 billion) Investors committing in Q1 2020 will likely experience a 12-18 month wait before their capital is called.	The Fund generally holds new investor closings monthly. The Fund has a sizeable in-bound queue ($3.7 billion) Investors committing in Q1 2020 will likely experience a 6-12 month wait before their capital is called.

Callan

Appendix - TSRS existing infrastructure fund investments

	Steel River North America ("SRIFNA")	Macquarie European Infrastructure Fund III ("MEIF III")
Vintage	2008	2008
Fund Size	USD 1.9 billion	EUR 1.2 billion
TSRS Commitment	USD 20 million	EUR 10 million
Target Return	10-12% Gross IRR (4-6% p.a. yield)	11-15% Net IRR, 1.5x net multiple
Vintage	2008	2008
Region	North America	Europe
Fund Term	20 year term	10 years, plus extensions for up to 4 years
Portfolio	5 investments	4 investments
Performance	4 investments sold	2 investments sold
Expected End of Fund	Several assets sold or in the sale process in 2019. Last asset sale ("People's Gas") is pending approval of PA State regulator. If this is delayed, the fund could require an additional one to two (or more) years to be completed.	The Brussels Airport is being sold, pending final regulatory approval and 90% of NAV expected to be returned to TSRS by year end 2019. The last asset may be sold in 2020-2021; this could be delayed.
Observations	Performance of the fund has been weak – the proceeds from the final asset sale will impact the overall investor return.	All invested capital has been returned to investors – with potential for one strong exit to provide more distributions.
6/30 NAV	$26,255,691	$12,707,974
Current Return	Below target	Below target for IRR, above target for multiple

Callan

November 15, 2019

Tucson Supplemental Retirement System

3rd Quarter 2019 Market Update

Gordie Weightman, CFA
Senior Vice President

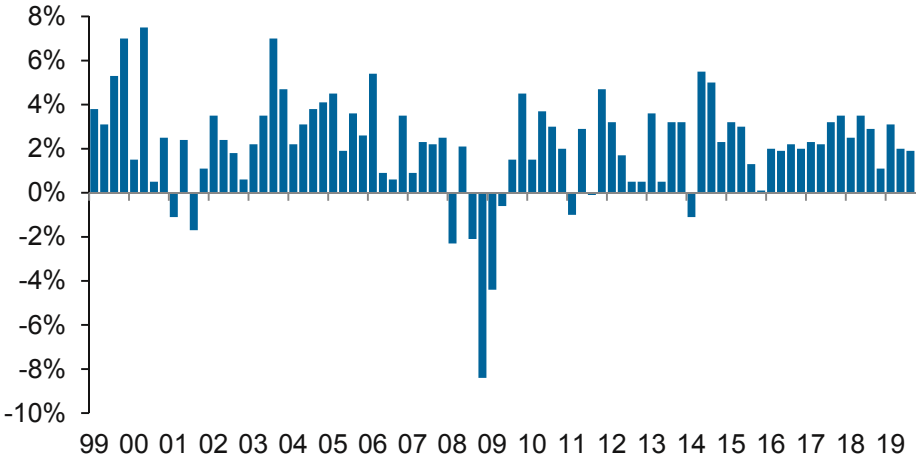
Paul Erlendson
Senior Vice President

Global Economic Update

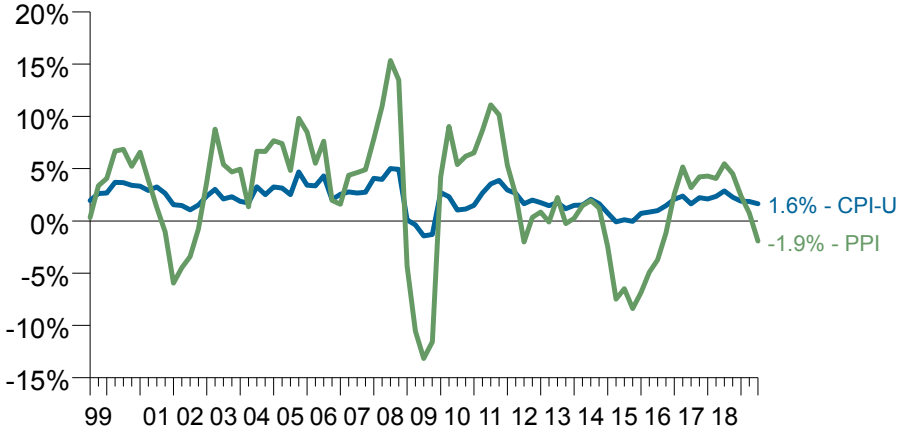
The Big Picture

- The initial estimate of annualized third quarter GDP was 1.9%, slightly ahead of consensus projections.
  - Consumer and government spending were contributors while business investment was a detractor.
- The headline Consumer Price Index (CPI) was flat in September but climbed 1.7% over the trailing 12 months. Core inflation rose 0.1% in the month, bringing year-over-year growth to 2.4%.
- The unemployment rate dropped to 3.5% in September, down from 3.7% in June. The participation rate climbed 0.3 percentage points from June to end September at 63.2%.
- Euro zone GDP grew at an annualized 0.2% in the second quarter, and 1.2% over the trailing year. The unemployment rate remained unchanged through the first quarter of the year, before falling slightly to close out the first half at 7.5%.
- The Federal Reserve cut rates in July, September and October in response to lackluster economic data.
- The ECB continues to take a more dovish stance on rates and asset purchases as GDP growth in the Eurozone remains a concern.

Quarterly Real GDP Growth



Inflation Year-Over-Year



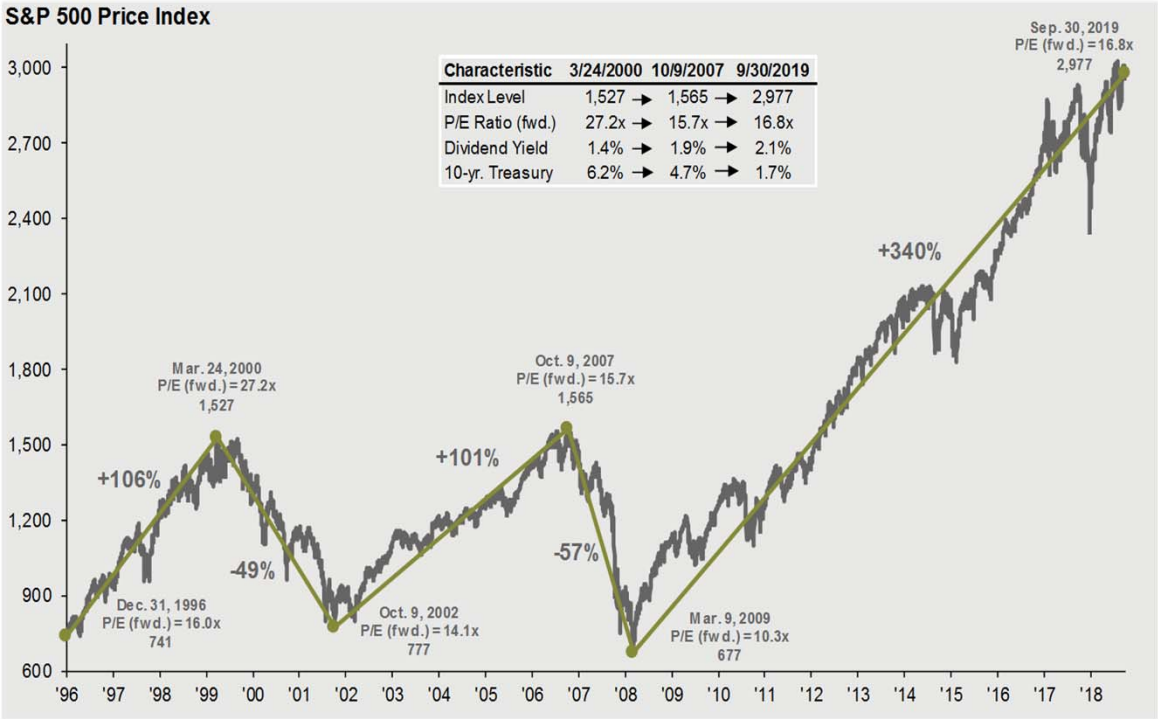
Asset Class Performance

Periodic Table of Investment Returns for Periods Ended September 30, 2019

	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 20 Years
Best	Blmbg:Aggregate 2.3%	Russell:Midcap Index **21.9%**	Blmbg:Aggregate 10.3%	S&P:500 13.4%	S&P:500 10.8%	S&P:500 13.2%	Russell:Midcap Index **9.5%**
	S&P:500 1.7%	S&P:500 20.6%	S&P:500 4.3%	Russell:Midcap Index **10.7%**	Russell:Midcap Index **9.1%**	Russell:Midcap Index **13.1%**	Russell:2000 Index 8.0%
	3 Month T-Bill 0.6%	Russell:2000 Index 14.2%	Russell:Midcap Index **3.2%**	Russell:2000 Index 8.2%	Russell:2000 Index 8.2%	Russell:2000 Index 11.2%	MSCI:EM Gross 7.6%
	Russell:Midcap Index **0.5%**	MSCI:EAFE 12.8%	3 Month T-Bill 2.4%	MSCI:EAFE 6.5%	Blmbg:Aggregate 3.4%	MSCI:EAFE 4.9%	S&P:500 6.3%
	MSCI:EAFE (1.1%)	Blmbg:Aggregate 8.5%	MSCI:EAFE (1.3%)	MSCI:EM Gross 6.4%	MSCI:EAFE 3.3%	Blmbg:Aggregate 3.7%	Blmbg:Aggregate 5.0%
	Russell:2000 Index (2.4%)	MSCI:EM Gross 6.2%	MSCI:EM Gross (1.6%)	Blmbg:Aggregate 2.9%	MSCI:EM Gross 2.7%	MSCI:EM Gross 3.7%	MSCI:EAFE 3.7%
Worst	MSCI:EM Gross (4.1%)	3 Month T-Bill 1.8%	Russell:2000 Index (8.9%)	3 Month T-Bill 1.5%	3 Month T-Bill 1.0%	3 Month T-Bill 0.5%	3 Month T-Bill 1.8%

Q3 Rebound Continues, U.S. Stock Markets Surge Through 2019

- New record for the S&P 500 reached in Q3 2019
  - 1.7% gain in Q3, after 4.3% in Q2 and the strongest first quarter (+13.7%) since 2009.
- Forward valuation slipped back to 16.8 in Q3, but above its 25-year average (16.2)
  - Still nowhere near the peak set in 2000

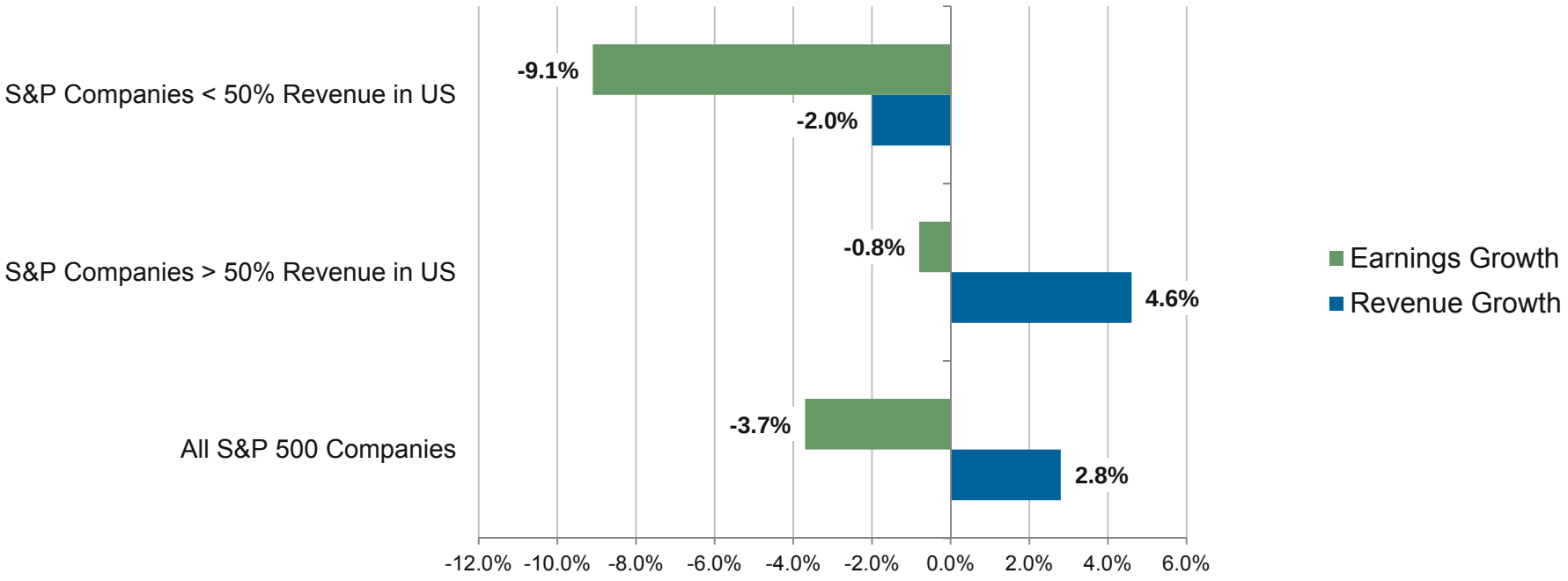


Source: Compustat, FactSet, Federal Reserve, Standard & Poor's, J.P. Morgan Asset Management.
Dividend yield is calculated as consensus estimates of dividends for the next 12 months, divided by most recent price, as provided by Compustat.
Forward price to earnings ratio is a bottom-up calculation based 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 September 30, 2019.

Source: J.P. Morgan Asset Management

Earnings and Revenue Growth – S&P 500

Third Quarter 2019



- For Q3 (40% of companies in the S&P 500 reporting actual results), 80% and 64% reported positive revenue and earnings surprise, respectively.
- Energy and IT sectors are the largest contributors to the earnings decline of those companies with more global exposure; Materials and Energy are the largest contributors to revenue declines.
- IT (57%), Materials (54%) and Energy (42%) are three of the four sectors with the highest international revenue exposure (fourth is Consumer Staples with 45%).
- Companies with the lowest exposure to international revenues are: Utilities (4%), Real Estate (15%) and Financials (22%).

Source: FactSet, Earnings Insight, October 25, 2019

U.S. Equity Market

September 30, 2019

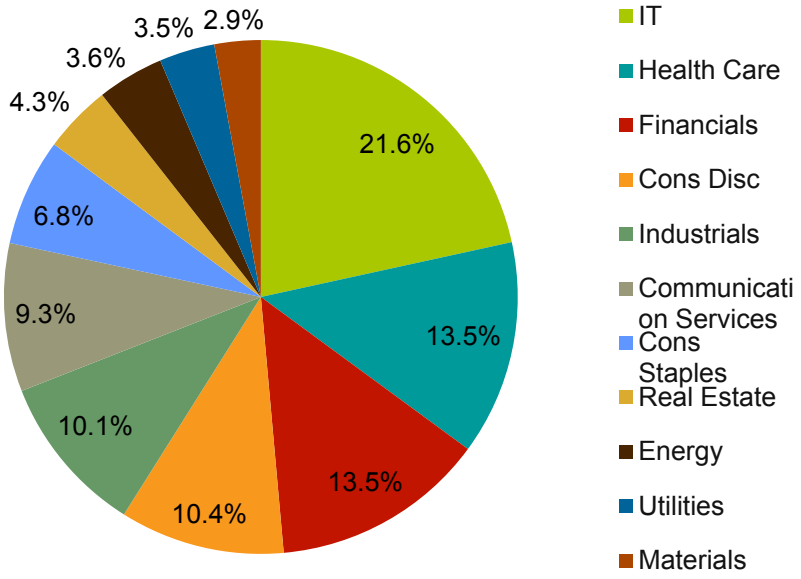
- The S&P 500 Index appreciated 1.7% in the third quarter
  - The index provided positive returns in July and September, but negative returns in August.
  - Utilities was the strongest performing sector at +8.0% (Russell 3000), while Energy was the weakest returning -7.7%.
  - Growth slightly outperformed Value in the third quarter.
    - R1000 Growth climbed 1.5% in the quarter, while R1000 Value grew 1.4%.
- Large caps outperformed in the third quarter, followed by mid cap and finally, small caps
  - Last quarter, the R1000 was up 1.4% vs. the R2000 which was down 2.4%.

Large Cap Equity	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Russell 1000 Index	1.4	20.5	3.9	13.2	10.6	13.2
Russell 1000 Growth	1.5	23.3	3.7	16.9	13.4	14.9
Russell 1000 Value	1.4	17.8	4.0	9.4	7.8	11.5
Mid Cap Equity						
Russell Midcap Index	0.5	21.9	3.2	10.7	9.1	13.1
Russell Midcap Growth	-0.7	25.2	5.2	14.5	11.1	14.1
Russell Midcap Value	1.2	19.5	1.6	7.8	7.6	12.3
Small Cap Equity						
Russell 2000 Index	-2.4	14.2	-8.9	8.2	8.2	11.2
Russell 2000 Growth	-4.2	15.3	-9.6	9.8	9.1	12.2
Russell 2000 Value	-0.6	12.8	-8.2	6.5	7.2	10.1

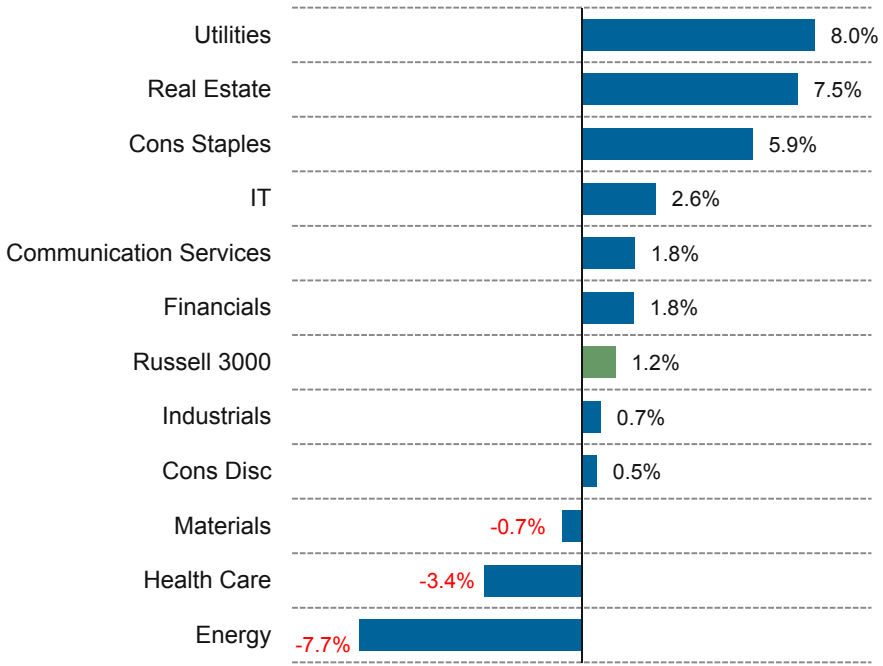
U.S. Equity Returns

September 30, 2019

Economic Sector Exposure (Russell 3000)



Quarterly Returns (Russell 3000)

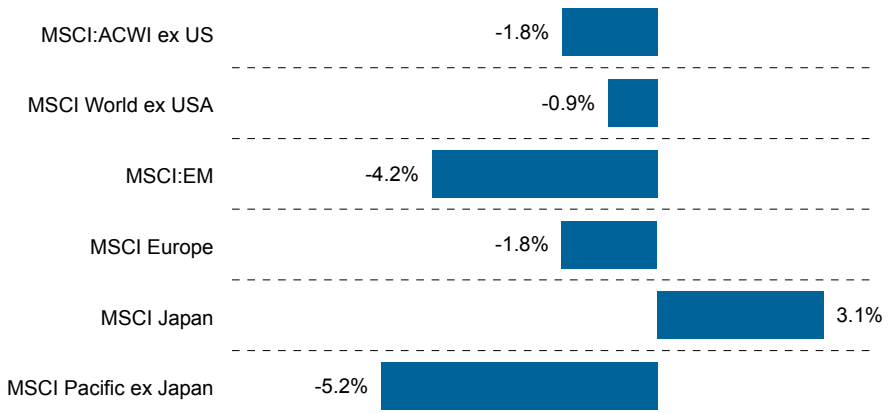


- The Russell 1000 Index rose 1.4% in the third quarter. Gains were driven by the Utilities sector (+8.3%), followed by Real Estate (+7.8%) and Consumer Staples (+6.0%).
- The Russell 2000 Index fell 2.4% in the third quarter. Losses were driven by the Energy sector (-20.7%), followed by Health Care (-9.3%) and Communication Services (-8.1%).

International Equity Returns

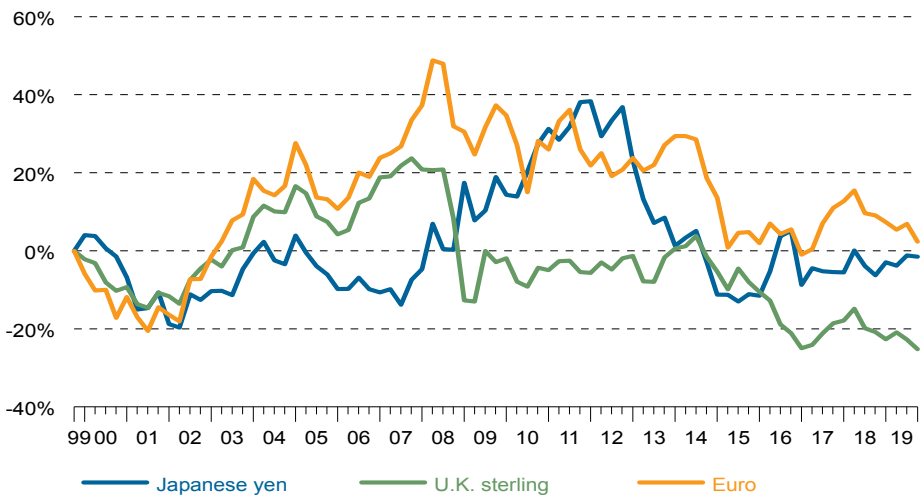
September 30, 2019

Regional Quarterly Performance (U.S. Dollar)



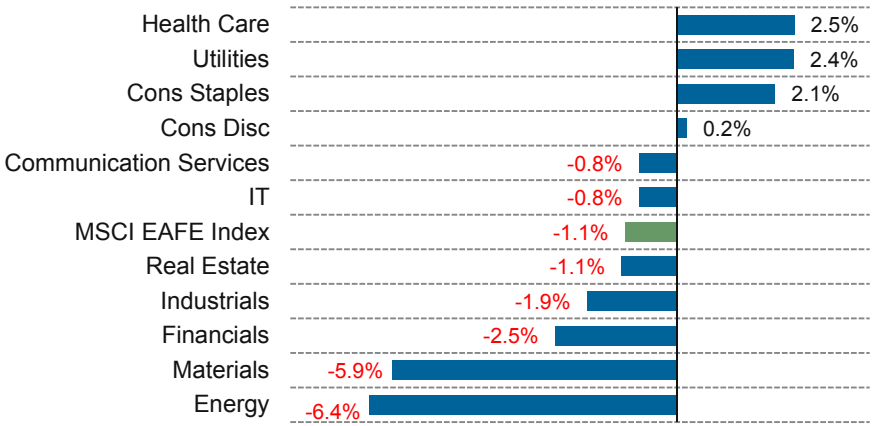
Source: MSCI

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



Source: MSCI

MSCI EAFE Sector Returns



Source: MSCI

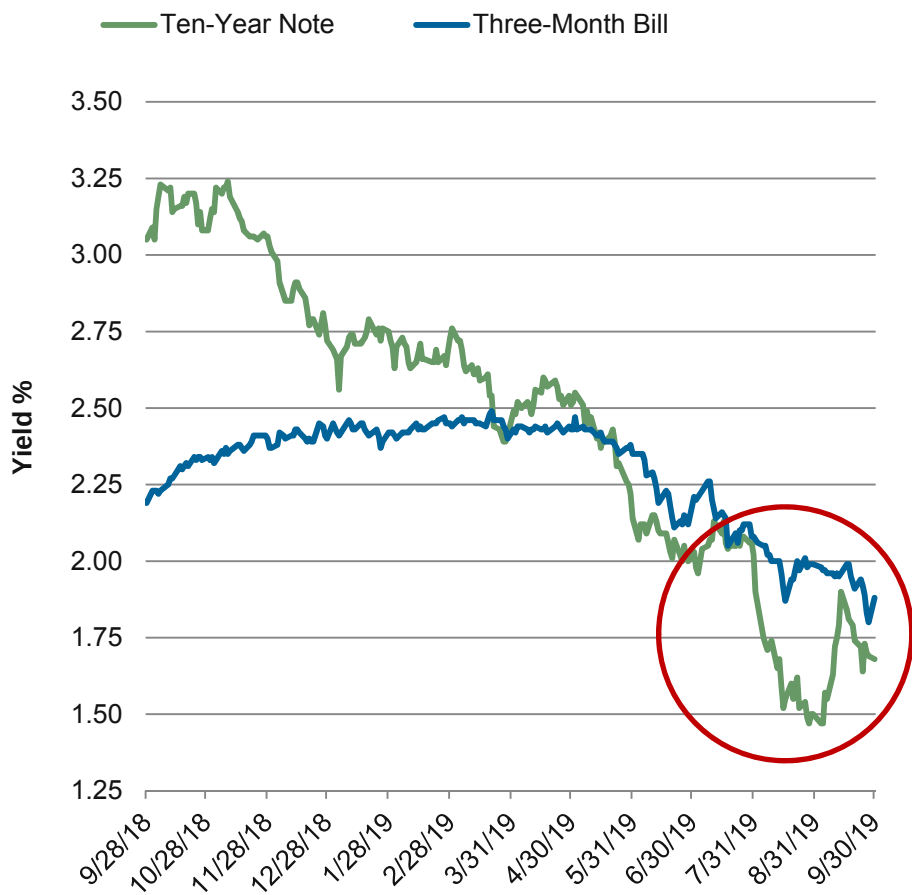
- International equity markets underperformed domestic equity in the third quarter (MSCI EAFE Index: -1.1%). Japan was a standout region, gaining 3.1%.
- Energy and Materials were the primary detractors while the Health Care and Utilities sectors fared better in the quarter.
- The euro (-4.3%), yen (-0.3%), and British pound (-3.2%) all fell against the dollar in the quarter.

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 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

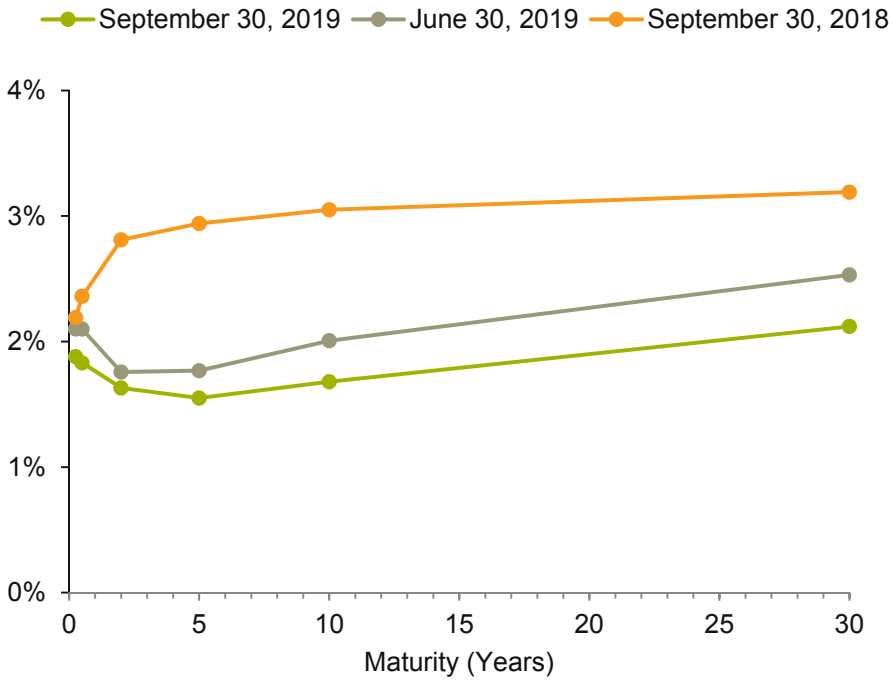


Source: Bloomberg

Yield Curve Changes

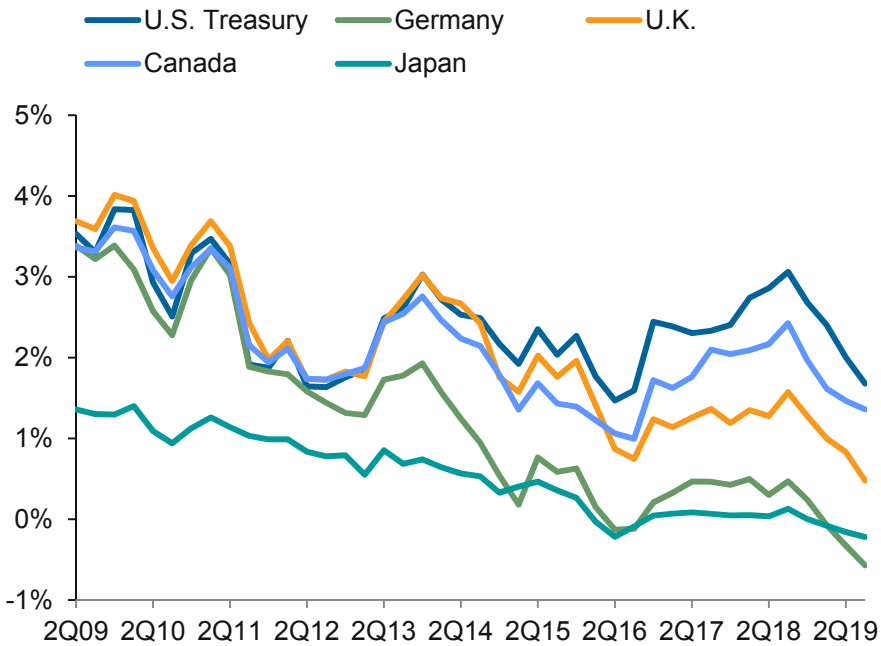
As of September 30, 2019

U.S. Treasury Yield Curve



Source: U.S. Department of the Treasury

10-Year Global Government Bond Yields

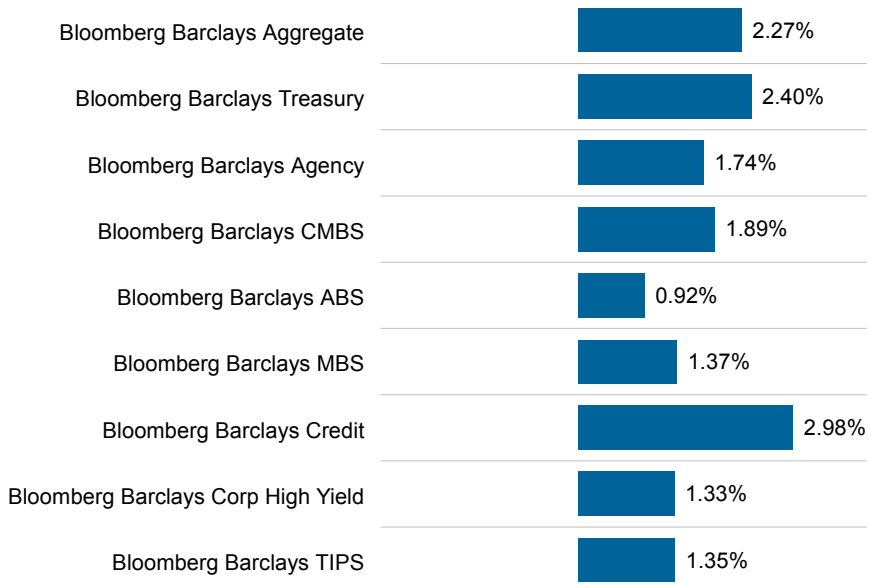


- The closely watched spread between the 2- and 10-year U.S. Treasury rates briefly inverted in August, before returning to a positive five bps spread.
- Yields have fallen by over a percent on the long end of the treasury curve over the past year.
- Despite declining yields in the U.S. over the past year, yields remain high compared to other developed nations.

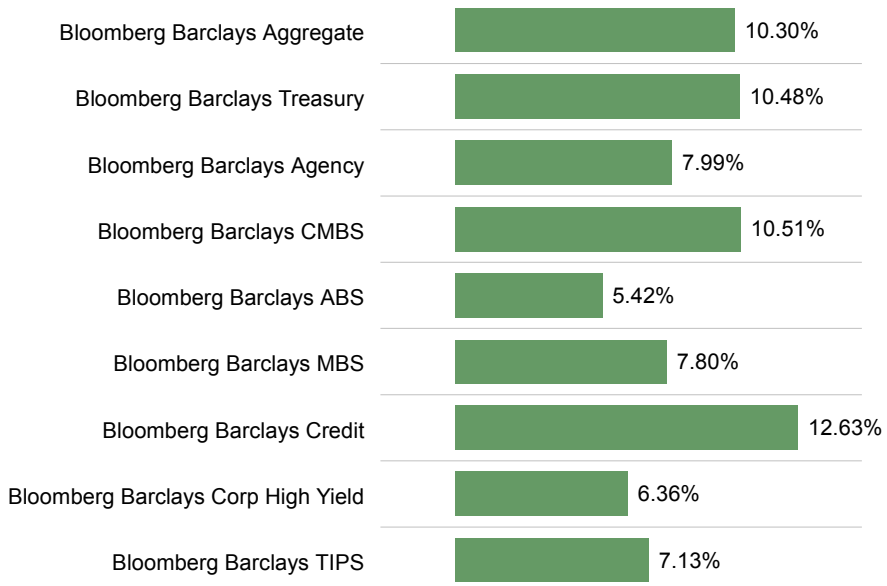
Total Rates of Return by Bond Sector

As of September 30, 2019

Trailing One-Quarter Returns



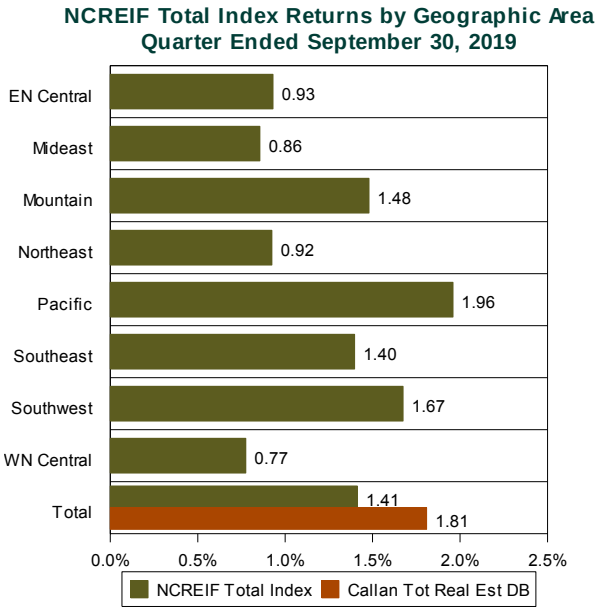
Trailing One-Year Returns

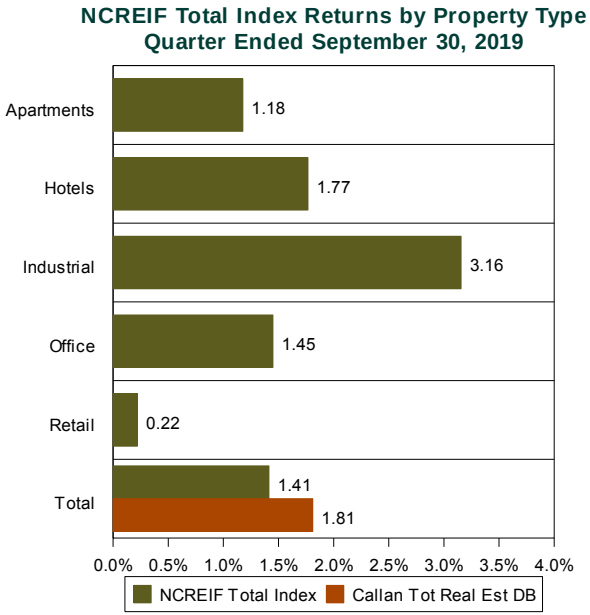


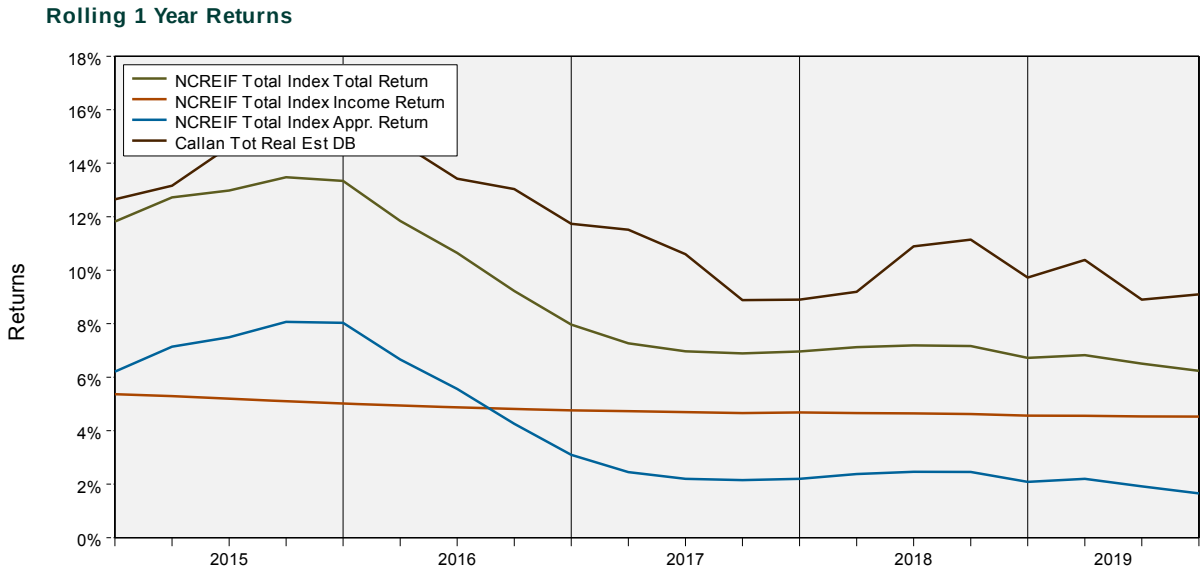
- Fixed income sector trends for the third quarter mirrored those of the trailing year.
- With concerns of slowing domestic and global growth, Treasuries produced over 2% in the third quarter and more than 10% over the trailing year.

Real Estate Overview

September 30, 2019







Callan

September 30, 2019

Tucson Supplemental Retirement System

Investment Measurement Service Quarterly Review

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Market Overview
Capital Markets Review

Callan Institute

Third Quarter 2019

Capital Market Review

The Four Most Dangerous Words

ECONOMY

2 PAGE

"This time, it's different" has been trotted out near the peak of most cycles as justification for why the expansion can continue, at a time when imbalances typically push measures of economic soundness to their limits. This time, however, it may really be different.

Steady Returns Amid Equities Rebound

INSTITUTIONAL INVESTORS

4 PAGE

Corporate plans gained the most among plan types over the one-year period ending in the third quarter. Nonprofits trailed all fund types. Over the last 20 years, returns for investor types ranged from 6.2%-6.3%, outpacing the 6.1% return of a stocks-bonds benchmark.

U.S. Stocks Mixed; Global Markets Fall

EQUITY

6 PAGE

U.S. equity markets posted mixed results amid historic lows for 30-year Treasury yields and a historic factor rotation. Global equity markets turned negative after modest but positive results in the second quarter, buffeted by geopolitical turmoil.

After Two Rate Cuts, Yields Fall Globally

FIXED INCOME

8 PAGE

The Federal Open Market Committee cut short-term interest rates by 25 basis points twice in the third quarter. Yields fell in the U.S. and abroad given global growth headwinds. U.S. fixed income saw mostly positive returns; non-U.S. returns were mixed.

Real Estate Solid; Real Assets Down

REAL ESTATE/REAL ASSETS

10 PAGE

U.S. core real estate returns continue to be driven by income, with limited appreciation this late in the cycle. Global REITs gained 4.6% in the third quarter; U.S. REITs advanced 7.8%. Most real assets, with the notable exception of gold, finished the quarter lower.

A Bountiful but Smaller Harvest

PRIVATE EQUITY

12 PAGE

Most private equity activity measures were down in the third quarter. So far this year, all private equity liquidity measures that Callan tracks moderated. High prices, perceived slowing of global economic growth, and spooky geopolitical events dampened activity so far this year.

Hedge Funds Flat; MACs Struggle

HEDGE FUNDS/MACs

13 PAGE

Equity market churn, while Treasury yields fell further, had a mixed effect across hedge funds, leaving the broad hedge fund universe flat. Multi-asset class (MAC) performance varied depending on net market exposures, but was mostly flat or down.

Returns Moderate for Callan DC Index

DEFINED CONTRIBUTION

15 PAGE

The Callan DC Index™ rose 3.3% in the second quarter compared to 9.6% in the first quarter. The Age 45 Target Date Fund gained 3.5%, largely due to its higher equity allocation. The Index's growth in balances returned to a normal level after a big gain in the first quarter.

Broad Market Quarterly Returns

U.S. Equity Russell 3000	Non-U.S. Equity MSCI ACWI ex USA	U.S. Fixed Income Bloomberg Barclays Agg	Non-U.S. Fixed Income Bloomberg Barclays Gbl ex US
↑	↓	↑	↓
1.2%	-1.8%	2.3%	-0.6%

Sources: Bloomberg Barclays, FTSE Russell, MSCI

The Four Most Dangerous Words (This Time, It's Different…)

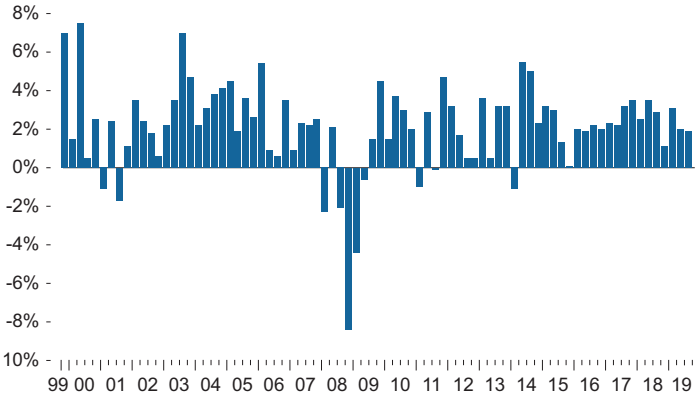
ECONOMY | Jay Kloepfer

Third quarter U.S. GDP growth surprised on the upside, coming in at 1.9% and extending what is now the longest economic expansion on record to 124 months. While 1.9% sounds modest compared to past cycles, it is positively robust compared to developed economies around the globe. The U.S. economy, and to an extent the entire global economy, has defied fears of an imminent collapse all year. While the current expansion may appear long in the tooth, elapsed time is not an economic variable. This expansion has been far weaker than each of the past 10, whether measured by cumulative GDP growth (at just under 25%, it's about half that of the 1990s), by job creation, or by investment. The overhang of the housing market collapse has weighed heavily on growth since 2009, and the measured pace of growth has in fact enabled the U.S. economy to maintain a slow burn.

Several long-held tenets of fundamental macroeconomics appear to be under serious re-consideration after the extraordinary 10-year period following the Global Financial Crisis: the cause (and the absence) of inflation; the execution of monetary policy; the role of central banks and in particular the pivot by the Federal Reserve at the start of 2019; and the business cycle. The new macroeconomic narrative says that first, the business cycle as we know it has been disrupted; second, the source and volatility of inflation has been altered going forward; third, central banks have added sustaining economic expansion to their official remit, therefore the quantitative easing (QE) genie is out of the bottle and we will not be stuffing it back in anytime soon. All of these changes to the macro world are interrelated, one sustaining the other, and are potentially pointing to a different path for the U.S. and global economy than would be expected, given past accepted relationships between inflation, monetary policy, and the business cycle.

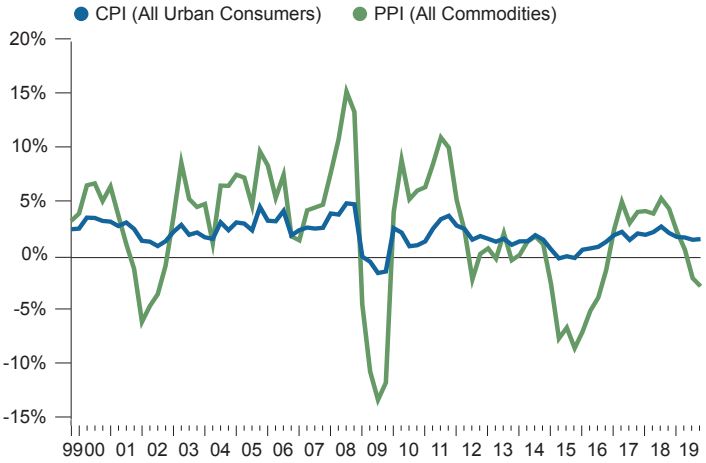
"This time, it's different" has been trotted out near the peak of most cycles to justify why the expansion can continue, at a time when imbalances typically push measures of economic soundness to their limits. This time, however, it may really be different.

Quarterly Real GDP Growth (20 Years)



Source: Bureau of Economic Analysis

Inflation Year-Over-Year



Source: Bureau of Labor Statistics

In the words of many analysts, the Fed rate hike in December 2018 may have been the end of an era. The Fed's standard operating procedure until now has been to tighten preemptively before inflation takes off, and following the extraordinary period of zero interest rate policy, the Fed's goal had been to normalize rates while inflation was low. The Fed pivot in January to pause on rate hikes, and then to implement two cuts in the third quarter while the expansion continues, indicates that preemptive tightening and rate normalization are over, and we may not see them again. The macro world as we know it may have changed.

The headlines of impending doom that have dominated 2019 make the coming recession, if it ever materializes, the most anticipated slowdown ever. The economic result so far in 2019 is that the U.S. economy has shrugged off slowing global growth, a prolonged trade war with China, and geopolitical uncertainty in the euro zone due to Brexit—and continued to steam along. The job market remains strong, and the unemployment rate is at a generational low of 3.6%. U.S. economic growth is clearly moderating, but the expected plunge has yet to materialize, in part because of the lack of obvious imbalances, and in part because of the relatively insular nature of the U.S. economy. The trade war with China is top of the news, yet the cumulative impact on GDP growth since 2018 is less than 1%, as estimated by Capital Economics. The rest of the world has clearly slowed, and global GDP growth looks ready to fall to its weakest pace (near 2% next year) since 2012.

The source of inflation has shifted from the goods and commodities sectors to the service sector. Goods and commodities have shown substantial variability, with the attendant impact on the business cycle and on prices. The service sector shows much more subdued cyclicality, and as a result both the business cycle and inflation may become irrevocably less volatile, with the boom and bust of past cycles no longer the expectation. Headline inflation came in at a 1.7% annual rate in the third quarter, still well below the Fed's target of 2%, and producer price inflation in particular went negative during 2019, dragged down by commodity and goods prices. The persistence of low inflation in the face of continued expansion and a decade of accommodative monetary policy is one factor giving the Fed cover to cut rates while growth continues.

The Long-Term View

Index	2019 3rd Qtr	Periods ended Dec. 31, 2018 Year	5 Yrs	10 Yrs	25 Yrs
U.S. Equity					
Russell 3000	1.2	-5.2	7.9	13.2	9.0
S&P 500	1.7	-4.4	8.5	13.1	9.1
Russell 2000	-2.4	-11.0	4.4	12.0	8.3
Non-U.S. Equity					
MSCI EAFE	-1.1	-13.8	0.5	6.3	4.6
MSCI ACWI ex USA	-1.8	-14.2	0.7	6.6	--
MSCI Emerging Markets	-4.2	-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	2.3	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	-0.6	-2.1	0.0	1.7	4.4
Real Estate					
NCREIF Property	1.4	6.7	9.3	7.5	9.3
FTSE Nareit Equity	7.8	-4.6	7.9	12.1	9.8
Alternatives					
CS Hedge Fund	0.3	-3.2	1.7	5.1	7.3
Cambridge PE*	4.3	10.6	11.9	13.8	15.2
Bloomberg Commodity	-1.8	-11.2	-8.8	-3.8	2.0
Gold Spot Price	4.2	-2.1	1.3	3.8	4.9
Inflation – CPI-U	0.2	1.9	1.5	1.8	2.2

*Data for most recent period lags by a quarter. Data as of June 30, 2019.
Sources: Bloomberg, Bloomberg Barclays, Bureau of Economic Analysis, Credit Suisse, FTSE Russell, MSCI, NCREIF, Standard & Poor's, Refinitiv/Cambridge

Recent Quarterly Economic Indicators

	3Q19	2Q19	1Q19	4Q18	3Q18	2Q18	1Q18	4Q17
Employment Cost–Total Compensation Growth	2.8%	2.7%	2.8%	2.9%	2.8%	2.8%	2.7%	2.6%
Nonfarm Business–Productivity Growth	-0.1%*	2.3%	3.5%	0.1%	1.2%	1.8%	0.9%	0.9%
GDP Growth	1.9%	2.0%	3.1%	1.1%	2.9%	3.5%	2.5%	3.5%
Manufacturing Capacity Utilization	75.5%	75.5%	76.4%	77.0%	76.9%	76.4%	76.1%	75.8%
Consumer Sentiment Index (1966=100)	93.8	98.4	94.5	98.2	98.1	98.3	98.9	98.4

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

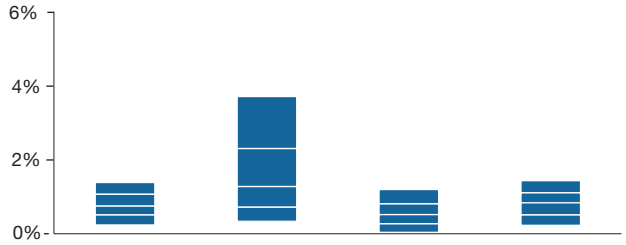
* Estimated figure provided by IHS Markit

Steady Returns Continue Amid Equities Rebound

INSTITUTIONAL INVESTORS

- A quarterly rebalanced 60% S&P 500/40% Bloomberg Barclays Aggregate portfolio returned 7.1% over the one year ended September 30, 2019. All broad institutional investor groups underperformed this benchmark.
- Both U.S. and non-U.S. equity markets continued their rebound in the third quarter after dropping during 2018. Non-U.S. equity underperformed relative to U.S. equity during 2018 and so far this year.
- Corporate plans gained the most among plan types over the one-year period, followed by public defined benefit (DB) plans. Nonprofits trailed all fund types. Over longer periods, Taft-Hartley plans have tended to perform best, but the range of returns for all institutional investor types tended to be in a narrow range; for instance, over the last 10 years, returns for all investor types ranged from 7.9%-8.4%.
- As the expansion continues, investors are discussing how long it can go on, and the fear of missing out is fading the longer the bull market runs. Investors are also addressing how the reversal in Fed policy changes the landscape, as it and other central banks take on the added role of sustaining the expansion. In addition, investors are examining what current yields portend for capital market assumptions.

Quarterly Returns, Callan Database Groups



	Public Database	Corporate Database	Nonprofit Database	Taft-Hartley Database
10th Percentile	1.39	3.72	1.20	1.44
25th Percentile	1.07	2.31	0.81	1.11
Median	0.75	1.28	0.52	0.84
75th Percentile	0.51	0.72	0.27	0.51
90th Percentile	0.24	0.34	0.04	0.23

Source: Callan

- Public DB plans are focused on returns from private markets, but face mounting pressure to control costs. One approach they have adopted is a barbelled pursuit of active management 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.

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

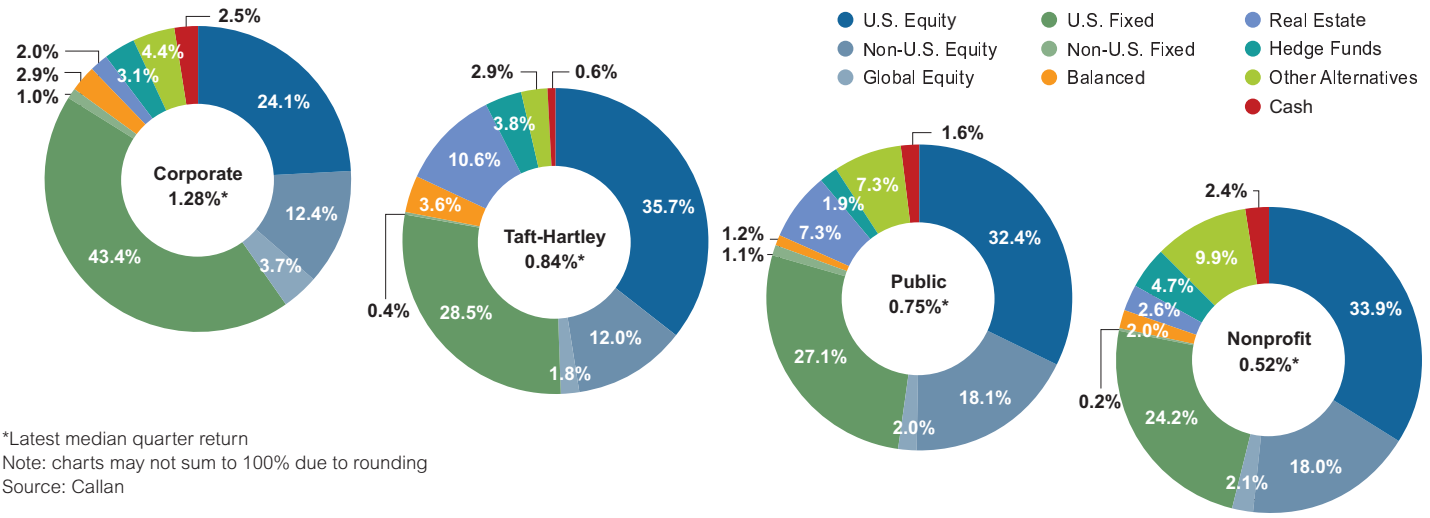
Database Group	Quarter	Year-to-date	Year	3 Years	5 Years	10 Years
Public Database	**0.75**	**12.03**	**4.17**	**7.80**	**6.39**	**8.10**
Corporate Database	**1.28**	**14.11**	**6.39**	**7.78**	**6.51**	**8.17**
Nonprofit Database	**0.52**	**12.59**	**3.63**	**7.88**	**5.98**	**7.94**
Taft-Hartley Database	**0.84**	**11.92**	**3.88**	**8.03**	**6.91**	**8.40**
All Institutional Investors	**0.77**	**12.62**	**4.19**	**7.88**	**6.39**	**8.18**
Large (>$1 billion)	**0.88**	**11.86**	**4.57**	**8.11**	**6.63**	**8.43**
Medium ($100mm - $1bn)	**0.83**	**12.54**	**4.25**	**7.91**	**6.46**	**8.17**
Small (<$100 million)	**0.70**	**12.87**	**4.00**	**7.72**	**6.19**	**7.95**

*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.

- All investor types are considering lower equity exposures. They are also reevaluating the purpose and implementation of:
  - Real assets
  - Hedge funds and liquid alternatives
  - Fixed income
  - Equity
- For public DB plans, return enhancement is the most important issue. Alternative assets such as private equity and private real estate continue to draw interest from investors. Some plans appear to be rethinking their approach to passive investments and holding off increasing their allocation to them. Plans continue to express interest in reducing their allocations to U.S. equity.
- Corporate DB plans are most focused on risk control. Many are looking to decrease their equity allocation, with nearly the same number considering increases to fixed income. The percentage of corporate DB plans continuing to implement the process of de-risking has increased significantly over the last four years.
- For DC plans, fees remain top of mind. Retirement income options are also getting attention.
- Enhancing returns is the biggest concern for nonprofits, as they seek to meet spending needs and grow the corpus over time. Among all investor types, nonprofits historically have implemented or considered an outsourced chief investment officer (OCIO) at a higher rate than other types of institutional investors, and that trend continued this quarter.
- As part of their efforts to increase returns to meet plan targets, investors are evaluating how to implement private market allocations, and whether it is feasible to create a customized program implementation.
- For instance, public DB plans are expressing interest in multi-asset class (MAC) strategies. However, that interest is not widely shared. Corporate DB plans and nonprofits do not seem to be interested in increasing their exposure to MACs, and in fact corporate DB plans are increasingly expressing a desire to reduce their MAC allocations. Nonprofits showed a similar shift in sentiment.
- Private real estate and private equity have been staples of many investors' portfolios, and they continue to express interest in increasing their allocations to these asset classes. Investors, most notably nonprofits, are also beginning to indicate growing interest in increasing allocations to private credit.
- Fund liquidity may be a concern that prevents some investors from adding to illiquid investments.
- Despite the interest in alternatives, some plans are terminating their hedge fund exposures.

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

U.S. equities posted mixed results amid a market that saw 30-year Treasury yields hit historic lows and the most meaningful, albeit short-lived, factor rotation among stocks since the Global Financial Crisis (GFC). Large cap (+1.4%) and mid cap stocks (+0.5%) posted modest gains for the quarter while small caps declined (Russell 2000: -2.4%). Ongoing U.S.-China trade tension, earnings and interest rate uncertainty, and the global political landscape continued to drive investor uncertainty.

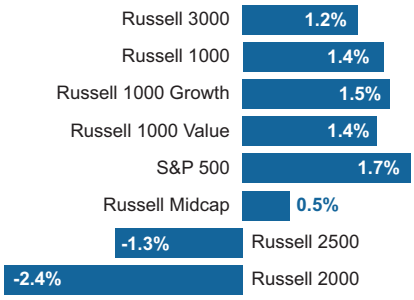
Large Cap ► *S&P 500: +1.7% | Russell 1000: +1.4%*

- Top sectors were in defensive areas including Utilities (+9.3%), Real Estate (+7.7%), and Consumer Staples (+6.1%) in response to investors' continued flight to quality.
- Energy, hurt by falling oil prices, fell 6.3%; Health Care lagged (-2.2%) amid discussions around price transparency and pricing reform by U.S. presidential candidates.
- Cyclical sector exposure has been volatile given uncertainty around the trade deal (and continued sideways movement of markets) along with slowed global growth.
- Up to September, momentum stocks (which have shifted to include many of the market's least volatile stocks) outperformed as investors shunned the cheapest quintile of value (and more volatile) stocks. This trend sharply reversed in early September as the 10-year Treasury yield rose from 1.46% to 1.73% and momentum stocks fell precipitously while value stocks traded up over the course of two days. The magnitude of the reversal gave a boost to value stocks across market capitalizations for the quarter.

Growth vs. Value ► *Russell 1000 Value: +1.4%, Russell 1000 Growth: +1.5% | Russell 2000 Value: -0.6%, Russell 2000 Growth: -4.2%)*

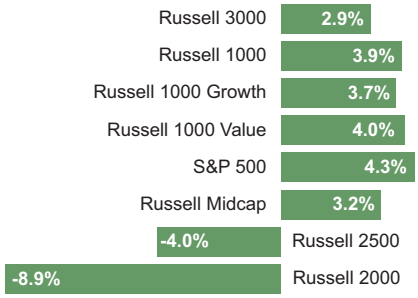
- While value continues to trail growth year-to-date, it gained ground during September's factor reversal, finishing the quarter essentially in line with growth within large caps.

U.S. Equity: Quarterly Returns



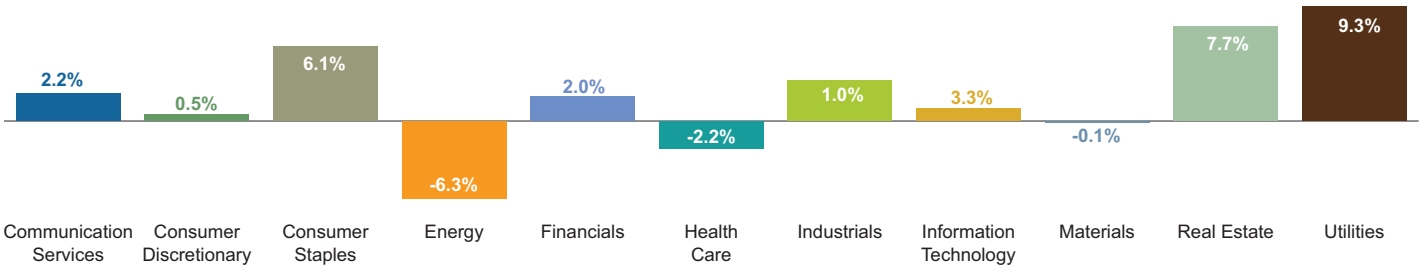
Sources: FTSE Russell and Standard & Poor's

U.S. Equity: One-Year Returns



Sources: FTSE Russell and Standard & Poor's

Quarterly Performance of Industry Sectors



Source: Standard & Poor's

– Within small cap, value benefited as investors favored the cheapest 20% of small caps while the most expensive quintile within the Russell 2000 declined double digits.

Non-U.S./Global Equities

Global equity markets turned negative in the third quarter. After more modest positive results in the second quarter, fears over continued trade war impacts, a no-deal Brexit, and a potential global slowdown impacted investor behavior. Given this backdrop, more defensive areas of the market outperformed.

Developed ► *MSCI EAFE: -1.1% | MSCI World ex USA: -0.9% | MSCI ACWI ex USA: -1.8% | MSCI Hong Kong: -11.9% | MSCI Japan: +3.1%*

– Boris Johnson's attempted suspension of Parliament and no-deal Brexit proclamations weighed on U.K. stocks (-2.5%).
– Germany (-4.0%) experienced recession fears; industrial production dropped 1.5% in June from the prior month, while the estimate was -0.5%.
– Hong Kong protests proved to be a headwind as its market fell 11.9% over the three-month period.
– Japan (+3.1%) was one of the few bright spots within developed markets as low short-term interest rates remain unchanged and a resolution to the Japan/South Korea trade war looked more promising.
– Cyclical sectors trailed as investors were positioned defensively; Energy (-6.5%) had the worst performance.
– For the quarter, factor performance reflected cautious investor behavior as quality and low volatility did well. However, the month of September saw a brief recovery in value across all markets as trade talks improved and central banks eased.

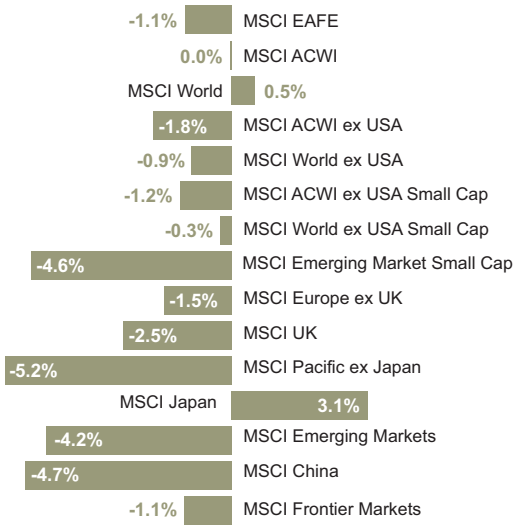
Emerging Markets ► *MSCI Emerging Markets Index: -4.2%*

– Emerging markets fared worst among global markets; uncertainty weighed heavily on these volatile countries.
– Though most emerging market countries fell during the quarter, Turkey (+11.7%) had strong results as its central bank cut rates two times in less than two months.
– Factor performance in emerging markets favored quality and price momentum as investors moved toward safe assets.

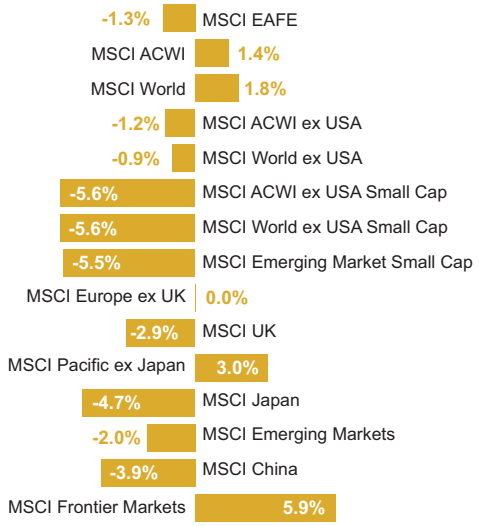
Non-U.S. Small Cap ► *MSCI World ex USA Small Cap: -0.3% | MSCI EM Small Cap: -4.6%*

– Small cap marginally outperformed large cap, both in developed and all country ex-U.S. markets; despite overall defensive posturing, idiosyncratic businesses pushed past global market issues.
– Japan (+4.0%) helped drive developed returns as small cap companies also benefited from low rates and resolved trade tensions; Hong Kong (-7.6%) detracted as local businesses were hurt by the protests.

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



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



Source: MSCI

Fixed Income

The Federal Open Market Committee (FOMC) cut short-term interest rates by 25 basis points twice in the third quarter amid an economic backdrop that has been supported by strong consumer spending and a solid labor market, but challenged by weakening manufacturing data and business investment. The Fed chair stated that the FOMC would act as "appropriate to sustain the expansion," and the European Central Bank and other central banks around the world also moved in the direction of easing monetary policy. Yields fell in the U.S. and abroad given global growth headwinds fueled by mounting trade tensions as well as geopolitical uncertainty.

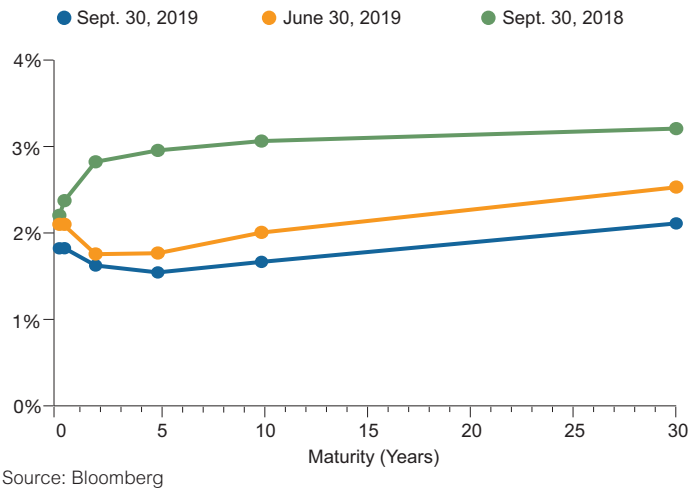
Core Fixed Income ► *Bloomberg Barclays US Agg: +2.3%*

- Treasuries returned 2.4% as rates fell across the yield curve.
- While the widely monitored 2- and 10-year key rates remained positive, the spread between the 3-month and 10-year key rates remained inverted.
- Long Treasuries soared (+7.9%) as 30-year yields fell roughly 40 bps.
- Nominal Treasuries outperformed TIPS as inflation expectations continued to fall; 10-year breakeven spreads were 1.53% as of quarter-end, down from 1.69% as of June 30. The 10-year real yield dipped briefly into negative territory in early September.

Investment-Grade Corporates ► *Bloomberg Barclays Corporate (Inv. Grade): +3.1%*

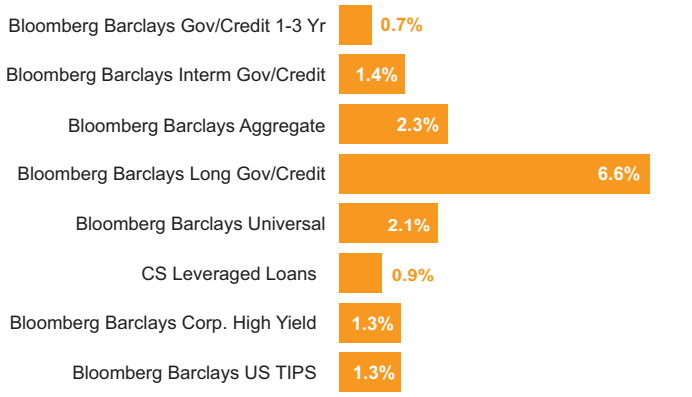
- Investment grade corporate credit spreads were range-bound, but their yield advantage was enough to generate positive excess returns versus like-duration Treasuries.
- Issuance in the corporate bond market was $320 billion in the quarter, $50 billion higher than a year ago; demand remained solid. BBB-rated corporates (+3.1%) modestly outperformed A-rated or higher corporates (+3.0%).

U.S. Treasury Yield Curves



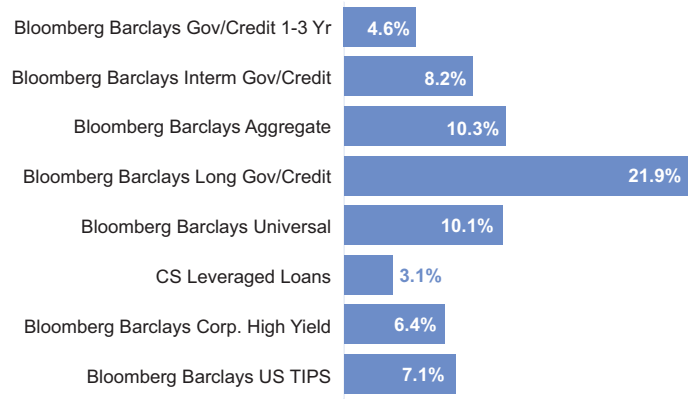
Source: Bloomberg

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: +1.3%*

- BB-rated corporates (+2.0%) outperformed CCC-rated corporates (-1.8%). BB- and B-rated spreads narrowed slightly, but the rally in rates helped drive outperformance as a result of higher quality bonds' greater sensitivity to interest rate movements.
- CCC-rated bond spreads widened significantly, representing some concern about deteriorating quality at the lower-end of the spectrum.

Leveraged Loans ► *CS Leveraged Loans: +0.9%*

- Bank loans, which have floating rate coupons, underperformed high yield bonds as rates rallied and investors worried about deteriorating credit quality.
- CLO issuance continued to exceed expectations, providing positive technical support to the leveraged loan market.

Non-U.S. Fixed Income

Global Fixed Income ► *Bloomberg Barclays Global Aggregate (unhedged): +0.7% | (hedged): +2.6%*

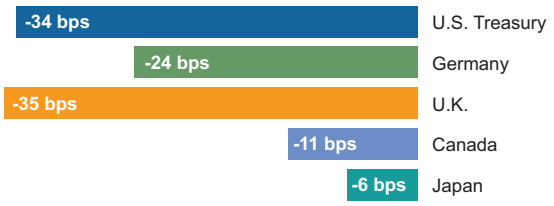
- Developed market sovereign bond yields rallied, pushing European sovereigns further into negative territory as the ECB reduced its deposit rate and announced a new bond purchasing stimulus program.
- Negative yielding debt totals nearly $17 trillion, a record high.
- The U.S. dollar was up 3.4% versus a basket of trade partner currencies and up 4.3% versus the beleaguered euro.

Emerging Market Debt ($US) ► *JPM EMBI Global Diversified: +1.5%* | (Local currency) ► *JPM GBI-EM Global Diversified: -0.8%*

- Broadly, emerging market currencies depreciated versus the U.S. dollar, hampering local currency returns.
- Within the dollar-denominated benchmark, Argentina (-42%) and Venezuela (-51%) were among the few to post negative returns. Conversely, returns in the local debt benchmark were more mixed with Turkey (+19%) and Argentina (-60%) being outliers.

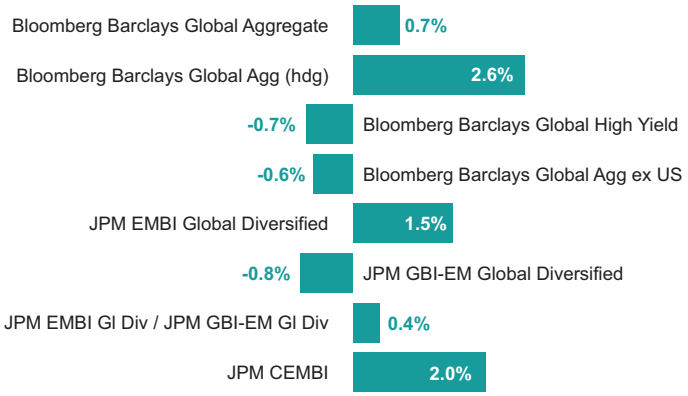
Change in 10-Year Global Government Bond Yields

2Q19 to 3Q19



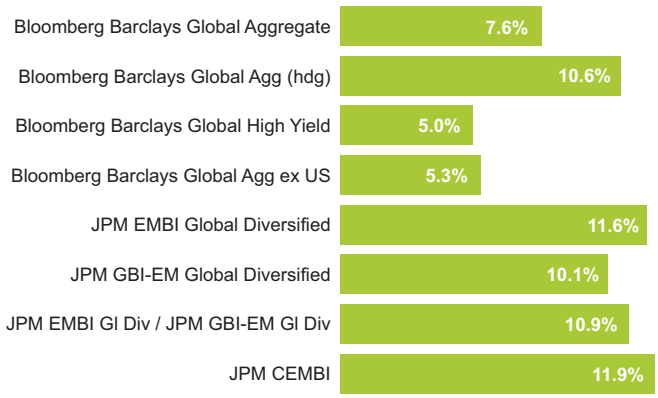
Source: Bloomberg Barclays

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 Stays Solid; Real Assets Mostly Down

REAL ESTATE/REAL ASSETS | Munir Iman and Kristin Bradbury

U.S. Real Estate

Real Estate Returns Continue to Moderate

- U.S. core real estate returns continue to be driven by income, with limited appreciation this late in the cycle.
- Returns are coming from net operating income (NOI) growth rather than further cap rate compression.
- Industrial continues to outperform other property types.
- Retail showing signs of depreciation

U.S. Real Estate Fundamentals Remain Healthy

- Steady returns continued, driven by above inflation-level rent growth in many metros.
- Within the NCREIF Property Index, the vacancy rate for U.S. Office was 9.6% in the quarter, the lowest in over 12 years.
- Net operating income (NOI) has been growing annually and is expected to be the primary return driver. Apartment and Industrial NOI growth fell slightly from the second quarter.

Pricing Remains Expensive in the U.S.

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

REITs Outperformed Global Equities

- U.S. REITs advanced 7.8% in the quarter, outpacing the S&P 500 Index, which rose 1.7%.
- Global REITs gained 4.6% compared to -0.2% for the MSCI ACWI IMI.
- Both U.S. and non-U.S. REITs are trading at net asset value.

Non-U.S. Real Estate

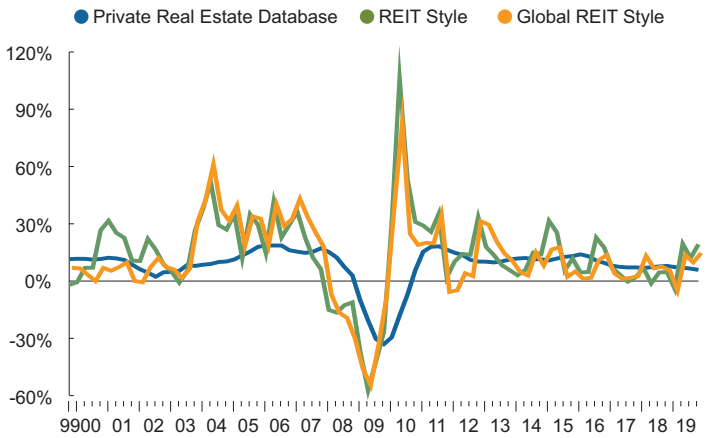
Asia Is Increasingly Important

- U.S.-China trade talks, unrest in Hong Kong, and other areas of political uncertainty have impacted real estate markets in the region. Managers continue to find attractive opportunities in some sectors of the market such as restructuring opportunities, necessity-based retail, and logistics.
- The number of open-end core funds focused on the Asia-Pacific market has increased in 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.
- During 2019, India had its first successful IPO for a REIT.

Europe Buffeted by Political Uncertainty

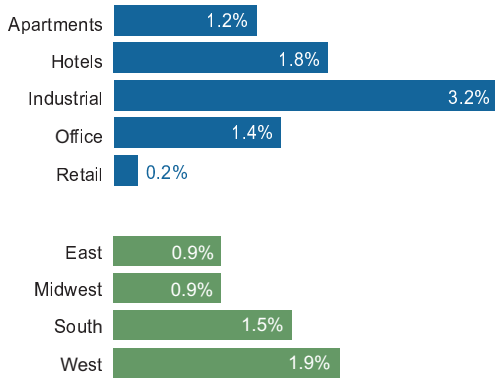
- Political uncertainty continues to weigh on overall economic growth throughout Europe, but real estate fundamentals remain strong in key gateway markets given strong demand and the continued lack of new supply. Cap rates for prime real estate remain low, as real estate continues to be an attractive asset class as a result of low interest rates throughout the region.
- Yields between prime and secondary real estate remain wide, providing opportunities for investors targeting transitional assets, as markets across Europe have less modern stock compared to 10 years ago.

Rolling One-Year Returns



Source: Callan

Sector Quarterly Returns by Property Type and Region



Source: NCREIF

Infrastructure Fundraising Momentum Continues

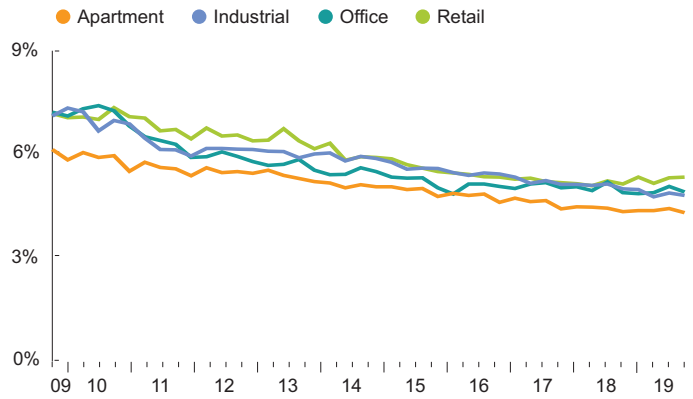
- Open end funds are raising significant capital, and the universe of investible funds keeps increasing.
- The closed end fund market continues to expand, with additional offerings in infrastructure debt, emerging markets, and sector-specific areas (e.g., communications and renewables).

Real Assets

Challenging Quarter as Oil Prices Slide

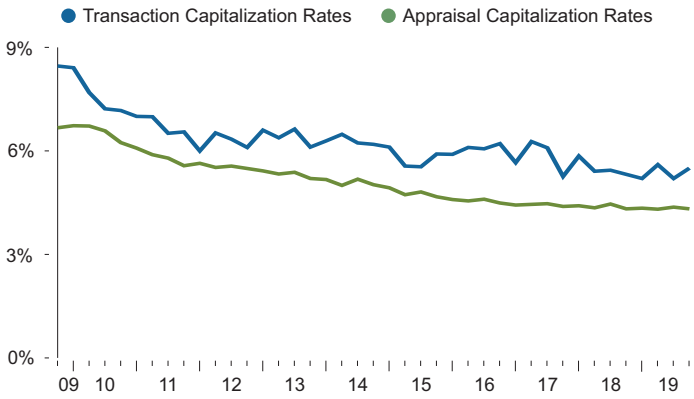
- While the MLP category generally benefits from declining rate environments, volatile and falling oil prices weighed more heavily on the space in the quarter (Alerian MLP Index: -5.0%; +11.0% YTD).
- Oil prices slid from $58.47 to $54.07 (WTI) during the quarter, and the energy-heavy Goldman Sachs Commodity Index was off 4.2%, while Gold (S&P Gold spot price: +4.3%; +15.0% YTD) benefited from its safe haven status.
- Looking across the rest of the commodity complex, Agriculture Commodities finished in negative territory (Bloomberg Commodity Agriculture Subindex: -6.2%), weighed down by coffee, corn, and cotton in particular, while nickel (+35.5%) almost single-handedly lifted the Industrial Metals Subindex (+2.4%) into positive territory for the quarter.

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 September 30, 2019

Private Real Assets	Quarter	Year to Date	Year	3 Years	5 Years	10 Years	15 Years
Real Estate ODCE Style	**1.5**	**4.5**	**5.9**	**7.1**	**9.0**	**9.9**	**6.8**
NFI-ODCE (value wt net)	1.1	3.1	4.6	6.3	8.4	9.8	6.9
NCREIF Property	1.4	4.8	6.2	6.8	8.6	9.8	8.6
NCREIF Farmland	1.0	2.4	5.3	6.1	7.9	11.0	14.2
NCREIF Timberland	0.2	1.3	2.1	3.1	4.4	4.0	7.0
Public Real Estate							
Global Real Estate Style	**4.6**	**22.3**	**14.7**	**7.4**	**8.3**	**10.2**	**8.3**
FTSE EPRA Nareit Developed	4.6	19.8	13.0	5.6	6.8	8.6	--
Global ex-U.S. Real Estate Style	**2.8**	**17.9**	**11.7**	**7.9**	**7.8**	**8.1**	**7.8**
FTSE EPRA Nareit Dev ex US	1.5	14.6	8.9	5.9	5.0	6.5	--
U.S. REIT Style	**7.7**	**28.5**	**19.2**	**8.4**	**10.7**	**13.6**	**9.7**
EPRA Nareit Equity REITs	7.8	27.0	18.4	7.4	10.3	13.0	9.0

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

A Bountiful but Smaller Harvest

PRIVATE EQUITY | Gary Robertson

Private equity activity measures were down in the third quarter, except for upticks in dollar volume for fundraising and buyout exits. So far this year, all private equity liquidity measures that Callan tracks moderated. High prices, perceived slowing of global economic growth, and challenging geopolitical events dampened activity so far this year.

Private equity partnerships holding final closes totaled $188 billion, with 201 new partnerships formed, according to PitchBook. The dollar volume rose 27% from the prior quarter, but the number of funds holding final closes fell 7%. So far this year, 2019 is running 7% behind 2018. No strategy is dominating the market compared to historical commitment ranges, as investors focus on diversification.

New buyout transactions declined, according to PitchBook. Funds closed 1,491 company investments with $110 billion in disclosed deal value, representing a 14% decline in count and a 16% dip in dollar value from the second quarter.

According to PitchBook, new investments in venture capital companies totaled 4,664 rounds of financing with $57 billion of announced value. The number of investments was down 13% from the prior quarter, and announced value fell 15%. The median pre-money valuations of Series A through D rounds continued to increase, with only Seed Stage remaining flat.

Funds Closed January 1 to September 30, 2019

Strategy	No. of Funds	Amt ($mm)	Share
Venture Capital	263	46,702	10%
Growth Equity	50	61,789	13%
Buyouts	158	241,920	51%
Mezzanine Debt	39	60,308	13%
Distressed	8	12,203	3%
Energy	10	14,767	3%
Secondary and Other	39	27,970	6%
Fund-of-funds	20	7,358	2%
Totals	**587**	**473,017**	**100%**

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

There were 404 private M&A exits of private equity-backed companies (excluding venture capital), PitchBook reports, with disclosed values totaling $122 billion. Private sale count was down 6% from the prior quarter but announced dollar volume rose 12%. The year-to-date exit count declined 35%. There were 16 private-equity backed IPOs in the third quarter raising $6 billion, a steep decline from 42 totaling $16 billion previously.

Venture-backed M&A exits totaled 320 transactions with disclosed value of $12 billion. The number of sales fell 12% and announced dollar volume plunged 52%. The year-to-date exit count declined 13%. There were 47 VC-backed IPOs in the third quarter with a combined float of $9 billion. For comparison, the second quarter had 59 IPOs and total issuance of $22 billion. Peloton was the largest third quarter IPO, raising $1.2 billion.

Private Equity Performance Database (%) (Pooled Horizon IRRs through June 30, 2019*)

Strategy	3 Months	Year	3 Years	5 Years	10 Years	15 Years	20 Years
All Venture	6.25	18.96	15.93	14.95	15.01	11.80	13.06
Growth Equity	4.70	15.37	17.71	13.26	14.77	13.59	13.53
All Buyouts	4.12	10.72	16.06	11.85	15.27	13.72	12.07
Mezzanine	2.37	8.05	11.64	10.28	11.05	10.63	8.73
Credit Opportunities	1.09	3.20	9.37	5.68	13.39	9.61	10.13
Control Distressed	1.95	4.27	10.47	7.62	12.16	10.63	10.58
All Private Equity	**4.34**	**12.31**	**15.52**	**11.98**	**14.79**	**12.88**	**12.13**
S&P 500	4.30	10.42	14.19	10.71	14.70	8.75	5.90

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.

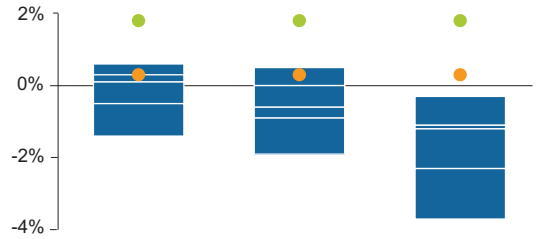
Hedge Funds Flat; MACs Struggle

HEDGE FUNDS/MACs | Jim McKee

Alpha trades flat as markets soften during the quarter

- Equity market churn, while Treasury yields fell further, had a mixed effect across hedge funds, leaving the broad hedge fund universe flat.
- *Managed Futures* (+3.5%) and *Global Macro* (+2.1%) were lead performers for the second quarter in a row, benefiting from continuing rate and currency trends.
- *Equity Market Neutral* (-1.7%) slipped hard, particularly given September's sudden factor rotation to value while momentum reversed.
- *Long/Short Equity* (+0.1%) was unchanged without much equity beta support; the equity factor reversal in September also hurt.
- *Distressed* (-3.5%) sank as spreads among weaker credits widened amid a flight-to-quality.
- Hedge fund portfolios with exposure to macro trading fared better while those with emerging market exposure, particularly Argentina, suffered more.

Hedge Fund-of-Funds Style Group Returns



	Absolute Return	Core Diversified	Long/Short Equity
10th Percentile	0.6	0.5	-0.3
25th Percentile	0.3	0.0	-1.1
Median	0.1	-0.6	-1.2
75th Percentile	-0.5	-0.9	-2.3
90th Percentile	-1.4	-1.9	-3.7
CS Hedge Fund ●	0.3	0.3	0.3
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 September 30, 2019

Hedge Fund Universe	Quarter	Year	3 Years	5 Years	10 Years	15 Years
Callan Fund-of-Funds Database	**-0.63**	**0.46**	**3.76**	**2.35**	**4.22**	**4.24**
Callan Absolute Return FOF Style	**0.07**	**0.80**	**3.60**	**2.32**	**4.16**	**3.95**
Callan Core Diversified FOF Style	**-0.62**	**0.23**	**3.37**	**2.02**	**3.99**	**4.12**
Callan Long/Short Equity FOF Style	**-1.19**	**0.02**	**4.57**	**3.40**	**4.67**	**5.37**
Credit Suisse Hedge Fund	0.26	2.13	3.83	2.30	4.32	4.97
CS Convertible Arbitrage	-0.41	1.29	2.55	2.28	4.36	3.78
CS Distressed	-3.46	-3.09	3.06	0.79	4.65	5.22
CS Emerging Markets	-4.11	1.81	3.29	3.02	4.28	5.99
CS Equity Market Neutral	-1.74	-4.37	0.27	0.16	1.14	-0.57
CS Event-Driven Multi	-0.80	0.18	3.49	0.16	3.37	5.05
CS Fixed Income Arb	0.28	2.38	4.39	3.23	5.66	3.84
CS Global Macro	2.12	7.66	5.35	3.11	4.89	6.43
CS Long/Short Equity	0.10	-0.36	4.85	3.38	4.88	5.74
CS Managed Futures	3.53	7.81	0.59	2.07	1.57	3.58
CS Multi-Strategy	0.68	1.94	4.23	4.18	6.23	5.95
CS Risk Arbitrage	0.23	1.98	3.18	2.64	2.68	3.81
HFRI Asset Wtd Composite	0.30	2.65	4.39	2.93	4.49	--
90-Day T-Bill + 5%	1.77	7.39	6.54	5.98	5.54	6.39

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

Amid choppy markets, MACs struggle for gains

- Multi-asset class (MAC) performance varied depending on net market exposures, but was mostly flat or down.
- The **HFR Risk Parity Index** targeting 10% volatility was positive (+1.9%), reflecting the modest lift of stocks and bonds.
- **Eurekahedge Multi-Factor Risk Premia Index** fell 5.1%, indicating broad headwinds for those seeking diversifying returns outside long-only markets.
- Within risk premia, *equity momentum* was a key detractor in light of September's factor reversal; *rates momentum* was an offsetting contributor given the trend of falling yields.
- *Long-Biased* trailed due to exposure to risk-on assets.
- *Absolute Return* benefited from exposure to higher-quality assets.

Volatility simmers slightly below average

- Markets are further discounting growth with lower expected rates, long and short.
- If global manufacturing data softens further, thereby overwhelming expectations of central banks easing, hedge funds are positioned reasonably well for an equity downturn.
- However, any economic rebound with tepid inflation will cause most hedge funds to lag.

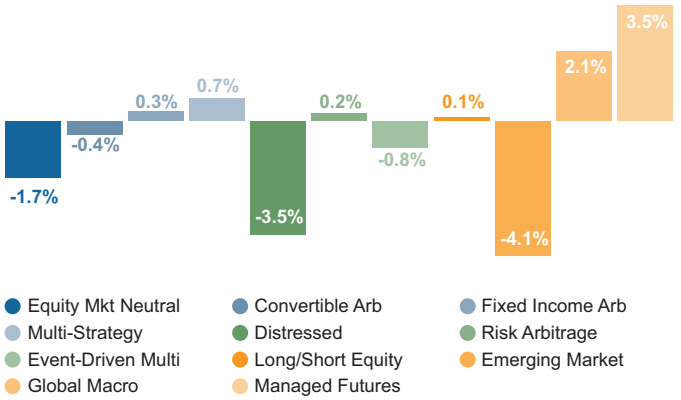
Falling yield curve shrinks the playing field, however level it may be

- Lower long rates factored into stocks and bonds leave less room for traditional assets to run, giving hedged strategies more opportunity to shine.
- However, as short rates also settle to lower levels, dwindling cash returns and short interest rebates take some wind out of hedge fund sails.

Industry outflows shade constructive mood

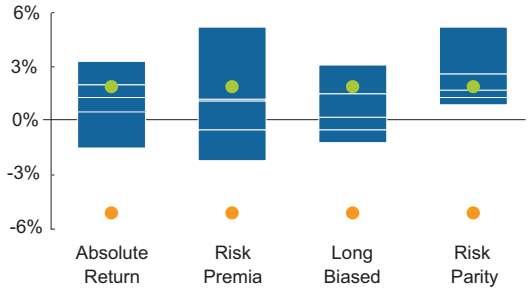
- The third quarter was the sixth consecutive quarter of industry asset outflows, which runs counter to the industry's positive view of an improving opportunity set ahead with increasing volatility tied to growing economic uncertainty.

Credit Suisse Hedge Fund Strategy Returns



Source: Credit Suisse

MAC Style Group Returns



	Absolute Return	Risk Premia	Long Biased	Risk Parity
10th Percentile	3.3	5.2	3.1	5.2
25th Percentile	2.0	1.2	1.5	2.6
Median	1.3	1.1	0.2	1.7
75th Percentile	0.5	-0.5	-0.5	1.3
90th Percentile	-1.5	-2.2	-1.2	0.9
Eurekahedge MFRP (5%v)	-5.1	-5.1	-5.1	-5.1
60% S&P 500/ 40% BB Barclays Agg	1.9	1.9	1.9	1.9

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

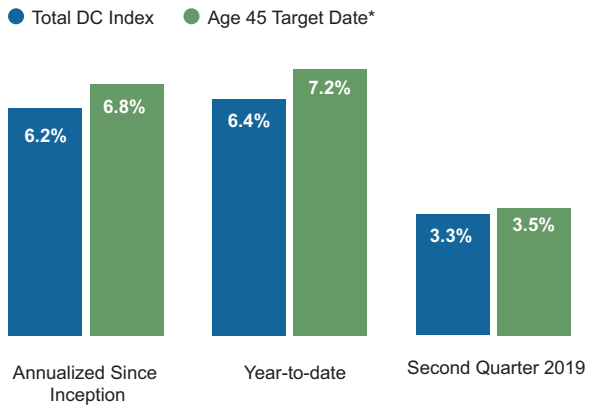
Performance Slows but Remains Solid

DEFINED CONTRIBUTION | Patrick Wisdom

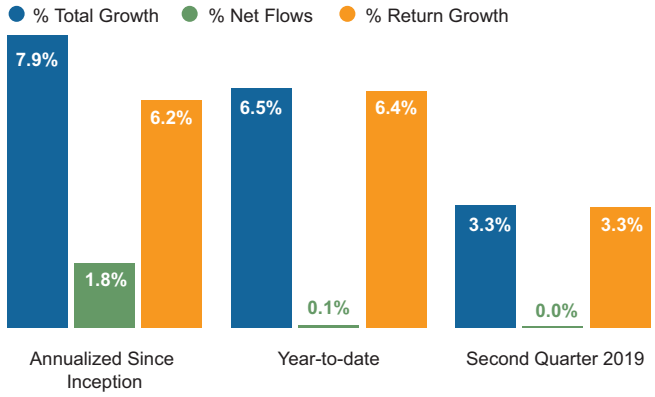
- The Callan DC Index™ gained 3.3% in the second quarter, compared to the first quarter's jump of 9.6%. The Age 45 Target Date Fund gained 3.5%, largely due to its higher equity allocation.
- The Index's growth in balances in the second quarter (3.3%) returned to a normal level after a robust gain in the first quarter (9.8%). Net flows were also positive but very small (0.03%).
- Target date funds (TDFs) yet again saw the largest inflows for the quarter. Both large-cap and small/mid-cap U.S. equity experienced large outflows. U.S. fixed income had relatively large inflows, while stable value options had relatively large outflows.
- Second quarter turnover (i.e., net transfer activity levels within DC plans) increased to 0.54% from the previous quarter's measure of 0.48%. Turnover has risen for three consecutive quarters but still sits below the historical average (0.60%).
- The overall allocation to equity increased to 70.0% from 69.5% in the previous quarter. The current allocation exceeds the Index's historical average by 2.2 percentage points.
- The percentage of assets allocated to U.S. large-cap equity rose. Gains as a result of strong performance outweighed outflows from the asset class. The current allocation to U.S. large-cap equity (25.2%) is now at its second highest level over the past decade.
- On the other hand, the percentage allocated to stable value decreased, while the allocation to TDFs remained steady.
- Stable value's prevalence within DC plans rose for the seventh consecutive quarter and is now at 77%. Additionally, more plans are now offering emerging market equity, global equity, and high yield fixed income as investment options.

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 (Second Quarter 2019)

(Top Two and Bottom Two Asset Gatherers)

Asset Class	Flows as % of Total Net Flows
Target Date Funds	62.56%
U.S. Fixed Income	26.82%
U.S. Smid Cap	-20.40%
U.S. Large Cap	-45.95%
Total Turnover**	**0.54%**

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.

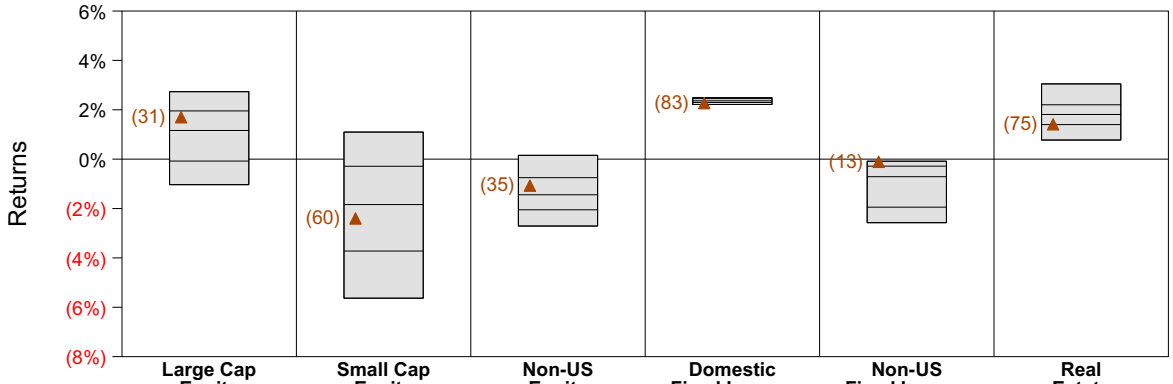
** Total Index "turnover" measures the percentage of total invested assets (transfers only, excluding contributions and withdrawals) that moved between asset classes.

Active Management
Overview

Market Overview

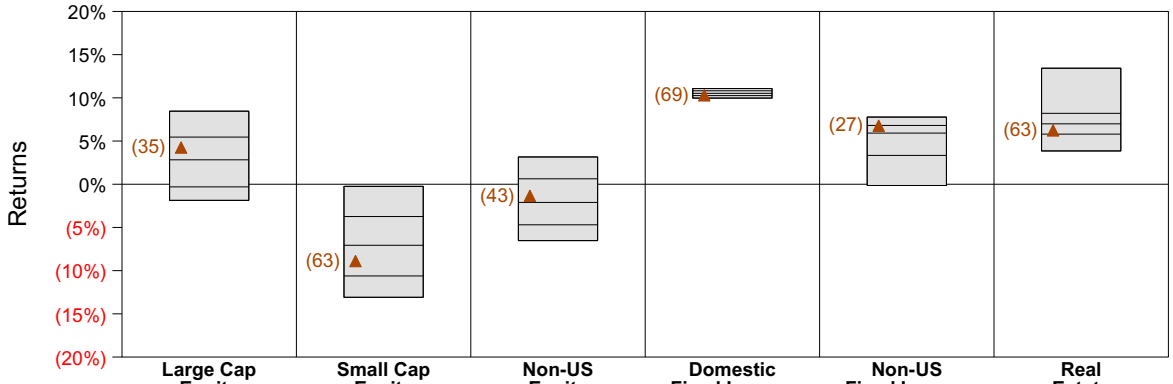
The charts below illustrate the range of returns across managers in Callan's Separate Account database over the most recent one quarter and one year time periods. The database is broken down by asset class to illustrate the difference in returns across those asset classes. An appropriate index is also shown for each asset class for comparison purposes. As an example, the first bar in the upper chart illustrates the range of returns for domestic equity managers over the last quarter. The triangle represents the S&P 500 return. The number next to the triangle represents the ranking of the S&P 500 in the Large Cap Equity manager database.

Range of Separate Account Manager Returns by Asset Class
One Quarter Ended September 30, 2019



	Large Cap Equity vs S&P 500	Small Cap Equity vs Russell 2000	Non-US Equity vs MSCI EAFE	Domestic Fixed Income vs Blmbg Aggr Bd	Non-US Fixed Income vs Citi Non-US Govt	Real Estate vs NCREIF Index
10th Percentile	2.73	1.10	0.15	2.49	(0.08)	3.05
25th Percentile	1.95	(0.29)	(0.75)	2.45	(0.28)	2.20
Median	1.16	(1.84)	(1.44)	2.36	(0.71)	1.81
75th Percentile	(0.08)	(3.72)	(2.05)	2.29	(1.95)	1.40
90th Percentile	(1.03)	(5.63)	(2.71)	2.21	(2.57)	0.77
Index ▲	1.70	(2.40)	(1.07)	2.27	(0.11)	1.41

Range of Separate Account Manager Returns by Asset Class
One Year Ended September 30, 2019

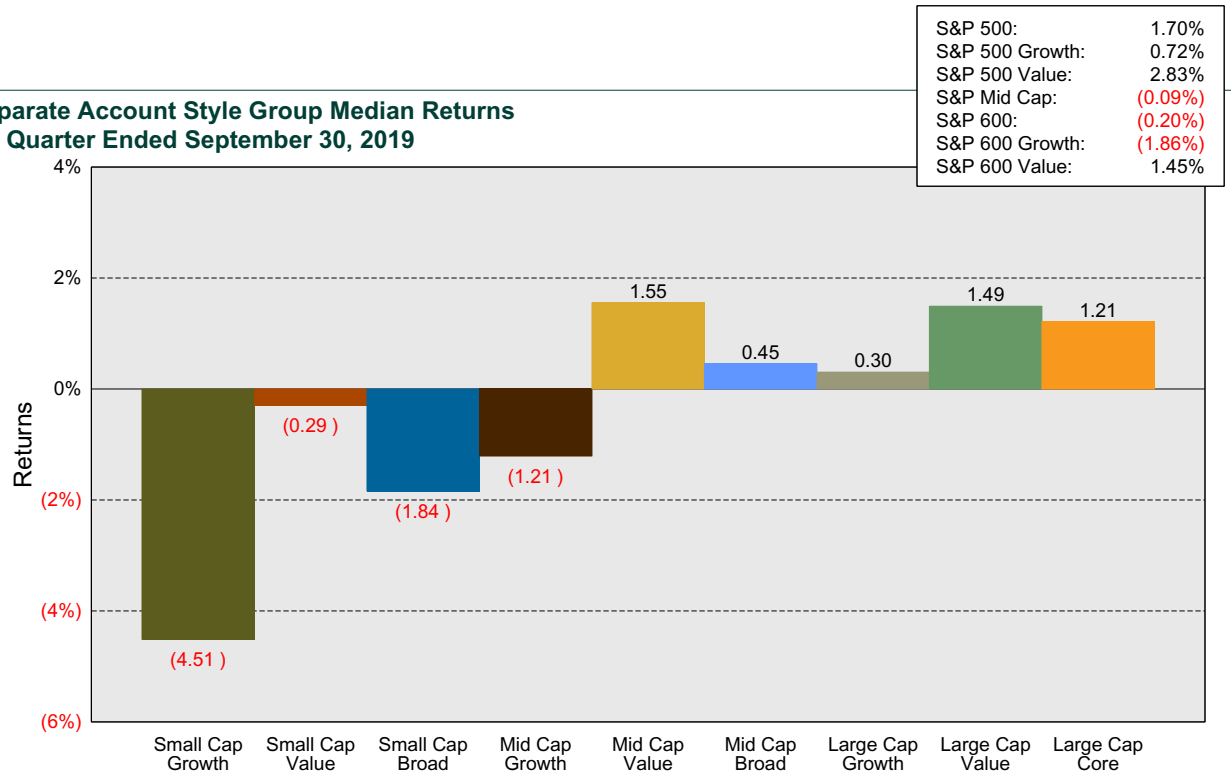


	Large Cap Equity vs S&P 500	Small Cap Equity vs Russell 2000	Non-US Equity vs MSCI EAFE	Domestic Fixed Income vs Blmbg Aggr Bd	Non-US Fixed Income vs Citi Non-US Govt	Real Estate vs NCREIF Index
10th Percentile	8.46	(0.24)	3.16	11.08	7.77	13.43
25th Percentile	5.46	(3.74)	0.63	10.82	6.80	8.21
Median	2.83	(7.07)	(2.10)	10.52	5.92	6.99
75th Percentile	(0.31)	(10.61)	(4.70)	10.26	3.34	5.80
90th Percentile	(1.87)	(13.09)	(6.52)	9.97	(0.14)	3.85
Index ▲	4.25	(8.89)	(1.34)	10.30	6.78	6.24

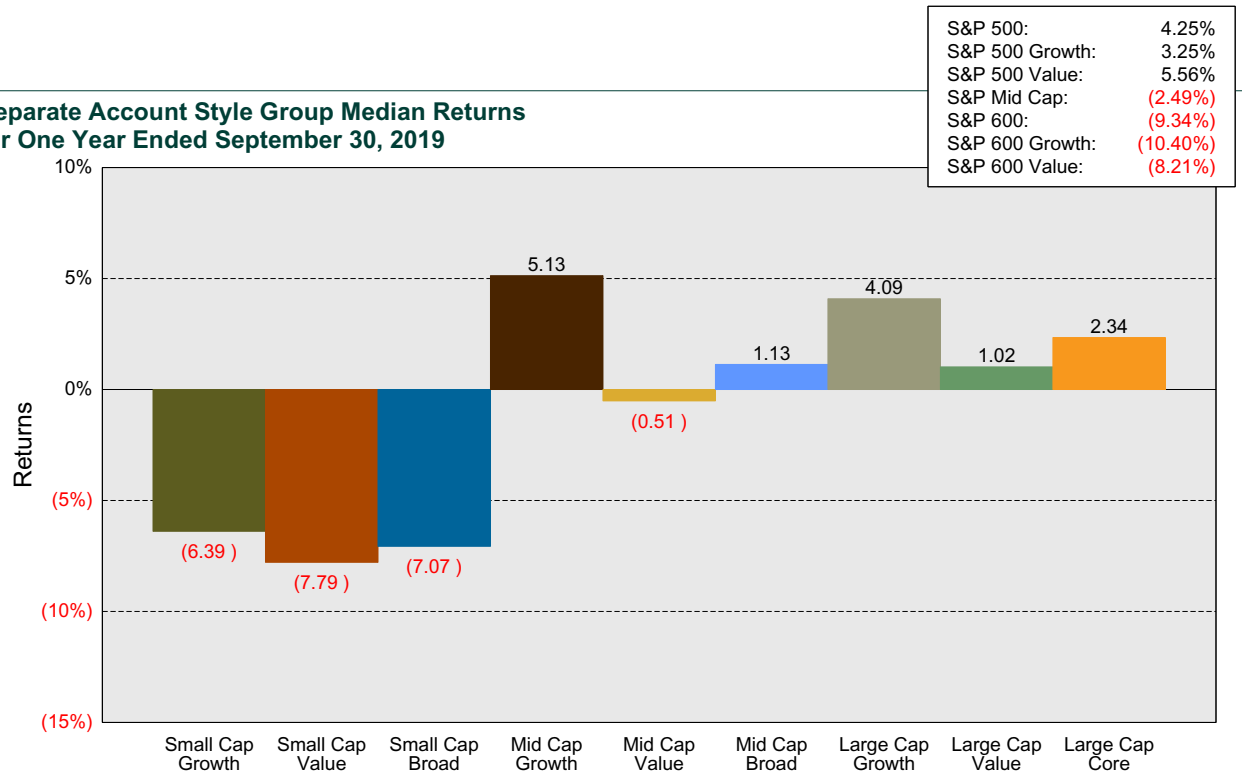
Domestic Equity
Active Management Overview

The S&P 500 Index returned 1.7% in the third quarter, bringing its y-t-d result to an impressive 20.6%. Third quarter returns were mixed across sectors. The winners were Real Estate (+7.7%) and Utilities (+9.3%), both benefiting from lower interest rates. Returns for both sectors are approaching 30% on a YTD basis. Energy, hurt by falling oil prices, lost 6.3% and is up only 6.0% for the year. Health Care was another poor performer, down 2.2% and up 5.6% YTD. From a style perspective, value mounted a comeback late in the quarter, but over the full quarter returns across styles were similar (R1000: 1.4%; R1000G: 1.5%; R1000V: 1.4%). Small caps underperformed (R2000: -2.4% vs R1000: +1.4%) and, notably, small cap value outperformed small cap growth by a significant margin (R2000V: -0.6% vs R2000G: -4.2%).

Separate Account Style Group Median Returns for Quarter Ended September 30, 2019



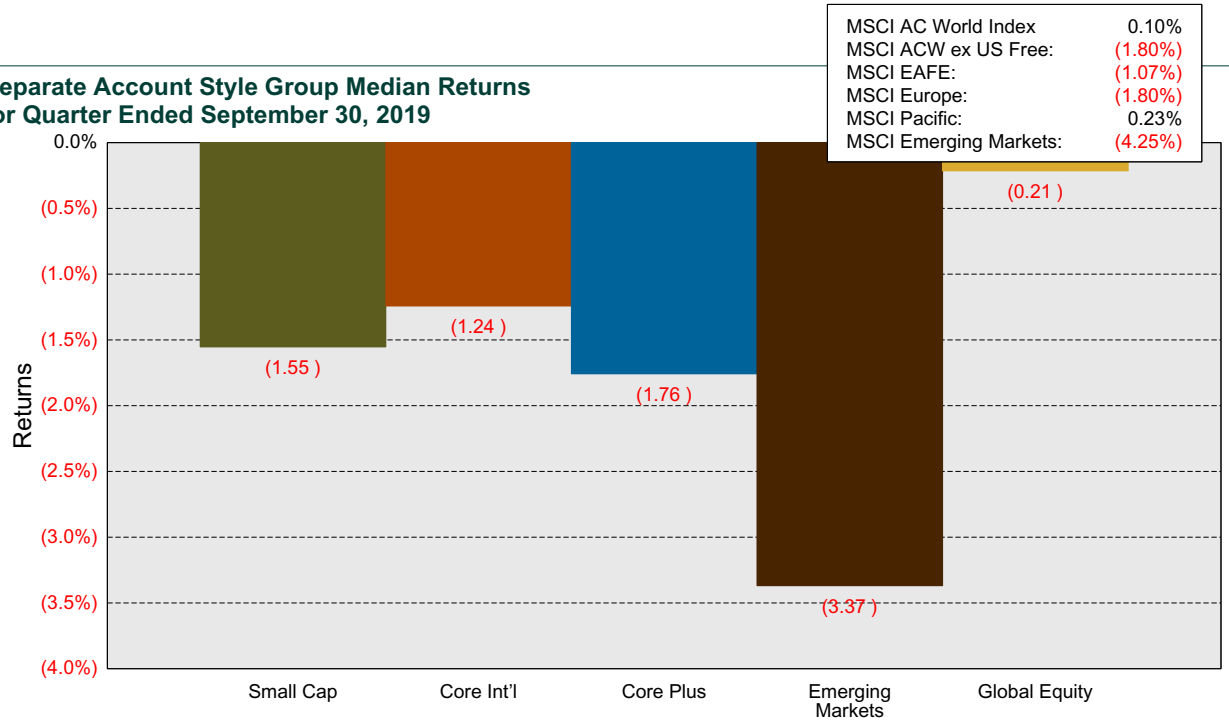
Separate Account Style Group Median Returns for One Year Ended September 30, 2019



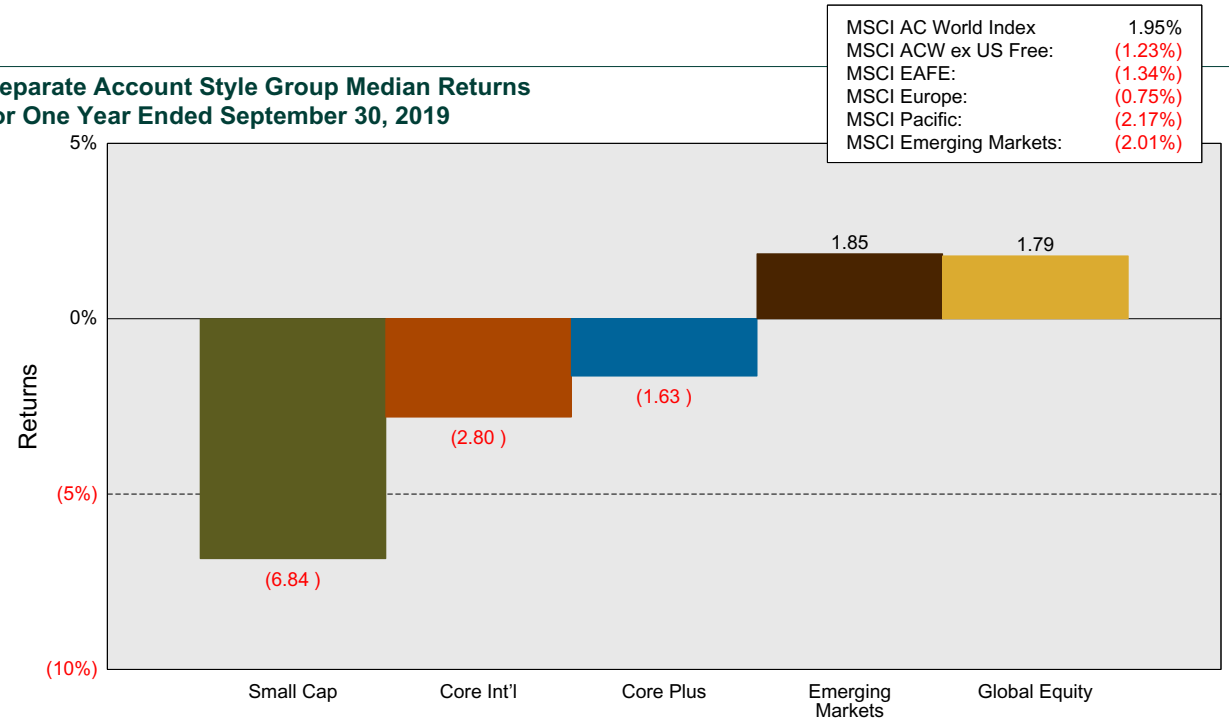
International Equity
Active Management Overview

International markets lagged the U.S. on the back of broad-based strength in the U.S.dollar. The MSCI ACWI ex USA Index fell 1.8%, with emerging markets (MSCI EM: -4.2%) underperforming developed (MSCI EAFE: -1.1%). The U.K. sank 2.5% due solely to performance of its currency, which lost just over 3% versus the U.S. dollar on Brexit-related woes. Japan (+3.1%) was one of the few countries to post a positive return, and the yen was also essentially flat vs the U.S. dollar. Brazil, India, and China were off roughly 5%, and Russia posted a more modest 1.4% loss. Political uncertainty in Argentina caused its market to lose half its value in August (-47%); that said, Argentina just entered the EM Index in May 2019 and accounts for a very small slice (less than 1%). Value underperformed growth in both developed and emerging markets and remains far behind on a YTD basis. From a sector standpoint, Technology (MSCI ACWI ex USA Technology: +2.2%) was up the most while Materials (-6.5%) and Energy (-4.6%) performed the worst.

Separate Account Style Group Median Returns for Quarter Ended September 30, 2019



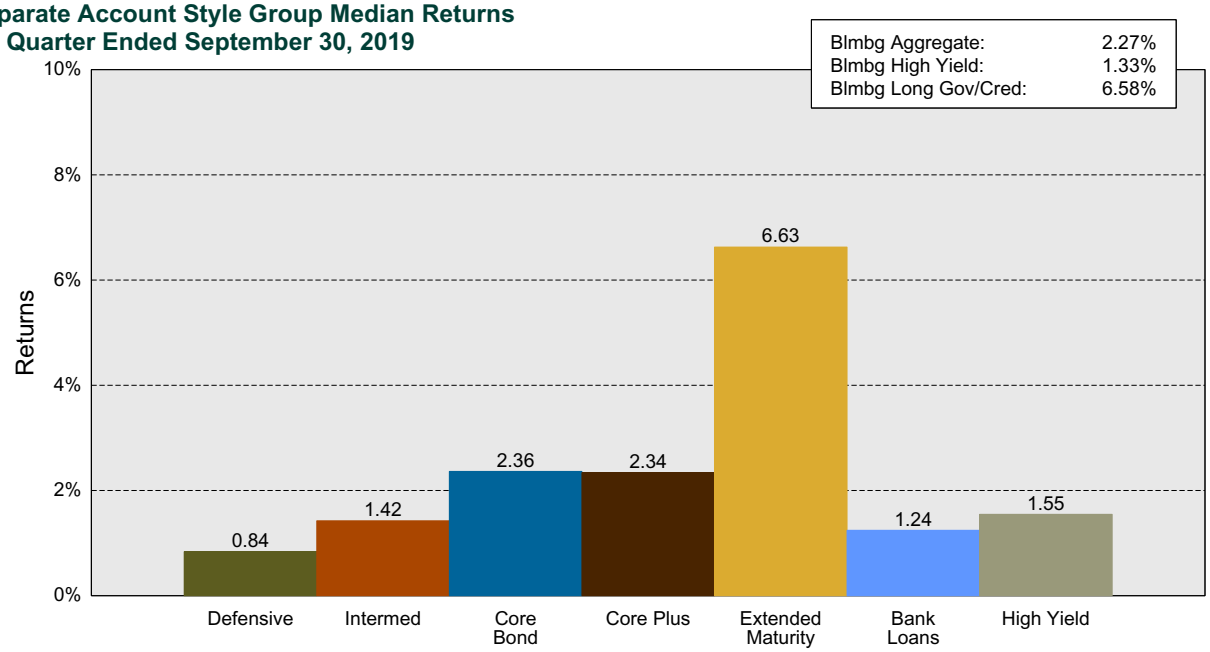
Separate Account Style Group Median Returns for One Year Ended September 30, 2019



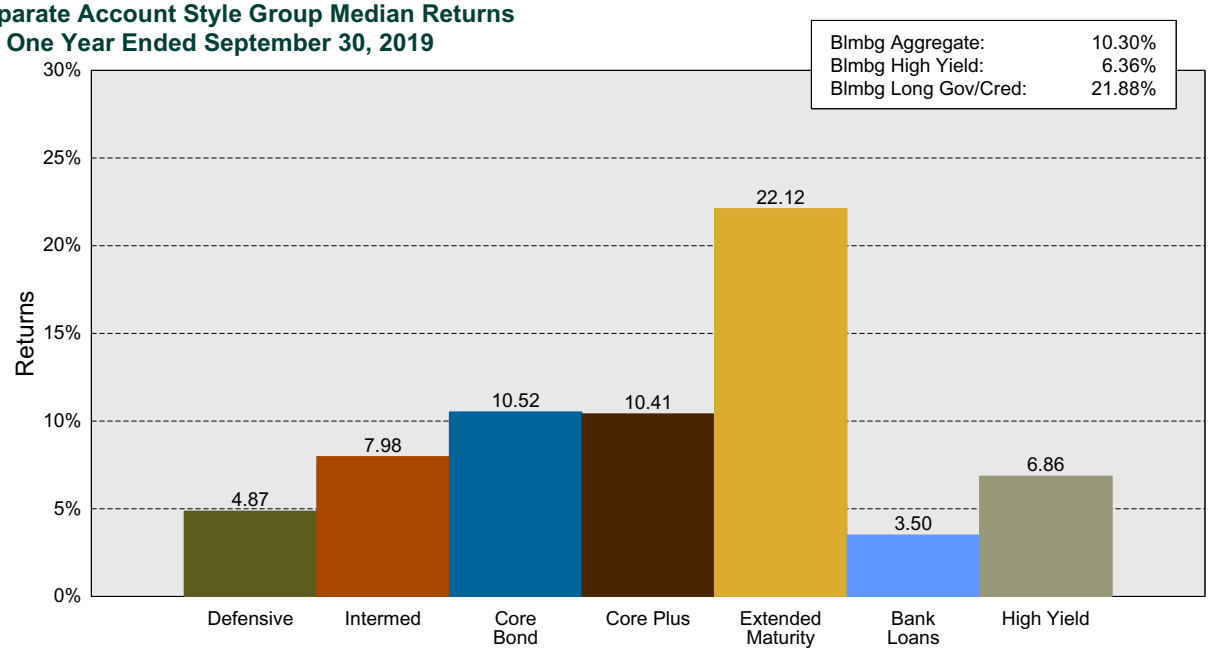
Domestic Fixed Income
Active Management Overview

Ten-year U.S. Treasury yields were volatile in the third quarter, especially in September, hitting a 2019 low of 1.40% on Sept. 4, soaring to 1.90% mid-month and closing the quarter at 1.68%, down 32 bps from June 30. U.S. Treasuries thus posted strong results (Bloomberg Barclays US Treasury Index: +2.4%). Long U.S. Treasuries soared (Bloomberg Barclays Long US Treasury Index: +7.9%; +19.8% YTD) in the falling rate environment. The Bloomberg Barclays Aggregate rose 2.3%, bringing its YTD result to an impressive +8.5%. High yield was up just over 1% (+11.4% YTD) but, notably, lower quality significantly underperformed (CCC: -1.8% vs BB: +2.0%, and +5.6% vs +12.8% YTD) representing some concern about deteriorating quality at the lower end of the spectrum. TIPS (Bloomberg Barclays TIPS: +1.3%) underperformed as inflation expectations waned; 10-year breakeven spreads were 1.53% as of quarter-end, down from 1.69% as of 6/30/19. The 10-year real yield dipped briefly into negative territory in early September.

Separate Account Style Group Median Returns for Quarter Ended September 30, 2019



Separate Account Style Group Median Returns for One Year Ended September 30, 2019



Total Fund

ASSET ALLOCATION AND PERFORMANCE

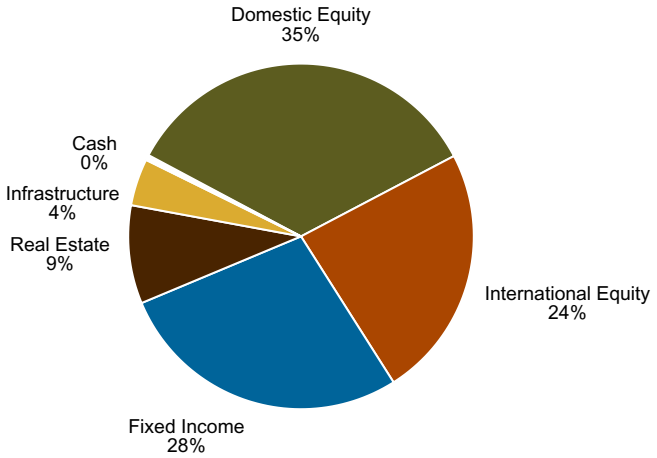
Asset Allocation and Performance

This section begins with an overview of the fund's asset allocation at the broad asset class level. This is followed by a top down performance attribution analysis which analyzes the fund's performance relative to the performance of the fund's policy target asset allocation. The fund's historical performance is then examined relative to funds with similar objectives. Performance of each asset class is then shown relative to the asset class performance of other funds. Finally, a summary is presented of the holdings of the fund's investment managers, and the returns of those managers over various recent periods.

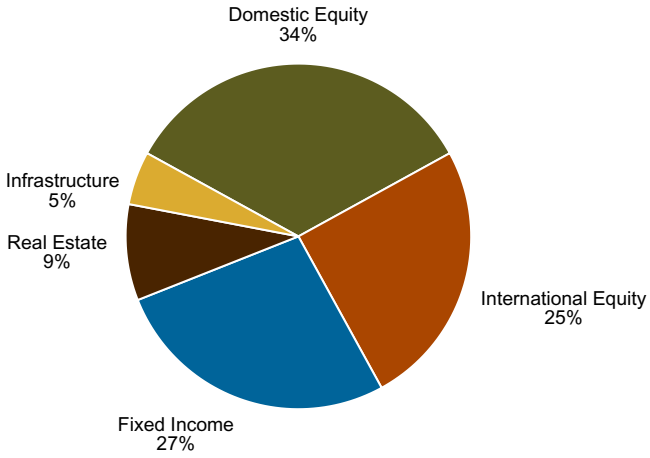
Actual vs Target Asset Allocation
As of September 30, 2019

The top left chart shows the Fund's asset allocation as of September 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

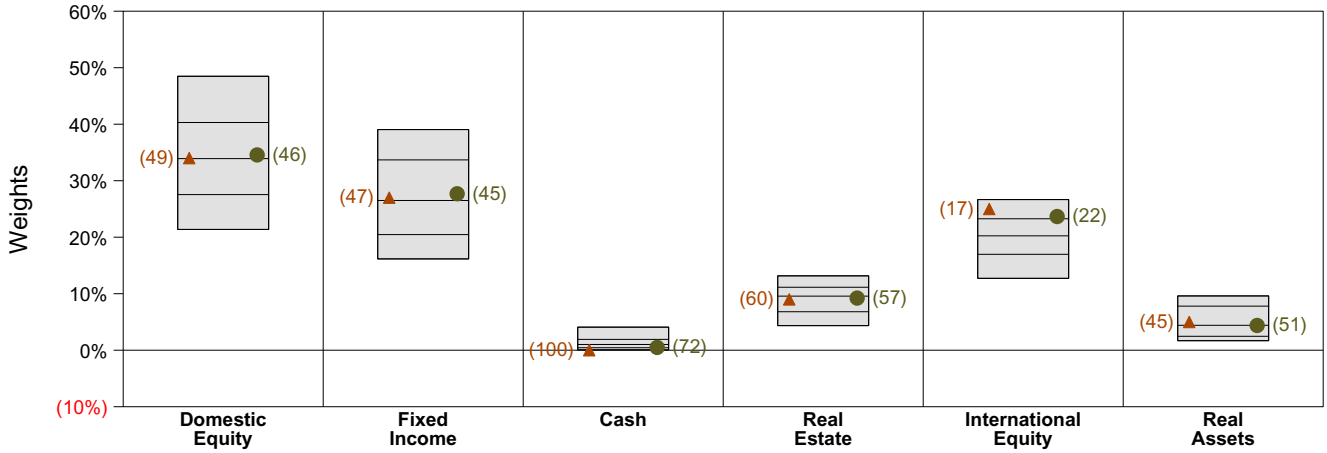


Target Asset Allocation



Asset Class	$000s Actual	Weight Actual	Target	Percent Difference	$000s Difference
Domestic Equity	288,922	34.6%	34.0%	0.6%	4,677
International Equity	197,788	23.7%	25.0%	(1.3%)	(11,217)
Fixed Income	231,455	27.7%	27.0%	0.7%	5,730
Real Estate	77,130	9.2%	9.0%	0.2%	1,888
Infrastructure	36,601	4.4%	5.0%	(0.6%)	(5,200)
Cash	4,121	0.5%	0.0%	0.5%	4,121
Total	836,017	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	48.48	39.05	4.08	13.16	26.66	9.61
25th Percentile	40.30	33.68	1.92	11.15	23.26	7.80
Median	33.91	26.50	1.02	9.57	20.24	4.41
75th Percentile	27.54	20.46	0.44	6.81	16.97	2.46
90th Percentile	21.38	16.16	0.07	4.35	12.72	1.69
Fund ●	34.56	27.69	0.49	9.23	23.66	4.38
Target ▲	34.00	27.00	0.00	9.00	25.00	5.00
% Group Invested	98.53%	97.06%	80.15%	79.41%	95.59%	27.21%

* 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 September 30, 2019, with the distribution as of June 30, 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

	September 30, 2019				June 30, 2019	
	Market Value	Weight	Net New Inv.	Inv. Return	Market Value	Weight
Domestic Equity	**$288,922,358**	**34.56%**	**$(3,016,697)**	**$548,064**	**$291,390,991**	**34.80%**
Large Cap Equity	**$221,653,467**	**26.51%**	**$(2,411,853)**	**$1,919,917**	**$222,145,403**	**26.53%**
Alliance S&P Index	67,885,488	8.12%	(605,636)	1,145,694	67,345,430	8.04%
PIMCO StocksPLUS	34,706,848	4.15%	0	556,743	34,150,105	4.08%
BlackRock Russell 1000 Value	60,662,981	7.26%	(600,000)	843,102	60,419,879	7.22%
T. Rowe Price Large Cap Growth	58,398,150	6.99%	(1,206,216)	(625,622)	60,229,989	7.19%
Small/Mid Cap Equity	**$67,268,891**	**8.05%**	**$(604,845)**	**$(1,371,853)**	**$69,245,588**	**8.27%**
Champlain Mid Cap	34,092,738	4.08%	(1,040)	(196,681)	34,290,459	4.09%
FIAM Small Cap	33,176,153	3.97%	(603,805)	(1,175,172)	34,955,130	4.17%
International Equity	**$197,787,656**	**23.66%**	**$(137,084)**	**$(3,713,741)**	**$201,638,481**	**24.08%**
Causeway International Opportunities	76,698,492	9.17%	0	(1,833,954)	78,532,446	9.38%
Aberdeen EAFE Plus	82,139,291	9.83%	(137,084)	(1,173,178)	83,449,553	9.97%
American Century Non-US SC [2]	38,949,873	4.66%	0	(706,609)	39,656,482	4.74%
Fixed Income	**$231,454,613**	**27.69%**	**$0**	**$5,138,343**	**$226,316,271**	**27.03%**
BlackRock U.S. Debt Fund	114,250,935	13.67%	0	2,547,713	111,703,222	13.34%
PIMCO Fixed Income	117,203,678	14.02%	0	2,590,629	114,613,049	13.69%
Real Estate	**$77,129,848**	**9.23%**	**$(307,309)**	**$(61,460)**	**$77,498,617**	**9.25%**
JP Morgan Strategic Property Fund	51,597,819	6.17%	0	(255,832)	51,853,651	6.19%
JP Morgan Income and Growth Fund	25,532,029	3.05%	(307,309)	194,372	25,644,966	3.06%
Infrastructure	**$36,601,184**	**4.38%**	**$(4,750,744)**	**$1,637,107**	**$39,714,821**	**4.74%**
Macquarie European Infrastructure	12,743,664	1.52%	(179,416)	215,106	12,707,974	1.52%
SteelRiver Infrastructure	23,857,520	2.85%	(4,571,328)	1,422,001	27,006,847	3.23%
Cash Composite	**$4,121,331**	**0.49%**	**$3,273,709**	**$17,395**	**$830,226**	**0.10%**
Cash	4,121,331	0.49%	3,273,709	17,395	830,226	0.10%
Total Plan	**$836,016,990**	**100.0%**	**$(4,938,125)**	**$3,565,708**	**$837,389,407**	**100.0%**

[2] 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 September 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 September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Gross of Fees					
Domestic Equity	**0.19%**	**3.00%**	**14.02%**	**11.53%**	**13.94%**
Total Domestic Equity Target (1)	0.98%	2.24%	12.47%	10.33%	13.03%
Large Cap Equity	**0.87%**	**3.60%**	**14.20%**	**11.24%**	**13.68%**
S&P 500 Index	1.70%	4.25%	13.39%	10.84%	13.24%
Alliance S&P Index	1.70%	4.27%	13.35%	10.80%	13.22%
PIMCO StocksPLUS	1.63%	4.15%	13.52%	10.76%	14.85%
S&P 500 Index	1.70%	4.25%	13.39%	10.84%	13.24%
BlackRock Russell 1000 Value Index	1.40%	4.14%	9.55%	7.87%	11.56%
Russell 1000 Value Index	1.36%	4.00%	9.43%	7.79%	11.46%
T. Rowe Price Large Cap Growth	(1.02%)	2.20%	20.07%	15.25%	16.45%
Russell 1000 Growth Index	1.49%	3.71%	16.89%	13.39%	14.94%
Small/Mid Cap Equity U.S. Equity	**(2.01%)**	**1.14%**	**13.42%**	**12.57%**	**14.80%**
Russell 2500 Index	(1.28%)	(4.04%)	9.51%	8.57%	12.22%
Champlain Mid Cap	(0.57%)	6.36%	16.79%	14.57%	15.59%
Russell MidCap Index	0.48%	3.19%	10.69%	9.10%	13.07%
FIAM Small Cap	(3.45%)	(4.45%)	9.81%	10.33%	13.98%
Russell 2000 Index	(2.40%)	(8.89%)	8.23%	8.19%	11.19%
International Equity	**(1.80%)**	**(2.74%)**	**6.08%**	**2.28%**	**4.67%**
MSCI ACWI x US (Net)	(1.80%)	(1.23%)	6.33%	2.90%	4.46%
Causeway International Opportunities (3)	(2.34%)	(5.23%)	5.69%	2.34%	6.33%
Causeway Linked Index (3)	(1.80%)	(1.23%)	6.33%	3.45%	4.99%
Aberdeen EAFE Plus	(1.41%)	2.11%	6.01%	1.46%	5.23%
MSCI ACWI x US (Net)	(1.80%)	(1.23%)	6.33%	2.90%	4.46%
American Century Non-US SC (4)	(1.55%)	(6.96%)	7.64%	-	-
MSCI ACWI ex US Small Cap	(1.19%)	(5.63%)	4.64%	3.98%	6.13%
Fixed Income	**2.27%**	**11.00%**	**4.67%**	**4.86%**	**5.23%**
Blmbg Aggregate Index	2.27%	10.30%	2.92%	3.38%	3.75%
BlackRock U.S. Debt Fund	2.28%	10.37%	3.02%	3.48%	3.87%
Blmbg Aggregate Index	2.27%	10.30%	2.92%	3.38%	3.75%
PIMCO Fixed Income	2.26%	11.62%	6.07%	5.93%	6.38%
Custom Index (2)	1.18%	9.57%	3.62%	4.41%	5.16%

(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. American Century's gross returns are provided by Manager.

Investment Manager Returns

The table below details the rates of return for the Fund's investment managers over various time periods ended September 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 September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Gross of Fees					
Real Estate	**(0.08%)**	**0.46%**	**5.33%**	**7.99%**	**9.96%**
NFI-ODCE Value Weight Gr	1.31%	5.59%	7.30%	9.34%	10.86%
JP Morgan Strategic Property Fund	(0.49%)	(0.66%)	4.86%	7.69%	10.09%
NFI-ODCE Value Weight Gr	1.31%	5.59%	7.30%	9.34%	10.86%
JP Morgan Income and Growth Fund	0.76%	2.80%	6.30%	8.70%	12.61%
NFI-ODCE Value Weight Gr	1.31%	5.59%	7.30%	9.34%	10.86%
Infrastructure	**4.25%**	**26.31%**	**19.84%**	**14.80%**	**10.80%**
CPI + 4%	1.18%	5.50%	6.05%	5.34%	5.71%
Macquarie European Infrastructure	1.75%	55.94%	44.43%	25.83%	15.29%
SteelRiver Infrastructure	5.53%	16.48%	7.25%	9.55%	9.23%
CPI + 4%	1.18%	5.50%	6.05%	5.34%	5.71%
Cash Composite	**0.53%**	**2.18%**	**1.49%**	**0.93%**	**0.54%**
Total Fund	**0.44%**	**4.30%**	**9.05%**	**7.82%**	**9.63%**
Total Fund Benchmark*	0.73%	4.23%	7.70%	6.71%	8.76%

* 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.

	6/2019-9/2019	FY 2019	FY 2018	FY 2017	FY 2016
Gross of Fees					
Domestic Equity	**0.19%**	**9.87%**	**16.87%**	**21.35%**	**1.24%**
Total Domestic Equity Target (1)	0.98%	8.32%	14.83%	18.38%	2.31%
Large Cap Equity	**0.87%**	**9.94%**	**16.40%**	**21.12%**	**1.60%**
S&P 500 Index	1.70%	10.42%	14.37%	17.90%	3.99%
Alliance S&P Index	1.70%	10.39%	14.33%	17.80%	3.97%
PIMCO StocksPLUS	1.63%	10.64%	14.13%	19.11%	2.68%
S&P 500 Index	1.70%	10.42%	14.37%	17.90%	3.99%
BlackRock Russell 1000 Value Index	1.40%	8.61%	6.88%	15.61%	2.75%
Russell 1000 Value Index	1.36%	8.46%	6.77%	15.53%	2.86%
T. Rowe Price Large Cap Growth	(1.02%)	10.46%	29.95%	31.65%	(2.64%)
Russell 1000 Growth Index	1.49%	11.56%	22.51%	20.42%	3.02%
Small/Mid Cap Equity U.S. Equity	**(2.01%)**	**9.76%**	**18.33%**	**21.97%**	**0.17%**
Russell 2500 Index	(1.28%)	1.77%	16.24%	19.84%	(3.67%)
Champlain Mid Cap	(0.57%)	16.06%	18.85%	22.50%	4.64%
Russell MidCap Index	0.48%	7.83%	12.33%	16.48%	0.56%
FIAM Small Cap	(3.45%)	2.94%	17.78%	21.31%	(4.41%)
Russell 2000 Index	(2.40%)	(3.31%)	17.57%	24.60%	(6.73%)
International Equity	**(1.80%)**	**(1.87%)**	**8.64%**	**20.73%**	**(9.40%)**
MSCI ACWI x US (Net)	(1.80%)	1.29%	7.28%	20.45%	(10.24%)
Causeway International Opportunities (3)	(2.34%)	(2.57%)	7.29%	23.39%	(11.66%)
Causeway Linked Index (3)	(1.80%)	1.29%	7.28%	20.45%	(9.42%)
Aberdeen EAFE Plus	(1.41%)	3.04%	3.38%	18.30%	(7.60%)
MSCI ACWI x US (Net)	(1.80%)	1.29%	7.28%	20.45%	(10.24%)
American Century Non-US SC (4)	(1.55%)	(9.14%)	23.86%	21.46%	-
MSCI ACWI ex US Small Cap	(1.19%)	(5.94%)	10.57%	20.32%	(5.46%)
Fixed Income	**2.27%**	**9.29%**	**0.43%**	**4.58%**	**6.39%**
Blmbg Aggregate Index	2.27%	7.87%	(0.40%)	(0.31%)	6.00%
BlackRock U.S. Debt Fund	2.28%	7.97%	(0.31%)	(0.21%)	6.13%
Blmbg Aggregate Index	2.27%	7.87%	(0.40%)	(0.31%)	6.00%
PIMCO Fixed Income	2.26%	10.57%	1.16%	7.99%	6.55%
Custom Index (2)	1.18%	9.53%	(1.05%)	3.83%	7.28%

(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's gross returns are provided by Manager.

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.

	6/2019-9/2019	FY 2019	FY 2018	FY 2017	FY 2016
Gross of Fees					
Real Estate	**(0.08%)**	**2.47%**	**7.72%**	**8.07%**	**10.80%**
NFI-ODCE Value Weight Gr	1.31%	6.41%	8.44%	7.87%	11.82%
JP Morgan Strategic Property Fund	(0.49%)	1.65%	7.80%	7.94%	11.10%
NFI-ODCE Value Weight Gr	1.31%	6.41%	8.44%	7.87%	11.82%
JP Morgan Income and Growth Fund	0.76%	4.19%	7.54%	8.27%	10.06%
NFI-ODCE Value Weight Gr	1.31%	6.41%	8.44%	7.87%	11.82%
Infrastructure	**4.25%**	**25.97%**	**18.95%**	**12.69%**	**12.61%**
CPI + 4%	1.18%	5.44%	7.09%	5.50%	4.64%
Macquarie European Infrastructure	1.75%	57.37%	59.87%	20.04%	6.82%
SteelRiver Infrastructure	5.53%	15.27%	(2.94%)	7.09%	17.75%
CPI + 4%	1.18%	5.44%	7.09%	5.50%	4.64%
Cash Composite	**0.53%**	**2.11%**	**1.22%**	**0.68%**	**0.12%**
Total Fund	**0.44%**	**6.69%**	**9.81%**	**14.77%**	**2.33%**
Total Fund Benchmark*	0.73%	6.28%	7.96%	12.04%	1.82%

* 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 September 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.

	FY 2015	FY 2014	FY 2013	FY 2012	FY 2011
Gross of Fees					
Domestic Equity	**9.01%**	**26.67%**	**23.35%**	**2.92%**	**33.98%**
Total Domestic Equity Target (1)	7.15%	24.84%	21.70%	3.77%	32.56%
Large Cap Equity	**7.96%**	**27.15%**	**22.41%**	**3.48%**	**32.04%**
S&P 500 Index	7.42%	24.61%	20.60%	5.45%	30.69%
Alliance S&P Index	7.43%	24.50%	20.51%	5.48%	30.36%
PIMCO StocksPLUS	7.57%	27.61%	24.51%	5.80%	36.12%
S&P 500 Index	7.42%	24.61%	20.60%	5.45%	30.69%
BlackRock Russell 1000 Value Index	4.34%	23.88%	25.36%	3.07%	29.08%
Russell 1000 Value Index	4.13%	23.81%	25.32%	3.01%	28.94%
T. Rowe Price Large Cap Growth	12.35%	32.80%	20.37%	5.19%	35.07%
Russell 1000 Growth Index	10.56%	26.92%	17.07%	5.76%	35.01%
Small/Mid Cap Equity U.S. Equity	**12.68%**	**24.97%**	**26.35%**	**0.64%**	**41.67%**
Russell 2500 Index	5.92%	25.58%	25.61%	(2.29%)	39.28%
Champlain Mid Cap	10.27%	26.20%	22.88%	0.78%	36.29%
Russell MidCap Index	6.63%	26.85%	25.41%	(1.65%)	38.47%
FIAM Small Cap	15.07%	23.59%	29.74%	0.44%	45.35%
Russell 2000 Index	6.49%	23.64%	24.21%	(2.08%)	37.41%
International Equity	**(5.79%)**	**21.26%**	**17.18%**	**(14.49%)**	**30.95%**
MSCI ACWI x US (Net)	(5.26%)	21.75%	13.63%	(14.57%)	29.73%
Causeway International Opportunities (3)	(2.38%)	23.76%	22.07%	(10.83%)	35.68%
Causeway Linked Index (3)	(4.22%)	23.57%	18.62%	(13.83%)	30.36%
Aberdeen EAFE Plus	(10.16%)	18.20%	11.69%	(4.27%)	31.73%
MSCI ACWI x US (Net)	(5.26%)	21.75%	13.63%	(14.57%)	29.73%
Fixed Income	**0.78%**	**7.64%**	**1.84%**	**8.32%**	**4.66%**
Blmbg Aggregate Index	1.86%	4.37%	(0.69%)	7.47%	3.90%
BlackRock U.S. Debt Fund	1.99%	4.49%	(0.48%)	7.55%	4.04%
Blmbg Aggregate Index	1.86%	4.37%	(0.69%)	7.47%	3.90%
PIMCO Fixed Income	0.05%	9.60%	3.27%	9.56%	5.64%
Custom Index (2)	0.75%	8.48%	2.41%	7.63%	5.86%

(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 updated 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 September 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.

	FY 2015	FY 2014	FY 2013	FY 2012	FY 2011
Gross of Fees					
Real Estate	**13.92%**	**13.27%**	**16.00%**	**11.63%**	**18.18%**
NFI-ODCE Value Weight Gr	14.43%	12.77%	12.17%	12.42%	20.48%
JP Morgan Strategic Property Fund	13.37%	14.08%	14.08%	12.00%	18.91%
NFI-ODCE Value Weight Gr	14.43%	12.77%	12.17%	12.42%	20.48%
JP Morgan Income and Growth Fund	16.19%	11.66%	25.49%	18.15%	33.69%
NFI-ODCE Value Weight Gr	14.43%	12.77%	12.17%	12.42%	20.48%
Cash Composite	**0.00%**	**0.00%**	**0.05%**	**0.03%**	**0.25%**
Total Fund	**4.63%**	**19.64%**	**14.84%**	**2.40%**	**23.19%**
Total Fund Benchmark*	4.34%	16.97%	12.87%	3.04%	22.53%

* 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 September 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 September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Net of Fees					
Domestic Equity	**0.19%**	**2.91%**	**13.76%**	**11.25%**	**13.59%**
Total Domestic Equity Target (1)	0.98%	2.24%	12.47%	10.33%	13.03%
Large Cap Equity	**0.87%**	**3.55%**	**14.07%**	**11.10%**	**13.48%**
S&P 500 Index	1.70%	4.25%	13.39%	10.84%	13.24%
Alliance S&P Index	1.70%	4.26%	13.32%	10.77%	13.18%
PIMCO StocksPLUS	1.63%	4.15%	13.52%	10.76%	14.75%
S&P 500 Index	1.70%	4.25%	13.39%	10.84%	13.24%
BlackRock Russell 1000 Value Index	1.40%	4.11%	9.51%	7.83%	11.54%
Russell 1000 Value Index	1.36%	4.00%	9.43%	7.79%	11.46%
T. Rowe Price Large Cap Growth	(1.02%)	2.06%	19.66%	14.81%	15.95%
Russell 1000 Growth Index	1.49%	3.71%	16.89%	13.39%	14.94%
Small/Mid Cap Equity U.S. Equity	**(2.01%)**	**0.92%**	**12.75%**	**11.82%**	**13.97%**
Russell 2500 Index	(1.28%)	(4.04%)	9.51%	8.57%	12.22%
Champlain Mid Cap	(0.57%)	6.12%	16.03%	13.73%	14.68%
Russell MidCap Index	0.48%	3.19%	10.69%	9.10%	13.07%
FIAM Small Cap	(3.45%)	(4.65%)	9.23%	9.66%	13.21%
Russell 2000 Index	(2.40%)	(8.89%)	8.23%	8.19%	11.19%
International Equity	**(1.91%)**	**(3.10%)**	**5.64%**	**1.76%**	**4.01%**
MSCI ACWI x US (Net)	(1.80%)	(1.23%)	6.33%	2.90%	4.46%
Causeway International Opportunities (3)	(2.34%)	(5.32%)	5.37%	1.90%	5.75%
Causeway Linked Index (3)	(1.80%)	(1.23%)	6.33%	3.45%	4.99%
Aberdeen EAFE Plus	(1.57%)	1.60%	5.36%	0.80%	4.47%
MSCI ACWI x US (Net)	(1.80%)	(1.23%)	6.33%	2.90%	4.46%
American Century Non-US SC	(1.78%)	(7.85%)	6.60%	-	-
MSCI ACWI ex US Small Cap	(1.19%)	(5.63%)	4.64%	3.98%	6.13%
Fixed Income	**2.27%**	**10.92%**	**4.45%**	**4.59%**	**4.95%**
Blmbg Aggregate Index	2.27%	10.30%	2.92%	3.38%	3.75%
BlackRock U.S. Debt Fund	2.28%	10.36%	2.98%	3.43%	3.84%
Blmbg Aggregate Index	2.27%	10.30%	2.92%	3.38%	3.75%
PIMCO Fixed Income	2.26%	11.48%	5.69%	5.49%	5.94%
Custom Index (2)	1.18%	9.57%	3.62%	4.41%	5.16%

(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 updated accordingly from EAFE to ACWI ex-US (Net Div).
(4) American Century Non-US SC was funded during second quarter 2016.

Investment Manager Returns

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Returns for Periods Ended September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Net of Fees					
Real Estate	**(0.17%)**	**(0.05%)**	**4.47%**	**7.01%**	**8.82%**
NFI-ODCE Equal Weight Net	1.18%	5.26%	6.69%	8.68%	9.89%
JP Morgan Strategic Property Fund	(0.49%)	(0.90%)	4.07%	6.78%	9.09%
NFI-ODCE Equal Weight Net	1.18%	5.26%	6.69%	8.68%	9.89%
JP Morgan Income and Growth Fund	0.50%	1.73%	5.28%	7.54%	11.13%
NFI-ODCE Equal Weight Net	1.18%	5.26%	6.69%	8.68%	9.89%
Infrastructure	**3.71%**	**21.86%**	**14.29%**	**11.18%**	**8.15%**
CPI + 4%	1.18%	5.50%	6.05%	5.34%	5.71%
Macquarie European Infrastructure	0.33%	38.03%	27.87%	16.55%	10.14%
SteelRiver Infrastructure	5.41%	15.81%	6.79%	8.85%	7.90%
CPI + 4%	1.18%	5.50%	6.05%	5.34%	5.71%
Cash Composite	**0.53%**	**2.18%**	**1.49%**	**0.93%**	**0.54%**
Total Fund	**0.38%**	**3.95%**	**8.42%**	**7.26%**	**9.06%**
Total Fund Benchmark*	0.73%	4.23%	7.70%	6.71%	8.76%

* 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%.

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	6/2019-9/2019	FY 2019	FY 2018	FY 2017	FY 2016
Net of Fees					
Domestic Equity	**0.19%**	**9.69%**	**16.55%**	**20.96%**	**0.94%**
Total Domestic Equity Target (1)	0.98%	8.32%	14.83%	18.38%	2.31%
Large Cap Equity	**0.87%**	**9.84%**	**16.25%**	**20.92%**	**1.44%**
S&P 500 Index	1.70%	10.42%	14.37%	17.90%	3.99%
Alliance S&P Index	1.70%	10.37%	14.29%	17.76%	3.93%
PIMCO StocksPLUS	1.63%	10.64%	14.13%	19.11%	2.68%
S&P 500 Index	1.70%	10.42%	14.37%	17.90%	3.99%
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Russell 1000 Growth Index	1.49%	11.56%	22.51%	20.42%	3.02%
Small/Mid Cap Equity U.S. Equity	**(2.01%)**	**9.31%**	**17.44%**	**20.95%**	**(0.61%)**
Russell 2500 Index	(1.28%)	1.77%	16.24%	19.84%	(3.67%)
Champlain Mid Cap	(0.57%)	15.57%	17.80%	21.43%	3.76%
Russell MidCap Index	0.48%	7.83%	12.33%	16.48%	0.56%
FIAM Small Cap	(3.45%)	2.54%	17.06%	20.34%	(5.10%)
Russell 2000 Index	(2.40%)	(3.31%)	17.57%	24.60%	(6.73%)
International Equity	**(1.91%)**	**(2.15%)**	**8.12%**	**20.24%**	**(10.04%)**
MSCI ACWI x US (Net)	(1.80%)	1.29%	7.28%	20.45%	(10.24%)
Causeway International Opportunities (3)	(2.34%)	(2.75%)	6.84%	22.89%	(12.24%)
Causeway Linked Index (3)	(1.80%)	1.29%	7.28%	20.45%	(9.42%)
Aberdeen EAFE Plus	(1.57%)	2.70%	2.61%	17.60%	(8.32%)
MSCI ACWI x US (Net)	(1.80%)	1.29%	7.28%	20.45%	(10.24%)
American Century Non-US SC	(1.78%)	(10.00%)	22.61%	20.31%	-
MSCI ACWI ex US Small Cap	(1.19%)	(5.94%)	10.57%	20.32%	(5.46%)
Fixed Income	**2.27%**	**9.14%**	**0.14%**	**4.27%**	**6.05%**
Blmbg Aggregate Index	2.27%	7.87%	(0.40%)	(0.31%)	6.00%
BlackRock U.S. Debt Fund	2.28%	7.96%	(0.38%)	(0.25%)	6.07%
Blmbg Aggregate Index	2.27%	7.87%	(0.40%)	(0.31%)	6.00%
PIMCO Fixed Income	2.26%	10.30%	0.65%	7.49%	6.04%
Custom Index (2)	1.18%	9.53%	(1.05%)	3.83%	7.28%

(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.
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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.

	6/2019-9/2019	FY 2019	FY 2018	FY 2017	FY 2016
Net of Fees					
Real Estate	**(0.17%)**	**1.78%**	**6.59%**	**7.07%**	**9.64%**
NFI-ODCE Equal Weight Net	1.18%	5.99%	7.68%	7.23%	11.24%
JP Morgan Strategic Property Fund	(0.49%)	1.15%	6.68%	6.88%	10.02%
NFI-ODCE Equal Weight Net	1.18%	5.99%	7.68%	7.23%	11.24%
JP Morgan Income and Growth Fund	0.50%	3.11%	6.43%	7.37%	8.69%
NFI-ODCE Equal Weight Net	1.18%	5.99%	7.68%	7.23%	11.24%
Infrastructure	**3.71%**	**21.76%**	**8.04%**	**11.42%**	**12.30%**
CPI + 4%	1.18%	5.44%	7.09%	5.50%	4.64%
Macquarie European Infrastructure	0.33%	40.10%	27.95%	17.65%	6.82%
SteelRiver Infrastructure	5.41%	14.56%	(3.21%)	6.64%	17.13%
CPI + 4%	1.18%	5.44%	7.09%	5.50%	4.64%
Cash Composite	**0.53%**	**2.11%**	**1.22%**	**0.68%**	**0.12%**
Total Fund - Standard	**0.38%**	**6.29%**	**8.77%**	**14.26%**	**1.89%**
Total Fund - IRR	0.38%	6.14%	8.85%	14.26%	2.38%
Total Fund Benchmark*	0.73%	6.28%	7.96%	12.04%	1.82%

The Total Fund/Plan IRR Calculation is based upon best available data.
* 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 September 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.

	FY 2015	FY 2014	FY 2013	FY 2012	FY 2011
Net of Fees					
Domestic Equity	**8.72%**	**26.30%**	**22.90%**	**2.50%**	**33.44%**
Total Domestic Equity Target (1)	7.15%	24.84%	21.70%	3.77%	32.56%
Large Cap Equity	**7.83%**	**26.95%**	**22.21%**	**3.21%**	**31.66%**
S&P 500 Index	7.42%	24.61%	20.60%	5.45%	30.69%
Alliance S&P Index	7.40%	24.45%	20.46%	5.43%	30.30%
PIMCO StocksPLUS	7.57%	27.61%	23.83%	5.56%	36.04%
S&P 500 Index	7.42%	24.61%	20.60%	5.45%	30.69%
BlackRock Russell 1000 Value Index	4.30%	23.83%	25.35%	3.07%	29.08%
Russell 1000 Value Index	4.13%	23.81%	25.32%	3.01%	28.94%
T. Rowe Price Large Cap Growth	11.93%	32.16%	19.79%	4.67%	34.41%
Russell 1000 Growth Index	10.56%	26.92%	17.07%	5.76%	35.01%
Small/Mid Cap Equity U.S. Equity	**11.80%**	**24.00%**	**25.36%**	**(0.16%)**	**40.57%**
Russell 2500 Index	5.92%	25.58%	25.61%	(2.29%)	39.28%
Champlain Mid Cap	9.33%	25.16%	21.86%	(0.08%)	35.17%
Russell MidCap Index	6.63%	26.85%	25.41%	(1.65%)	38.47%
FIAM Small Cap	14.24%	22.70%	28.79%	(0.31%)	44.30%
Russell 2000 Index	6.49%	23.64%	24.21%	(2.08%)	37.41%
International Equity	**(6.46%)**	**20.41%**	**16.34%**	**(15.16%)**	**29.90%**
MSCI ACWI x US (Net)	(5.26%)	21.75%	13.63%	(14.57%)	29.73%
Causeway International Opportunities (3)	(3.01%)	22.98%	21.27%	(11.43%)	34.80%
Causeway Linked Index (3)	(4.22%)	23.57%	18.62%	(13.83%)	30.36%
Aberdeen EAFE Plus	(10.90%)	17.28%	10.80%	(5.04%)	30.75%
MSCI ACWI x US (Net)	(5.26%)	21.75%	13.63%	(14.57%)	29.73%
Fixed Income	**0.45%**	**7.30%**	**1.51%**	**8.03%**	**4.42%**
Blmbg Aggregate Index	1.86%	4.37%	(0.69%)	7.47%	3.90%
BlackRock U.S. Debt Fund	1.94%	4.43%	(0.49%)	7.55%	4.04%
Blmbg Aggregate Index	1.86%	4.37%	(0.69%)	7.47%	3.90%
PIMCO Fixed Income	(0.43%)	9.07%	2.77%	9.15%	5.28%
Custom Index (2)	0.75%	8.48%	2.41%	7.63%	5.86%

(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 updated 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 September 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.

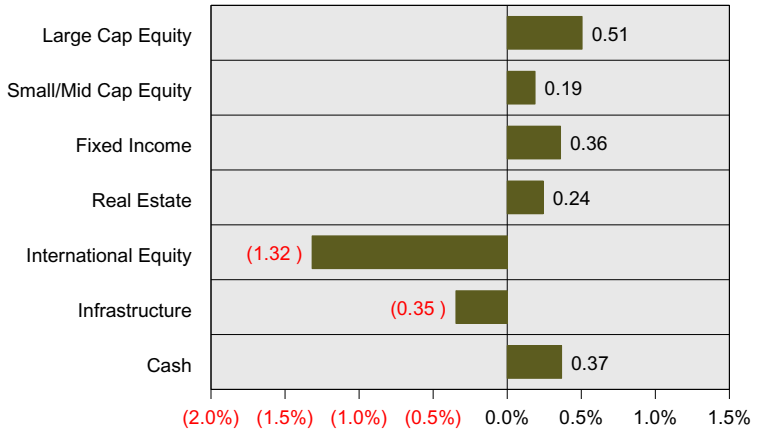
	FY 2015	FY 2014	FY 2013	FY 2012	FY 2011
Net of Fees					
Real Estate	**12.74%**	**12.03%**	**14.67%**	**10.34%**	**16.77%**
NFI-ODCE Equal Weight Net	13.64%	11.37%	10.80%	11.46%	19.33%
JP Morgan Strategic Property Fund	12.28%	12.98%	12.95%	10.90%	17.75%
NFI-ODCE Equal Weight Net	13.64%	11.37%	10.80%	11.46%	19.33%
JP Morgan Income and Growth Fund	14.74%	9.93%	23.54%	16.49%	31.44%
NFI-ODCE Equal Weight Net	13.64%	11.37%	10.80%	11.46%	19.33%
Cash Composite	**(0.00%)**	**0.00%**	**0.05%**	**0.03%**	**0.25%**
Total Fund - Standard	**4.17%**	**19.11%**	**14.21%**	**1.82%**	**22.52%**
Total Fund - IRR	4.17%	19.17%	11.02%	(3.08%)	16.78%
Total Fund Benchmark*	4.34%	16.97%	12.87%	3.04%	22.53%

The Total Fund/Plan IRR Calculation is based upon best available data.
* 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%.

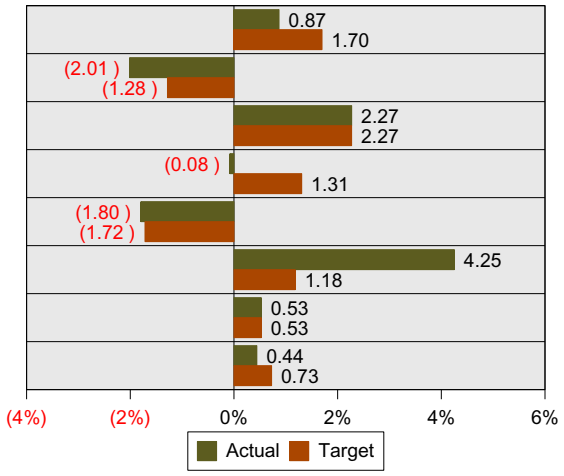
Quarterly Style Attribution - September 30, 2019

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.

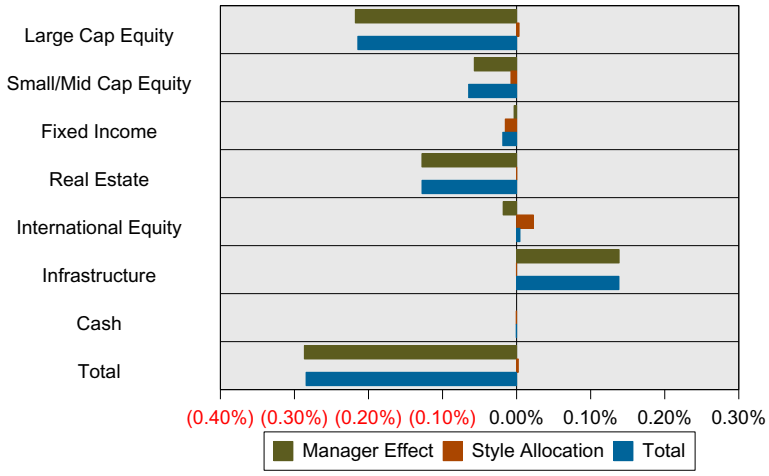
Style Class Under or Overweighting



Actual vs Target Returns



Relative Attribution by Style Class



Relative Attribution Effects for Quarter ended September 30, 2019

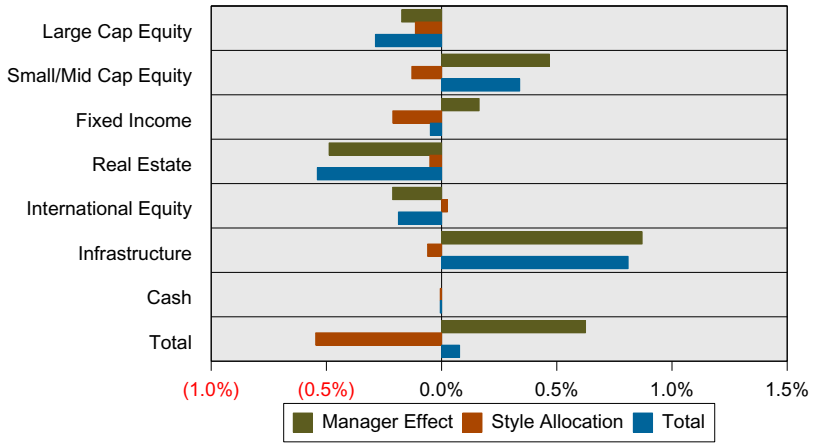
Style Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Style Allocation	Total Relative Return
Large Cap Equity	27%	26%	0.87%	1.70%	(0.22%)	0.00%	(0.21%)
Small/Mid Cap Equity	8%	8%	(2.01%)	(1.28%)	(0.06%)	(0.01%)	(0.06%)
Fixed Income	27%	27%	2.27%	2.27%	(0.00%)	(0.02%)	(0.02%)
Real Estate	9%	9%	(0.08%)	1.31%	(0.13%)	0.00%	(0.13%)
International Equity	24%	25%	(1.80%)	(1.72%)	(0.02%)	0.02%	0.00%
Infrastructure	5%	5%	4.25%	1.18%	0.14%	(0.00%)	0.14%
Cash	0%	0%	0.53%	0.53%	0.00%	(0.00%)	(0.00%)
Total			**0.44% =**	**0.73% +**	**(0.29%) +**	**0.00%**	**(0.28%)**

* 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%.

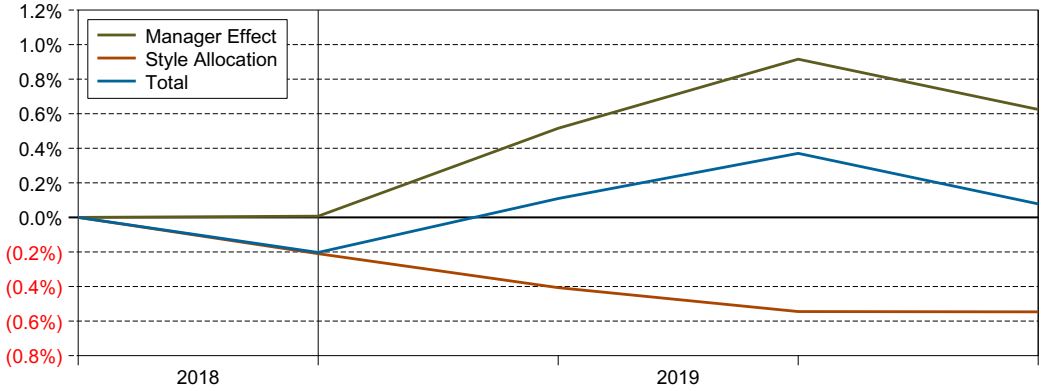
Cumulative Style Relative Attribution - September 30, 2019

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

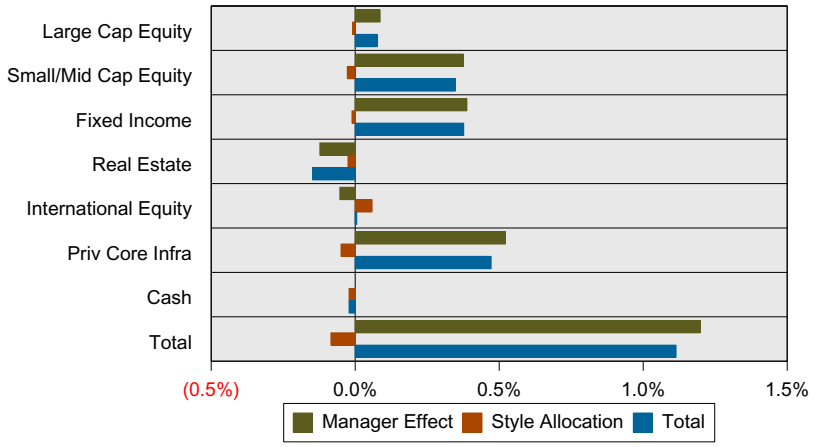
Style Class	Effective Actual Weight	Effective Target Weight	Actual Return		Target Return		Manager Effect		Style Allocation	Total Relative Return
Large Cap Equity	27%	26%	3.60%		4.25%		(0.17%)		(0.11%)	(0.29%)
Small/Mid Cap Equity	8%	8%	1.14%		(4.04%)		0.47%		(0.13%)	0.34%
Fixed Income	27%	27%	11.00%		10.30%		0.16%		(0.21%)	(0.05%)
Real Estate	10%	9%	0.46%		5.59%		(0.49%)		(0.05%)	(0.54%)
International Equity	24%	25%	(2.74%)		(1.84%)		(0.21%)		0.03%	(0.19%)
Infrastructure	5%	5%	26.31%		5.50%		0.87%		(0.06%)	0.81%
Cash	0%	0%	2.18%		2.18%		0.00%		(0.01%)	(0.01%)
Total			**4.30%**	**=**	**4.23%**	**+**	**0.62%**	**+**	**(0.55%)**	**0.08%**

* 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%.

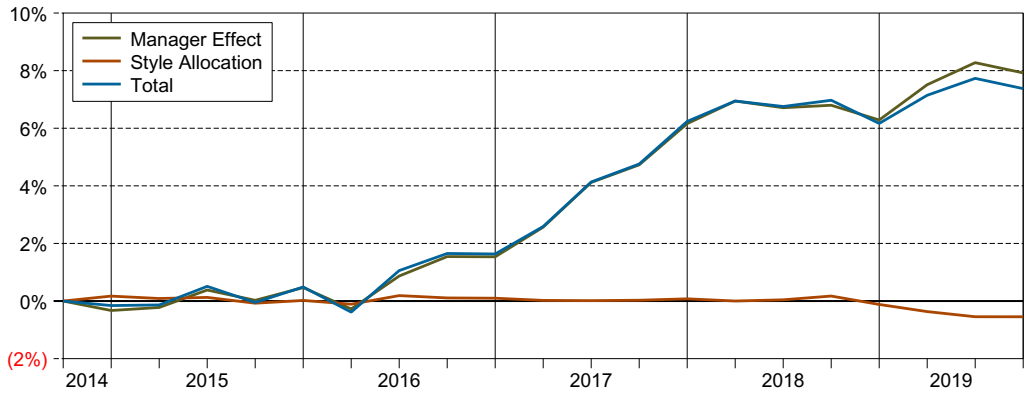
Cumulative Style Relative Attribution - September 30, 2019

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

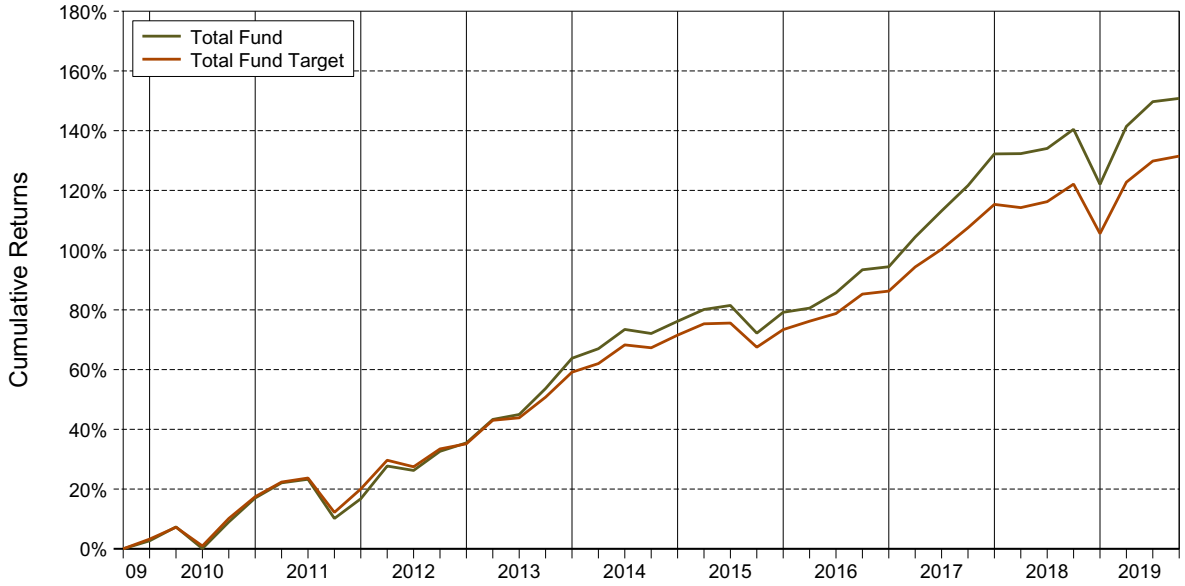
Style Class	Effective Actual Weight	Effective Target Weight	Actual Return		Target Return		Manager Effect		Style Allocation	Total Relative Return
Large Cap Equity	30%	29%	11.24%		10.84%		0.09%		(0.01%)	0.08%
Small/Mid Cap Equity	9%	9%	12.57%		8.57%		0.38%		(0.03%)	0.35%
Fixed Income	25%	27%	4.86%		3.38%		0.39%		(0.01%)	0.38%
Real Estate	9%	9%	7.99%		9.34%		(0.12%)		(0.03%)	(0.15%)
International Equity	21%	22%	2.28%		2.78%		(0.05%)		0.06%	0.01%
Priv Core Infra	5%	5%	14.80%		5.34%		0.52%		(0.05%)	0.47%
Cash	0%	0%	0.93%		0.93%		0.00%		(0.02%)	(0.02%)
Total			**7.82%**	**=**	**6.71%**	**+**	**1.20%**	**+**	**(0.08%)**	**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%.

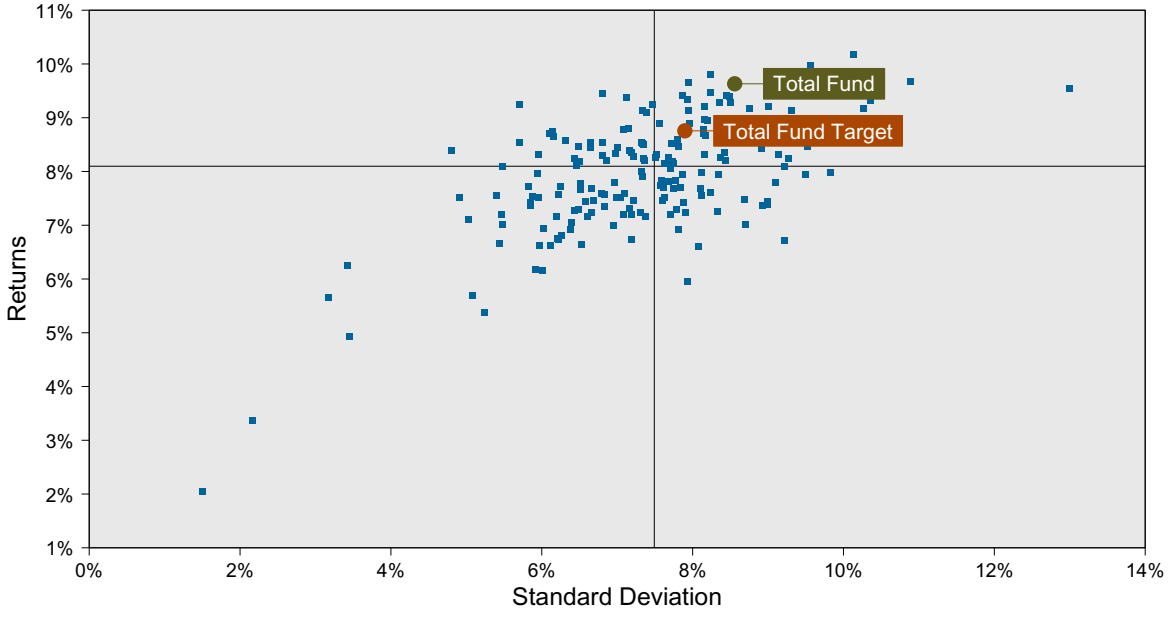
Cumulative Performance Relative to Target

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



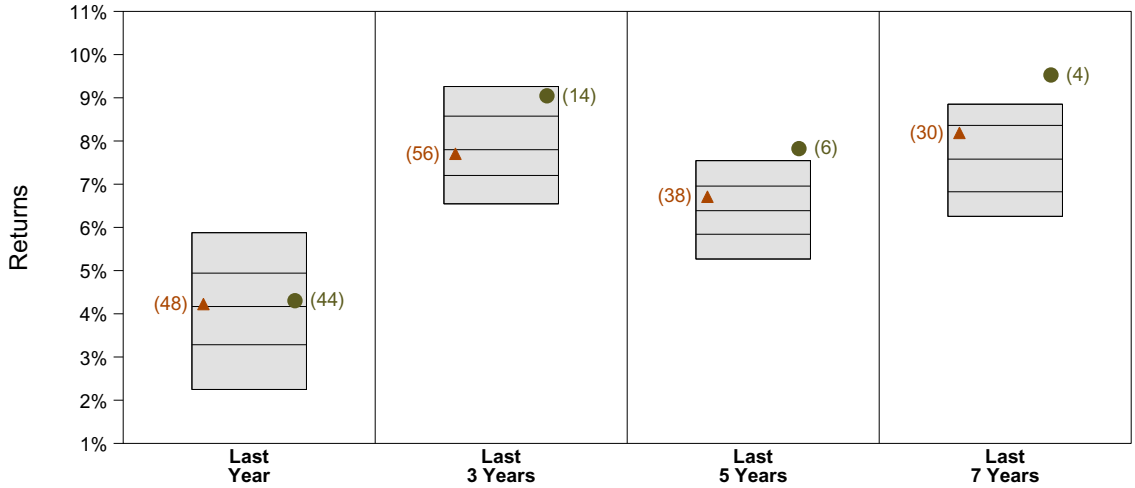
Squares represent membership of the Callan Public Fund Sponsor Database

* 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

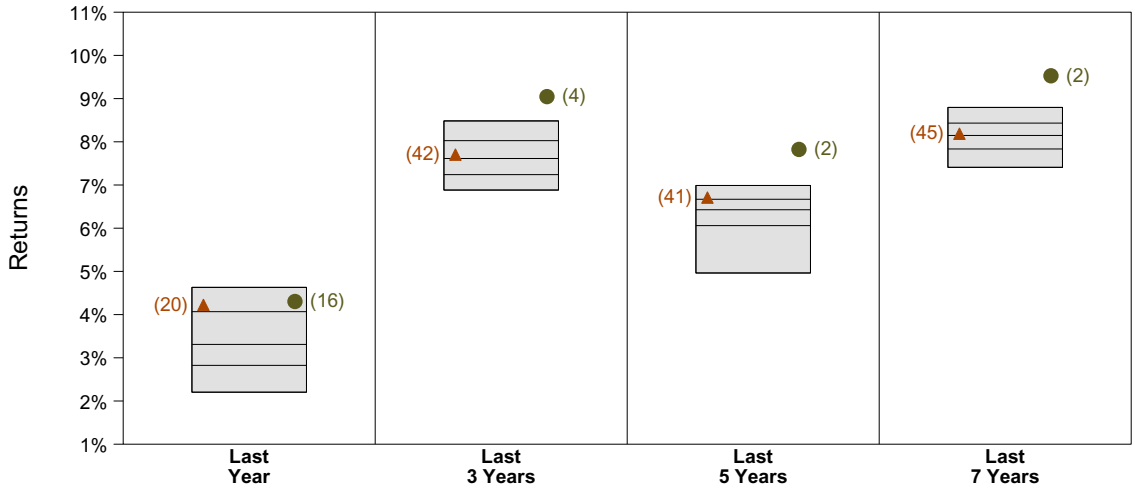
The first two charts show the ranking of the Total Fund's performance relative to that of the Callan Public Fund Sponsor Database for periods ended September 30, 2019. The first chart is a standard unadjusted ranking. In the second chart each fund in the database is adjusted to have the same historical 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	5.88	9.26	7.55	8.85
25th Percentile	4.94	8.58	6.96	8.36
Median	4.17	7.80	6.39	7.58
75th Percentile	3.28	7.20	5.84	6.82
90th Percentile	2.25	6.55	5.27	6.26
Total Fund ●	4.30	9.05	7.82	9.53
Policy Target ▲	4.23	7.70	6.71	8.19

Asset Allocation Adjusted Ranking



	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
10th Percentile	4.63	8.48	6.99	8.80
25th Percentile	4.07	8.03	6.67	8.43
Median	3.31	7.61	6.43	8.15
75th Percentile	2.82	7.24	6.06	7.83
90th Percentile	2.20	6.88	4.96	7.41
Total Fund ●	4.30	9.05	7.82	9.53
Policy Target ▲	4.23	7.70	6.71	8.19

* 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 September 30, 2019

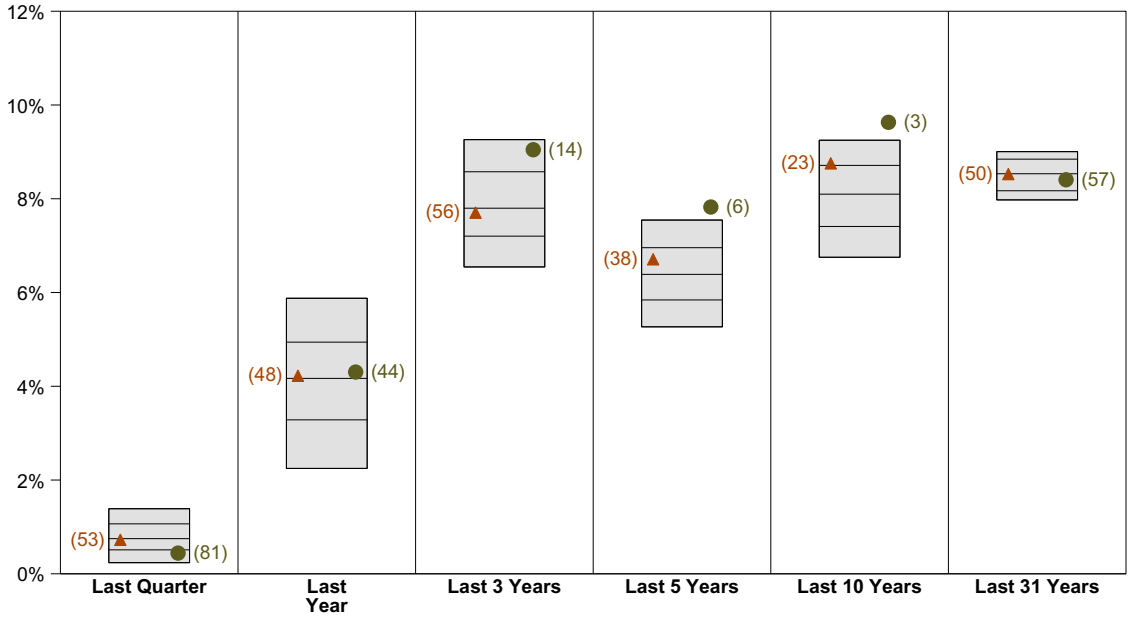
Investment Philosophy

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

Quarterly Summary and Highlights

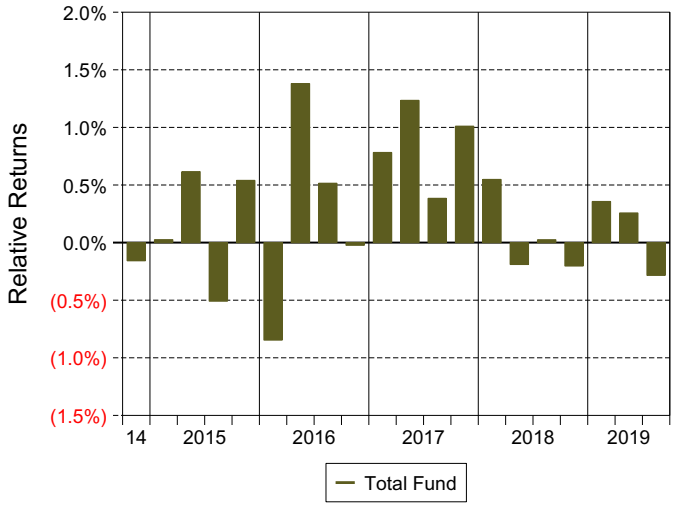
- Total Fund's portfolio posted a 0.44% return for the quarter placing it in the 81 percentile of the Callan Public Fund Sponsor Database group for the quarter and in the 44 percentile for the last year.
- Total Fund's portfolio underperformed the Total Fund Benchmark by 0.28% for the quarter and outperformed the Total Fund Benchmark for the year by 0.08%.

Performance vs Callan Public Fund Sponsor Database (Gross)

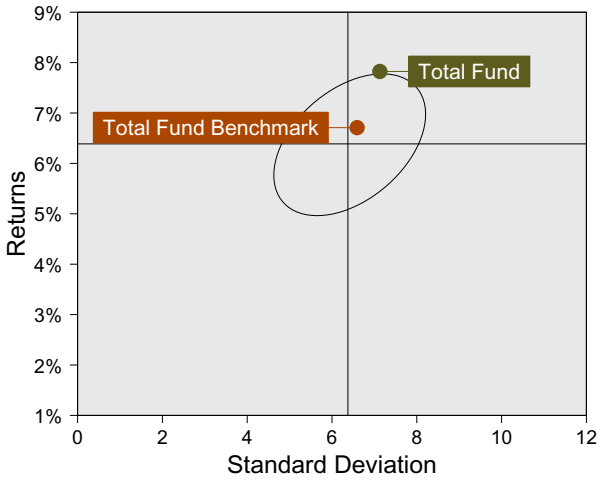


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 31 Years
10th Percentile	1.39	5.88	9.26	7.55	9.25	9.01
25th Percentile	1.07	4.94	8.58	6.96	8.71	8.84
Median	0.75	4.17	7.80	6.39	8.10	8.53
75th Percentile	0.51	3.28	7.20	5.84	7.41	8.17
90th Percentile	0.24	2.25	6.55	5.27	6.75	7.98
Total Fund ●	0.44	4.30	9.05	7.82	9.63	8.40
Total Fund Benchmark ▲	0.73	4.23	7.70	6.71	8.76	8.53

Relative Return vs Total Fund Benchmark



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

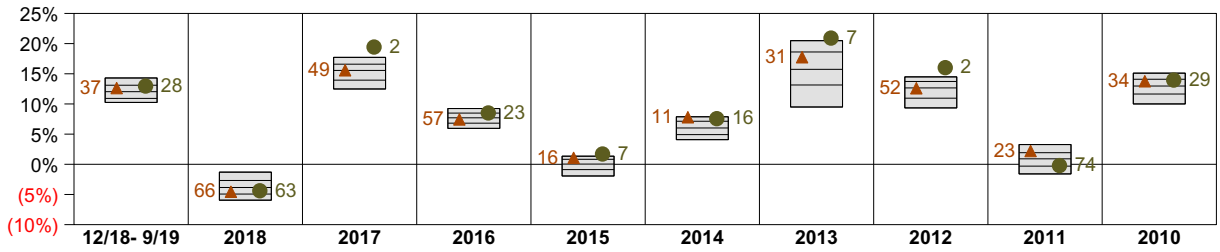


Total Fund
Return Analysis Summary

Return Analysis

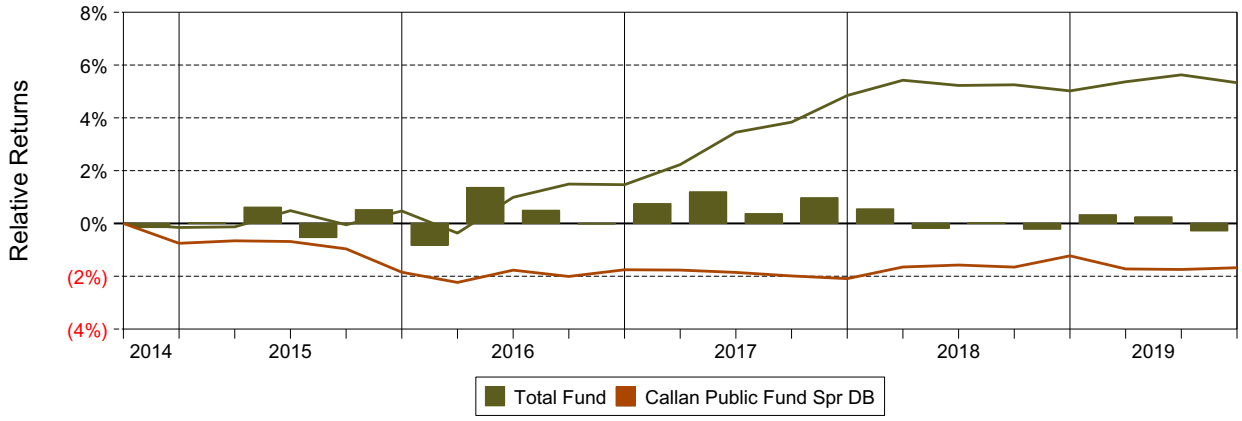
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate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

Performance vs Callan Public Fund Sponsor Database (Gross)

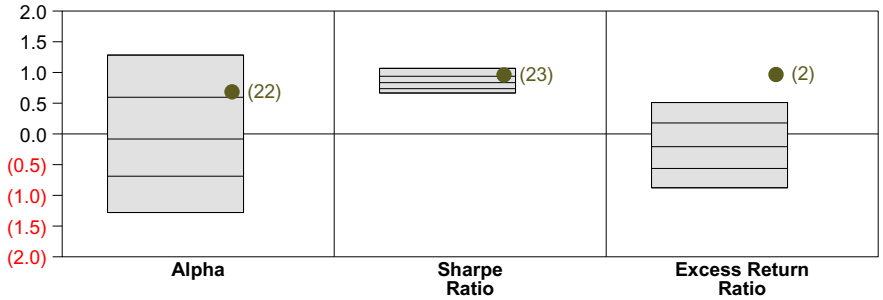


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	14.31	(1.30)	17.72	9.24	1.34	7.88	20.49	14.49	3.27	15.10
25th Percentile	13.10	(2.68)	16.59	8.48	0.83	7.13	18.61	13.73	1.93	14.09
Median	12.03	(3.84)	15.56	7.70	0.04	6.02	15.74	12.66	0.91	12.97
75th Percentile	10.92	(4.93)	13.94	6.81	(0.88)	4.92	13.14	10.96	(0.30)	11.65
90th Percentile	10.25	(5.95)	12.48	5.95	(1.94)	4.08	9.49	9.34	(1.59)	10.00
Total Fund ●	12.96	(4.39)	19.43	8.51	1.71	7.56	20.92	16.02	(0.21)	13.95
Total Fund Benchmark ▲	12.63	(4.55)	15.58	7.44	1.08	7.80	17.74	12.60	2.20	13.76

Cumulative and Quarterly Relative Return vs Total Fund Benchmark



Risk Adjusted Return Measures vs Total Fund Benchmark
Rankings Against Callan Public Fund Sponsor Database (Gross)
Five Years Ended September 30, 2019



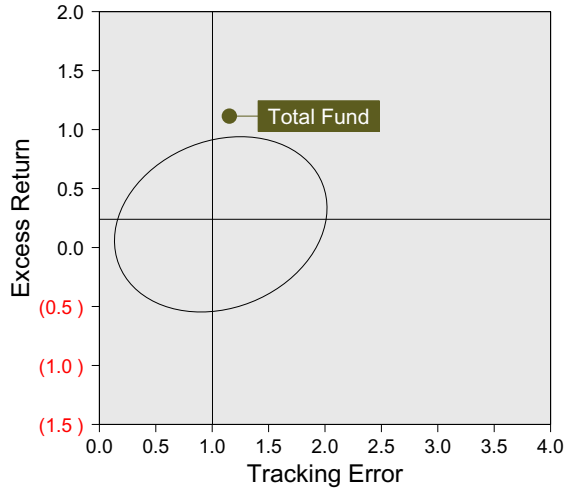
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.28	1.07	0.51
25th Percentile	0.60	0.94	0.18
Median	(0.08)	0.83	(0.21)
75th Percentile	(0.69)	0.74	(0.56)
90th Percentile	(1.28)	0.67	(0.88)
Total Fund ●	0.69	0.96	0.97

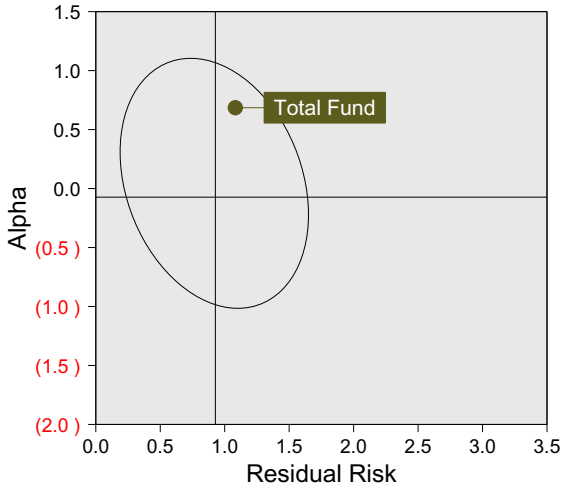
Total Fund
Total Fund vs Target Risk Analysis

Risk Analysis

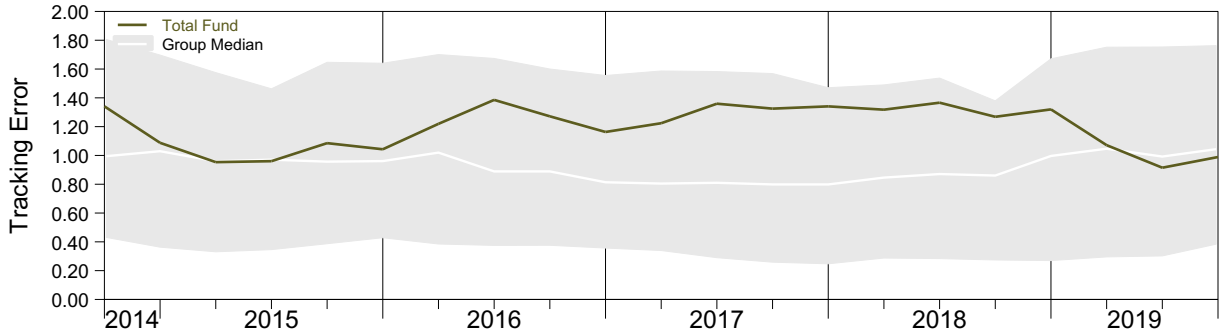
The graphs below analyze the performance and risk of the fund relative to the appropriate target mix. This relative performance is compared to a peer group of funds wherein each member fund is measured against its own target mix. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the target. The second scatter chart displays the relationship, sometimes called Information Ratio, between alpha (market-risk or "beta" adjusted return) and residual risk (non-market or "unsystematic" risk). The third chart shows tracking error patterns over time compared to the range of tracking error patterns for the peer group. The last two charts show the ranking of the fund's risk statistics versus the peer group.

Risk Analysis vs Callan Public Fund Sponsor Database
Five Years Ended September 30, 2019

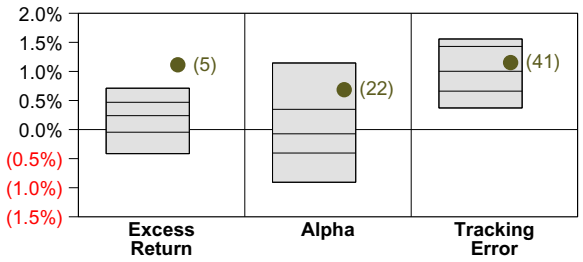




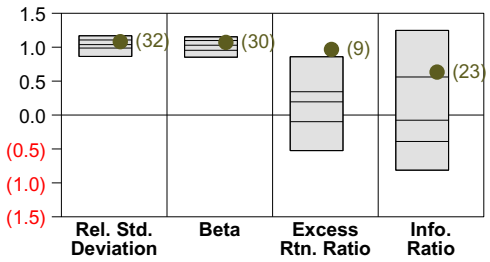
Rolling 12 Quarter Tracking Error vs Targets Compared to Callan Public Fund Sponsor Database



Risk Statistics Rankings vs Targets
Rankings Against Callan Public Fund Sponsor Database
Five Years Ended September 30, 2019



	Excess Return	Alpha	Tracking Error
10th Percentile	0.71	1.15	1.56
25th Percentile	0.47	0.35	1.43
Median	0.24	(0.07)	1.00
75th Percentile	(0.05)	(0.40)	0.66
90th Percentile	(0.41)	(0.91)	0.37
Total Fund ●	1.11	0.69	1.15



	Rel. Std. Deviation	Beta	Excess Rtn. Ratio	Info. Ratio
10th Percentile	1.17	1.15	0.86	1.25
25th Percentile	1.11	1.10	0.34	0.56
Median	1.04	1.03	0.19	(0.08)
75th Percentile	0.99	0.95	(0.10)	(0.39)
90th Percentile	0.86	0.85	(0.52)	(0.81)
Total Fund ●	1.08	1.07	0.97	0.63

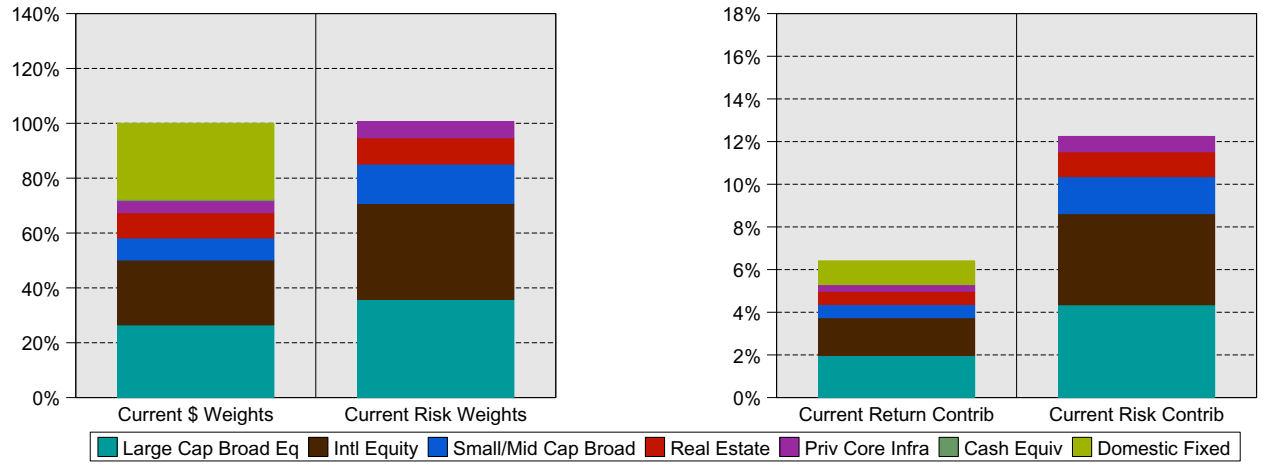
Tucson Supplemental Retirement System
Total Fund Projected Risk Analysis
as of September 30, 2019

The following is forward-looking analysis of the **projected long-term** total fund risk, return, and diversification benefits (improvement in risk and Sharpe ratio) using long-term capital market assumptions. The top table displays the projected results and diversification benefits for the total fund using both the actual and target asset allocations. The middle and bottom exhibits give a detailed attribution by asset class of the sources of projected total fund risk and return. This analysis juxtaposes dollar weights with projected risk weights and examines the projected risk and return contribution by asset class.

Capital Market Assumptions: Callan 2019
Total Fund Projected Risk Profile

	Projected Return	Projected Risk	Projected Sharpe	Risk w/o Diversification	Risk Diversification	Sharpe Diversification
Current Asset Allocation	6.41%	12.16%	0.32	14.31%	2.14%	0.05%
Target Asset Allocation	6.45%	12.39%	0.32	14.52%	2.13%	0.05%

Projected Risk and Return Sources



Detailed Risk and Return Sources by Asset Class

	Current Dollar Weight	Target Dollar Weight	Projected Return	Projected Risk	Current Risk Weight	Target Risk Weight	Projected Return Contrib	Projected Risk Contrib	Projected Rtn/Risk Contrib
Large Cap Broad Eq	26.51%	26.00%	7.02%	17.10%	**35.77%**	34.37%	1.98%	4.35%	0.46x
Intl Equity	23.66%	25.00%	7.00%	19.75%	**35.13%**	36.58%	1.76%	4.27%	0.41x
Small/Mid Cap Broad	8.05%	8.00%	7.26%	22.65%	**14.25%**	13.88%	0.62%	1.73%	0.36x
Real Estate	9.23%	9.00%	6.25%	15.70%	**9.59%**	9.17%	0.61%	1.17%	0.53x
Priv Core Infra	4.38%	5.00%	6.75%	18.00%	**5.89%**	6.61%	0.31%	0.72%	0.44x
Cash Equiv	0.49%	-	2.52%	0.90%	**(0.00%)**	-	0.01%	(0.00%)	(183.42x)
Domestic Fixed	27.69%	27.00%	3.73%	3.75%	**(0.63%)**	(0.62%)	1.10%	(0.08%)	(14.44x)

Domestic Equity

Domestic Equity
Period Ended September 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

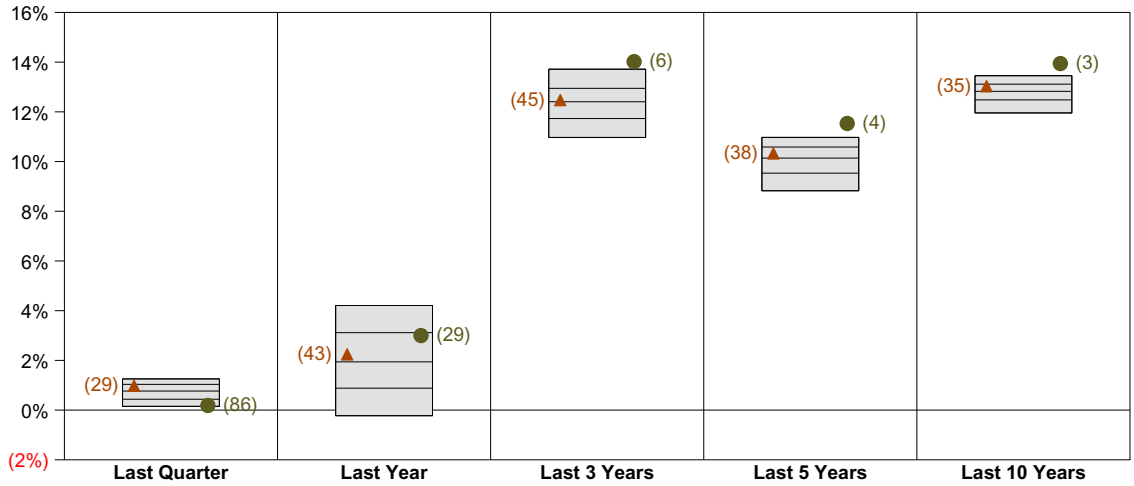
- Domestic Equity's portfolio posted a 0.19% return for the quarter placing it in the 86 percentile of the Public Fund - Domestic Equity group for the quarter and in the 29 percentile for the last year.
- Domestic Equity's portfolio underperformed the Total Domestic Equity Target by 0.80% for the quarter and outperformed the Total Domestic Equity Target for the year by 0.75%.

Quarterly Asset Growth

Beginning Market Value	$291,390,991
Net New Investment	$-3,016,697
Investment Gains/(Losses)	$548,064
Ending Market Value	$288,922,358

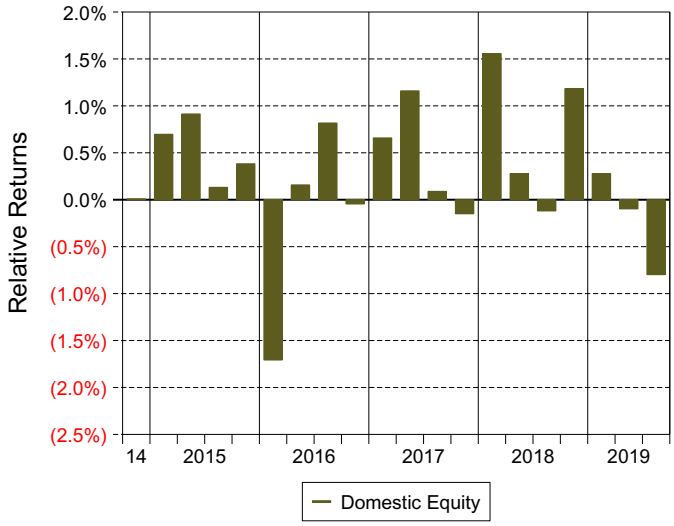
Percent Cash: 0.8%

Performance vs Public Fund - Domestic Equity (Gross)

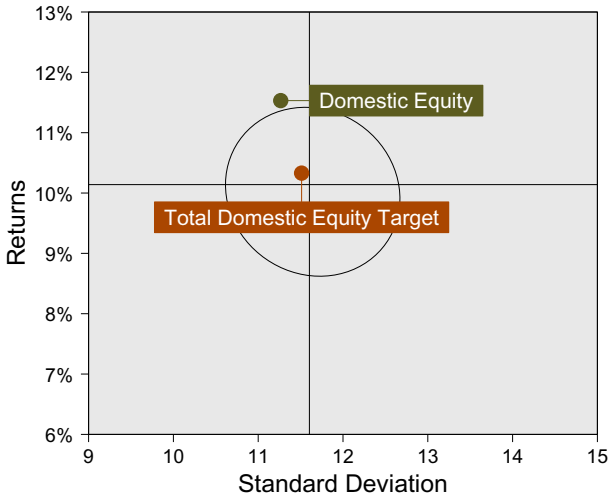


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	1.26	4.21	13.72	10.97	13.45
25th Percentile	1.04	3.12	12.95	10.58	13.11
Median	0.77	1.94	12.41	10.14	12.82
75th Percentile	0.44	0.88	11.73	9.53	12.48
90th Percentile	0.15	(0.23)	10.97	8.83	11.96
Domestic Equity ●	0.19	3.00	14.02	11.53	13.94
Total Domestic Equity Target ▲	0.98	2.24	12.47	10.33	13.03

Relative Returns vs Total Domestic Equity Target



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

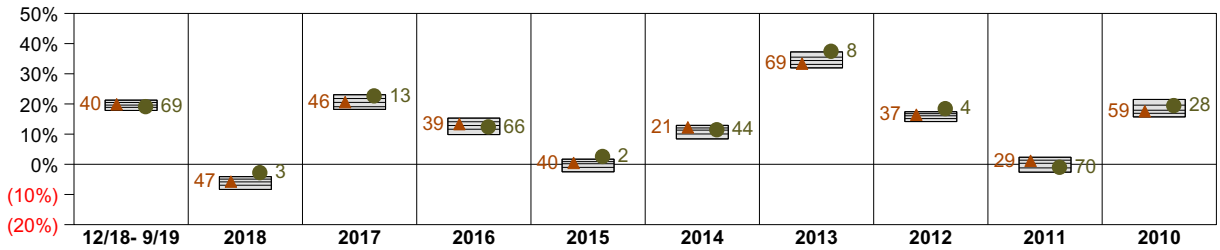


Domestic Equity
Return Analysis Summary

Return Analysis

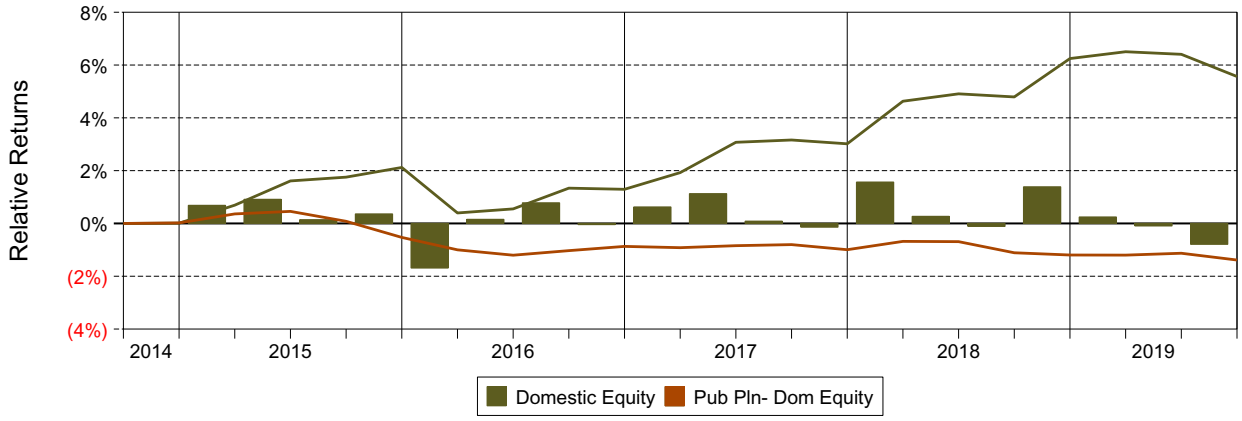
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

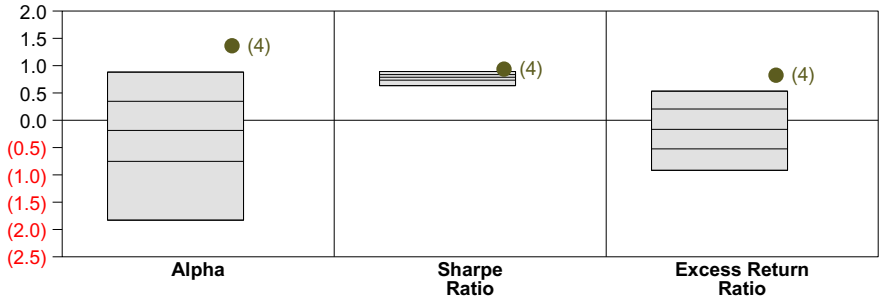


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	21.27	(4.09)	23.06	15.31	1.70	12.91	37.25	17.42	2.34	21.49
25th Percentile	20.48	(4.91)	21.80	14.10	0.89	12.05	35.51	16.79	1.36	19.60
Median	19.63	(5.83)	20.51	12.86	0.19	11.32	34.39	16.08	0.33	17.92
75th Percentile	18.87	(6.94)	19.08	11.63	(1.03)	10.05	33.11	15.15	(1.19)	16.90
90th Percentile	17.85	(8.33)	18.20	9.85	(2.49)	8.41	31.95	14.16	(2.61)	15.71
Domestic Equity ●	19.11	(2.77)	22.67	12.40	2.59	11.46	37.46	18.44	(0.99)	19.45
Total Domestic Equity Target ▲	19.88	(5.72)	20.62	13.32	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 September 30, 2019



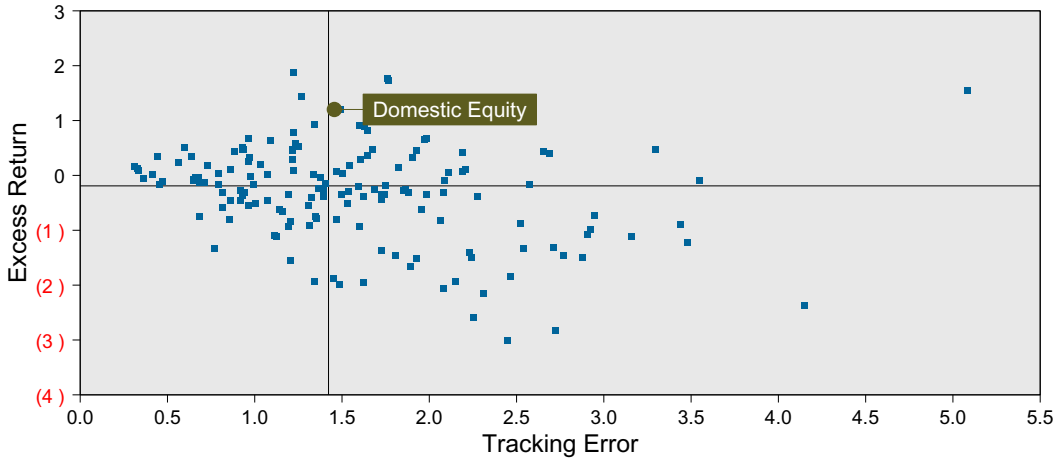
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.88	0.89	0.53
25th Percentile	0.35	0.84	0.21
Median	(0.19)	0.79	(0.17)
75th Percentile	(0.75)	0.73	(0.52)
90th Percentile	(1.83)	0.63	(0.92)
Domestic Equity ●	1.36	0.94	0.83

Domestic Equity
Risk Analysis Summary

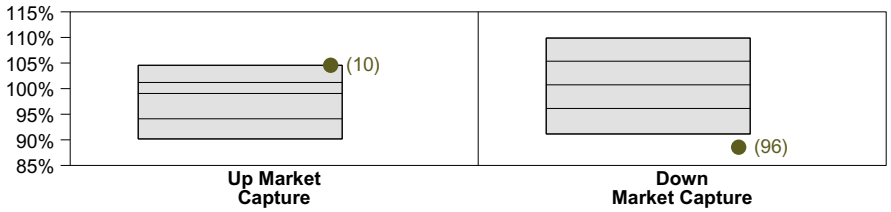
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

Risk Analysis vs Public Fund - Domestic Equity (Gross)
Five Years Ended September 30, 2019

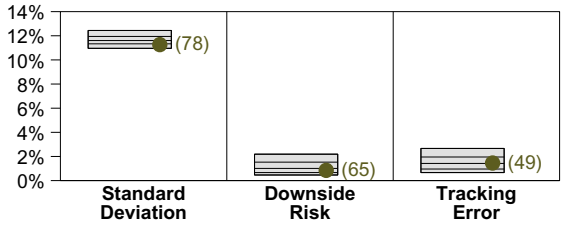


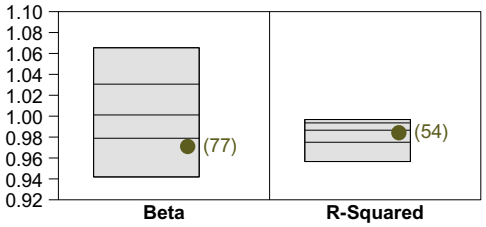
Market Capture vs Total Domestic Equity Target
Rankings Against Public Fund - Domestic Equity (Gross)
Five Years Ended September 30, 2019



	Up Market Capture	Down Market Capture
10th Percentile	104.56	109.88
25th Percentile	101.21	105.36
Median	99.06	100.75
75th Percentile	94.11	96.13
90th Percentile	90.18	91.15
Domestic Equity ●	104.57	88.56

Risk Statistics Rankings vs Total Domestic Equity Target
Rankings Against Public Fund - Domestic Equity (Gross)
Five Years Ended September 30, 2019





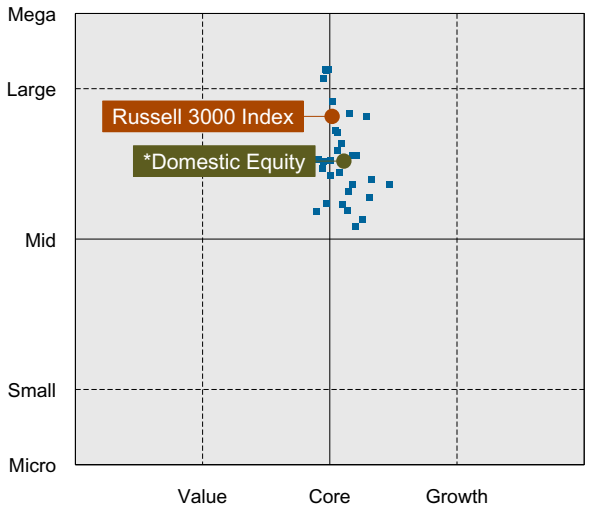
	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	12.44	2.19	2.67
25th Percentile	11.94	1.53	1.96
Median	11.60	1.01	1.42
75th Percentile	11.33	0.66	0.96
90th Percentile	10.96	0.46	0.67
Domestic Equity ●	11.27	0.85	1.46

	Beta	R-Squared
10th Percentile	1.07	1.00
25th Percentile	1.03	0.99
Median	1.00	0.99
75th Percentile	0.98	0.98
90th Percentile	0.94	0.96
Domestic Equity ●	0.97	0.98

Current Holdings Based Style Analysis
Domestic Equity
As of September 30, 2019

This page analyzes the current investment style of a portfolio utilizing a detailed holdings-based style analysis to determine actual exposures to various market capitalization and style segments of the domestic equity market. The market is segmented quarterly by capitalization and style. The capitalization segments are dictated by capitalization decile breakpoints. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the current market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the current portfolio and index weights and stock counts (in parentheses) in each capitalization/style segment of the market. The middle chart illustrates the total exposures and stock counts in the three style segments, with a legend showing the total growth, value, and "combined Z" (growth - value) scores. The bottom chart exhibits the sector weights as well as the style weights within each sector.

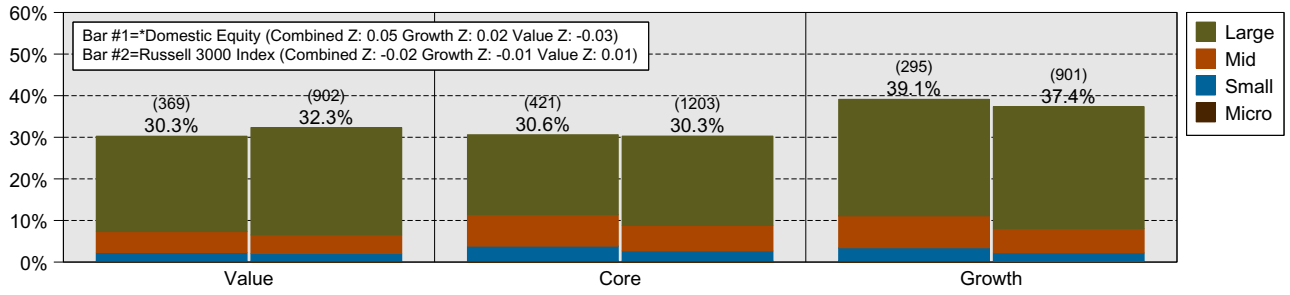
Style Map vs Pub Pln- Dom Equity
Holdings as of September 30, 2019



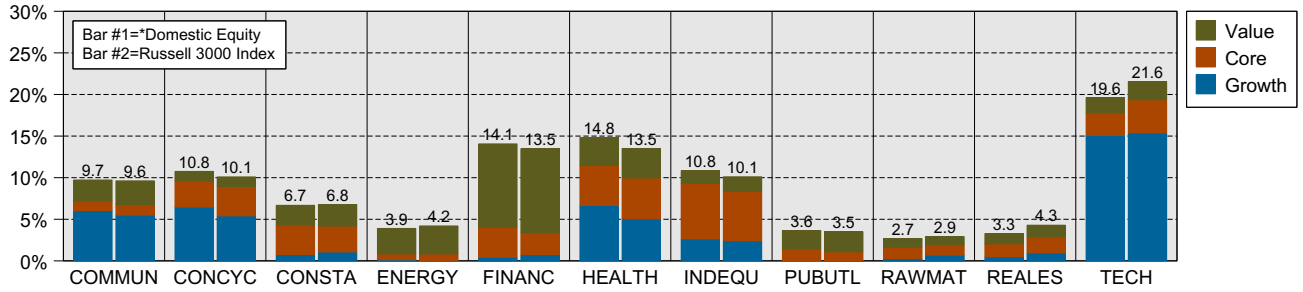
Style Exposure Matrix
Holdings as of September 30, 2019

	Value	Core	Growth	Total
Large	22.9% (106) 25.8% (106)	19.2% (103) 21.4% (103)	28.0% (89) 29.4% (91)	70.2% (298) 76.6% (300)
Mid	5.0% (168) 4.5% (168)	7.6% (201) 6.2% (224)	7.7% (131) 5.8% (209)	20.3% (500) 16.4% (601)
Small	2.1% (88) 1.8% (333)	3.6% (105) 2.4% (486)	3.2% (65) 2.1% (384)	8.8% (258) 6.3% (1203)
Micro	0.2% (7) 0.2% (295)	0.3% (12) 0.3% (390)	0.3% (10) 0.2% (217)	0.7% (29) 0.7% (902)
Total	30.3% (369) 32.3% (902)	30.6% (421) 30.3% (1203)	39.1% (295) 37.4% (901)	100.0% (1085) 100.0% (3006)

Combined Z-Score Style Distribution
Holdings as of September 30, 2019



Sector Weights Distribution
Holdings as of September 30, 2019



*9/30/19 portfolio characteristics generated using most recently available holdings (6/30/19) modified based on a "buy-and-hold" assumption (repriced and adjusted for corporate actions). Analysis is then done using current market and company financial data.

Domestic Equity
Top 10 Portfolio Holdings Characteristics
as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Microsoft Corp	Information Technology	$8,675,860	3.0%	4.14%	1061.55	25.67	1.47%	14.15%
Amazon.Com	Consumer Discretionary	$7,596,270	2.6%	(8.33)%	858.68	56.36	0.00%	83.00%
Facebook Inc Cl A	Communication Services	$5,232,346	1.8%	(7.73)%	428.41	20.49	0.00%	20.05%
Apple Inc	Information Technology	$5,032,759	1.7%	13.60%	1012.16	17.60	1.38%	9.68%
Alphabet Inc Cl A	Communication Services	$4,937,022	1.7%	12.78%	365.77	22.61	0.00%	12.56%
Boeing Co	Industrials	$4,383,955	1.5%	5.16%	214.09	21.33	2.16%	9.61%
Visa Inc Com Cl A	Information Technology	$4,222,171	1.5%	(0.75)%	297.06	27.46	0.58%	15.55%
Berkshire Hathaway Inc Del Cl B New	Financials	$3,499,941	1.2%	(2.42)%	288.38	19.50	0.00%	4.64%
JPMorgan Chase & Co	Financials	$3,254,382	1.1%	6.01%	376.31	11.31	3.06%	5.45%
Alphabet Inc Cl C	Communication Services	$2,887,298	1.0%	12.78%	423.41	22.55	0.00%	12.56%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Stamps Com Inc	Consumer Discretionary	$134,010	0.0%	64.46%	1.28	21.34	0.00%	30.73%
Cyrusone Inc	Real Estate	$39,361	0.0%	37.93%	8.95	354.71	2.53%	(3.18)%
Kla-Tencor Corp	Information Technology	$105,846	0.0%	35.67%	25.27	16.19	1.88%	14.57%
New York Cmnty Bancorp Inc	Financials	$25,399	0.0%	27.61%	5.87	14.63	5.42%	(10.64)%
Liveperson Inc	Information Technology	$210,630	0.1%	27.32%	2.34	(258.70)	0.00%	30.00%
Kontoor Brands	Consumer Discretionary	$5	0.0%	27.25%	2.00	9.41	6.38%	-
Trex Co Inc	Industrials	$129,121	0.0%	26.82%	5.31	32.97	0.00%	34.48%
Fti Consulting	Industrials	$148,386	0.1%	26.42%	3.98	19.86	0.00%	36.44%
Entegris Inc	Information Technology	$223,535	0.1%	26.33%	6.36	21.37	0.68%	16.33%
Pilgrims Pride Corp New	Consumer Staples	$5,100	0.0%	26.21%	7.99	13.44	0.00%	(15.54)%

10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Viewray Inc	Health Care	$51,040	0.0%	(67.08)%	0.29	(2.95)	0.00%	10.00%
2u Inc	Information Technology	$126,269	0.0%	(56.75)%	1.03	(16.13)	0.00%	-
Pg&e Corp	Utilities	$23,677	0.0%	(56.37)%	5.29	2.53	0.00%	5.60%
Propetro Hldg Corp	Energy	$57,267	0.0%	(56.09)%	0.91	3.93	0.00%	-
Covetrus Inc	Health Care	$6,614	0.0%	(51.39)%	1.33	21.70	0.00%	-
Sarepta Therapeutics Inc	Health Care	$105,448	0.0%	(50.43)%	5.60	(13.45)	0.00%	-
Merit Medical Systems	Health Care	$98,081	0.0%	(48.86)%	1.68	15.52	0.00%	11.00%
Nektar Therapeutics	Health Care	$24,675	0.0%	(48.81)%	3.19	(7.00)	0.00%	-
Kalvista Pharmaceuticals Inc	Health Care	$40,600	0.0%	(47.63)%	0.21	(7.73)	0.00%	-
Dxc Technology Co	Information Technology	$67,279	0.0%	(46.15)%	7.73	3.77	2.85%	6.69%

*9/30/19 portfolio characteristics generated using most recently available holdings (6/30/19) modified based on a "buy-and-hold" assumption (repriced and adjusted for corporate actions). Analysis is then done using current market and company financial data.

Large Cap Equity
Period Ended September 30, 2019

Investment Philosophy

Large Cap Broad peer group reflects both growth and value managers that invest in the common stock of US-based companies whose market capitalization tends to fall within the range of the Russell 1000 Index or the S&P 500 Index.

Quarterly Summary and Highlights

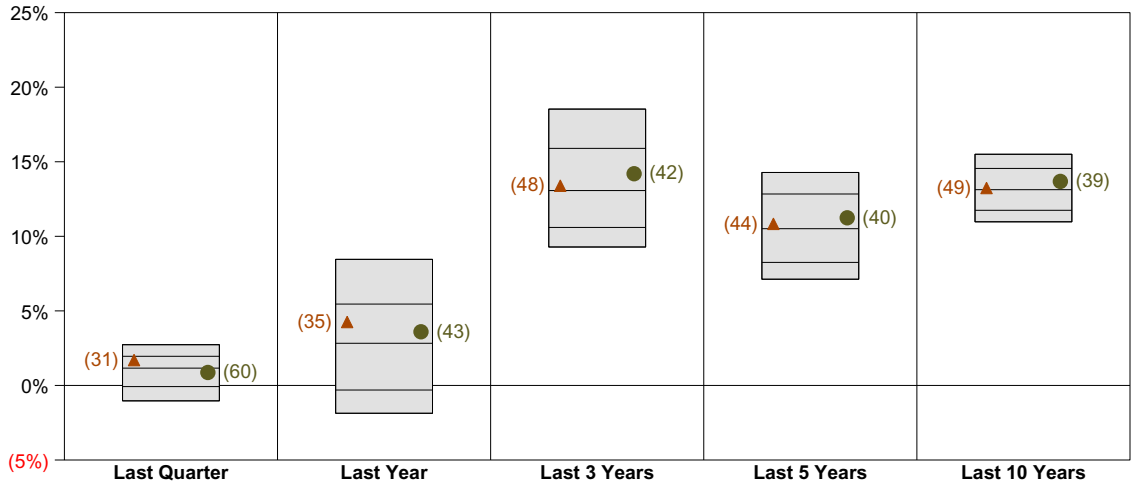
- Large Cap Equity's portfolio posted a 0.87% return for the quarter placing it in the 60 percentile of the Callan Large Capitalization group for the quarter and in the 43 percentile for the last year.
- Large Cap Equity's portfolio underperformed the S&P 500 Index by 0.83% for the quarter and underperformed the S&P 500 Index for the year by 0.66%.

Quarterly Asset Growth

Beginning Market Value	$222,145,403
Net New Investment	$-2,411,853
Investment Gains/(Losses)	$1,919,917
Ending Market Value	$221,653,467

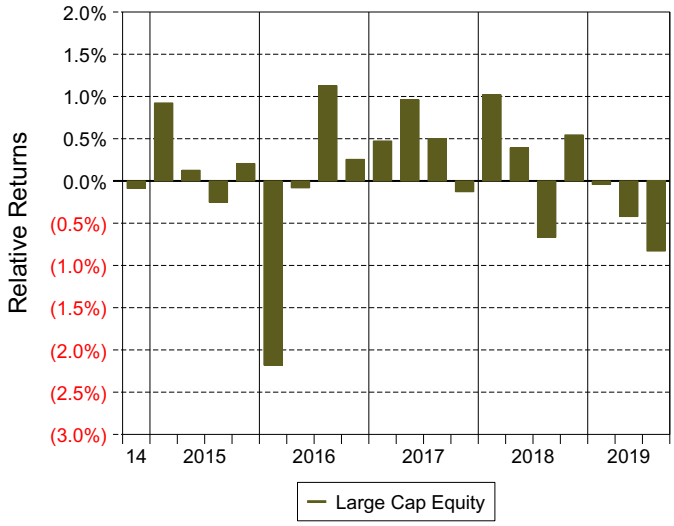
Percent Cash: 0.5%

Performance vs Callan Large Capitalization (Gross)

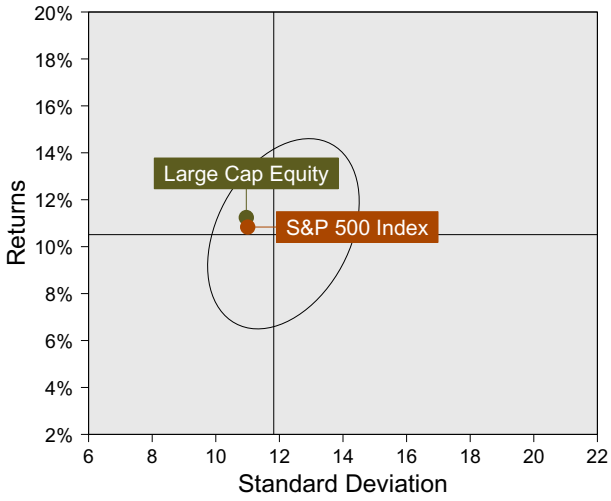


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	2.73	8.46	18.53	14.28	15.50
25th Percentile	1.95	5.46	15.90	12.84	14.55
Median	1.16	2.83	13.07	10.51	13.13
75th Percentile	(0.08)	(0.31)	10.59	8.25	11.75
90th Percentile	(1.03)	(1.87)	9.28	7.12	10.97
Large Cap Equity ●	0.87	3.60	14.20	11.24	13.68
S&P 500 Index ▲	1.70	4.25	13.39	10.84	13.24

Relative Return vs S&P 500 Index



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

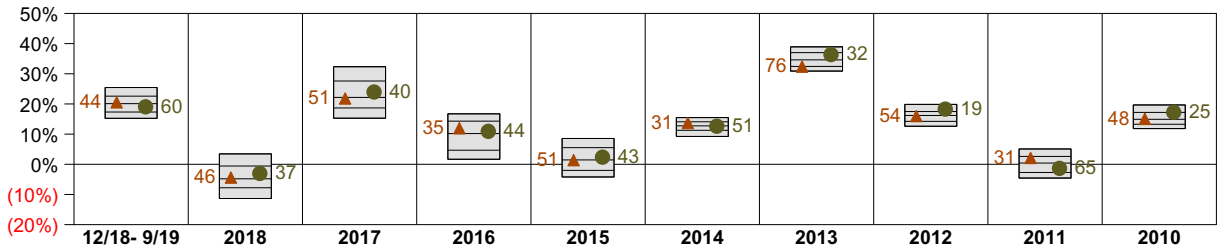


Large Cap Equity
Return Analysis Summary

Return Analysis

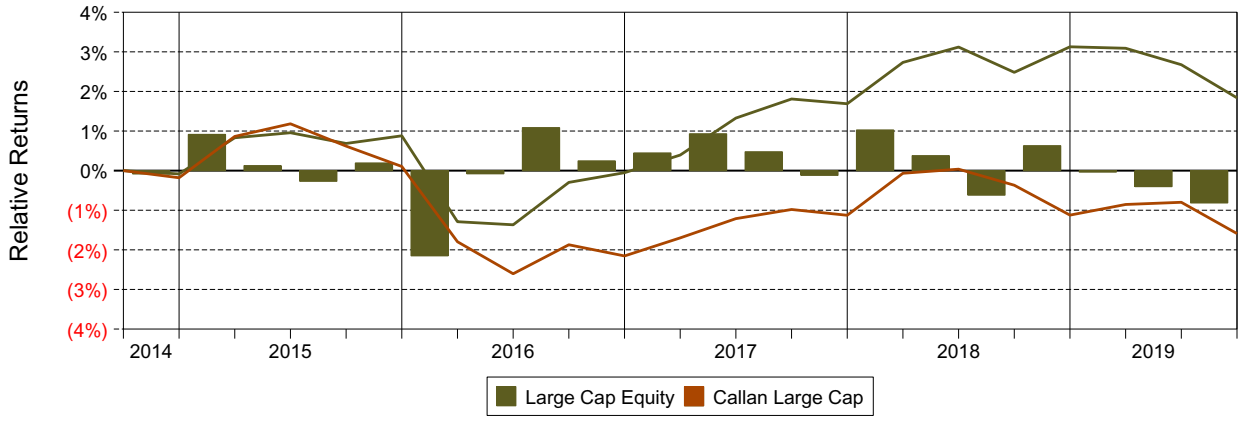
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate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

Performance vs Callan Large Capitalization (Gross)

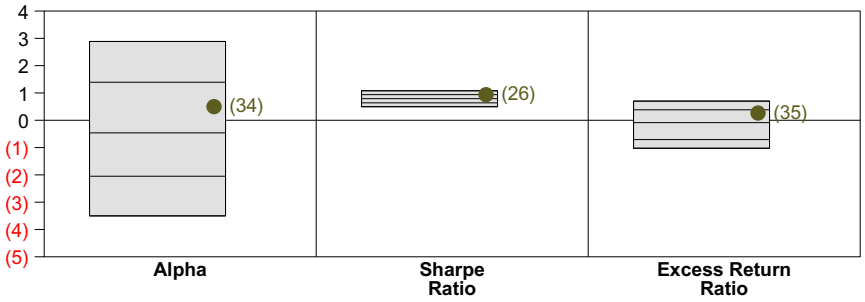


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	25.45	3.46	32.34	16.73	8.56	15.49	38.93	19.85	5.09	19.67
25th Percentile	22.58	(0.57)	27.61	14.30	5.52	14.09	37.01	17.48	2.61	17.20
Median	20.10	(4.80)	22.17	10.18	1.45	12.73	34.61	16.18	0.40	14.92
75th Percentile	17.33	(7.78)	18.68	4.67	(2.01)	11.27	32.43	14.23	(2.71)	13.26
90th Percentile	15.23	(11.33)	15.28	1.67	(4.21)	9.23	30.89	12.61	(4.56)	11.84
Large Cap Equity ●	19.05	(3.03)	23.95	10.93	2.36	12.62	36.37	18.29	(1.34)	17.24
S&P 500 Index ▲	20.55	(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 September 30, 2019



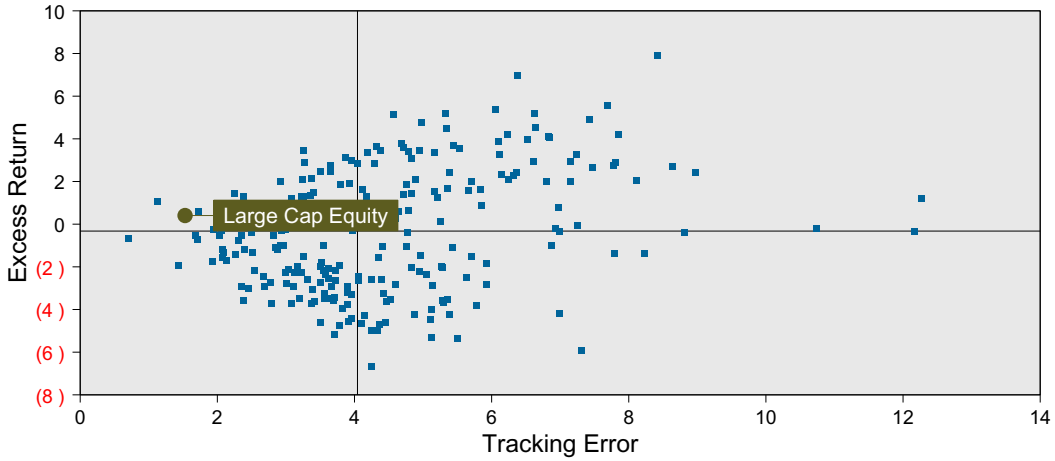
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.89	1.08	0.70
25th Percentile	1.39	0.94	0.38
Median	(0.46)	0.79	(0.09)
75th Percentile	(2.05)	0.64	(0.71)
90th Percentile	(3.50)	0.50	(1.02)
Large Cap Equity ●	0.50	0.94	0.26

Large Cap Equity
Risk Analysis Summary

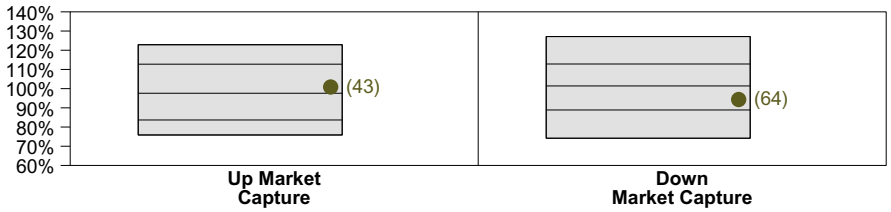
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

Risk Analysis vs Callan Large Capitalization (Gross)
Five Years Ended September 30, 2019

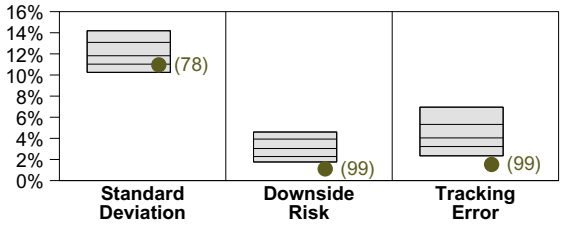


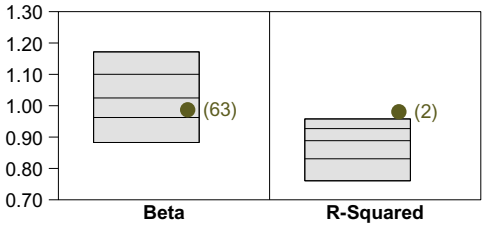
Market Capture vs S&P 500 Index
Rankings Against Callan Large Capitalization (Gross)
Five Years Ended September 30, 2019



	Up Market Capture	Down Market Capture
10th Percentile	122.88	127.13
25th Percentile	112.73	112.83
Median	97.59	101.40
75th Percentile	83.68	88.89
90th Percentile	75.87	74.17
Large Cap Equity ●	100.85	94.34

Risk Statistics Rankings vs S&P 500 Index
Rankings Against Callan Large Capitalization (Gross)
Five Years Ended September 30, 2019





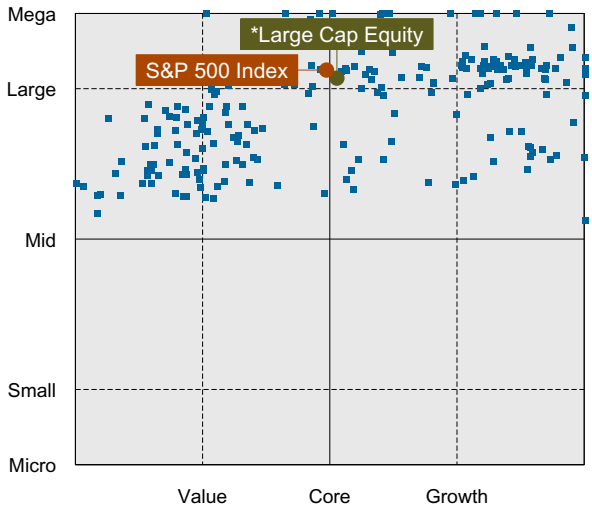
	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	14.19	4.60	6.95
25th Percentile	13.09	3.93	5.32
Median	11.82	3.04	4.04
75th Percentile	11.03	2.28	3.22
90th Percentile	10.25	1.76	2.35
Large Cap Equity ●	10.96	1.11	1.53

	Beta	R-Squared
10th Percentile	1.17	0.96
25th Percentile	1.10	0.93
Median	1.02	0.89
75th Percentile	0.96	0.83
90th Percentile	0.88	0.76
Large Cap Equity ●	0.99	0.98

Current Holdings Based Style Analysis
Large Cap Equity
As of September 30, 2019

This page analyzes the current investment style of a portfolio utilizing a detailed holdings-based style analysis to determine actual exposures to various market capitalization and style segments of the domestic equity market. The market is segmented quarterly by capitalization and style. The capitalization segments are dictated by capitalization decile breakpoints. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the current market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the current portfolio and index weights and stock counts (in parentheses) in each capitalization/style segment of the market. The middle chart illustrates the total exposures and stock counts in the three style segments, with a legend showing the total growth, value, and "combined Z" (growth - value) scores. The bottom chart exhibits the sector weights as well as the style weights within each sector.

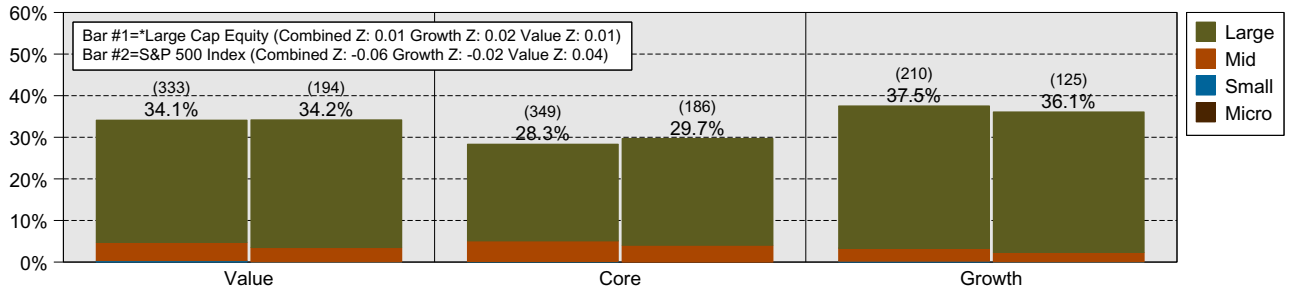
Style Map vs Callan Large Cap
Holdings as of September 30, 2019



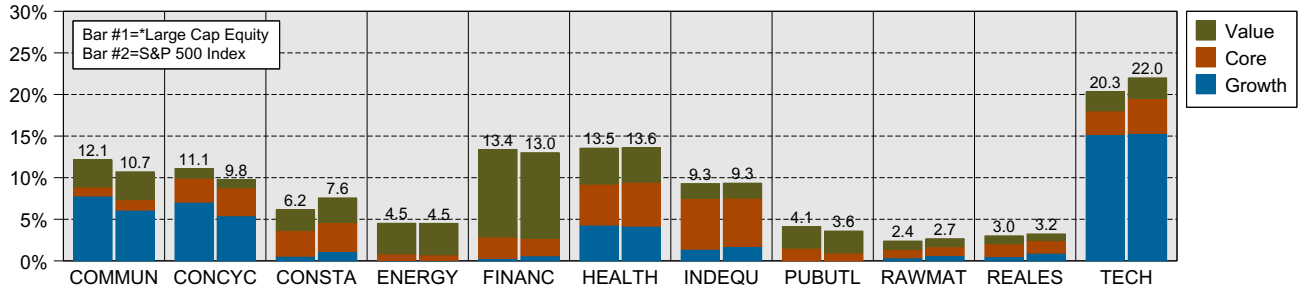
Style Exposure Matrix
Holdings as of September 30, 2019

	Value	Core	Growth	Total
Large	29.4% (106) 30.7% (103)	23.3% (103) 25.7% (101)	34.2% (87) 33.8% (80)	**86.9% (296)** **90.2% (284)**
Mid	4.4% (163) 3.5% (89)	4.9% (195) 4.0% (85)	3.1% (104) 2.3% (43)	**12.4% (462)** **9.8% (217)**
Small	0.3% (64) 0.0% (2)	0.2% (49) 0.0% (0)	0.2% (19) 0.0% (2)	**0.7% (132)** **0.0% (4)**
Micro	0.0% (0) 0.0% (0)	0.0% (2) 0.0% (0)	0.0% (0) 0.0% (0)	**0.0% (2)** **0.0% (0)**
Total	**34.1% (333)** **34.2% (194)**	**28.3% (349)** **29.7% (186)**	**37.5% (210)** **36.1% (125)**	**100.0% (892)** **100.0% (505)**

Combined Z-Score Style Distribution
Holdings as of September 30, 2019



Sector Weights Distribution
Holdings as of September 30, 2019



*9/30/19 portfolio characteristics generated using most recently available holdings (6/30/19) modified based on a "buy-and-hold" assumption (repriced and adjusted for corporate actions). Analysis is then done using current market and company financial data.

Large Cap Equity
Top 10 Portfolio Holdings Characteristics
as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Microsoft Corp	Information Technology	$8,675,860	3.9%	4.14%	1061.55	25.67	1.47%	14.15%
Amazon.Com	Consumer Discretionary	$7,596,270	3.4%	(8.33)%	858.68	56.36	0.00%	83.00%
Facebook Inc Cl A	Communication Services	$5,232,346	2.4%	(7.73)%	428.41	20.49	0.00%	20.05%
Apple Inc	Information Technology	$5,032,759	2.3%	13.60%	1012.16	17.60	1.38%	9.68%
Alphabet Inc Cl A	Communication Services	$4,937,022	2.2%	12.78%	365.77	22.61	0.00%	12.56%
Boeing Co	Industrials	$4,383,955	2.0%	5.16%	214.09	21.33	2.16%	9.61%
Visa Inc Com Cl A	Information Technology	$4,222,171	1.9%	(0.75)%	297.06	27.46	0.58%	15.55%
Berkshire Hathaway Inc Del Cl B New	Financials	$3,499,941	1.6%	(2.42)%	288.38	19.50	0.00%	4.64%
JPMorgan Chase & Co	Financials	$3,254,382	1.5%	6.01%	376.31	11.31	3.06%	5.45%
Alphabet Inc Cl C	Communication Services	$2,887,298	1.3%	12.78%	423.41	22.55	0.00%	12.56%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Cyrusone Inc	Real Estate	$39,361	0.0%	37.93%	8.95	354.71	2.53%	(3.18)%
Kla-Tencor Corp	Information Technology	$105,846	0.0%	35.67%	25.27	16.19	1.88%	14.57%
New York Cmnty Bancorp Inc	Financials	$25,399	0.0%	27.61%	5.87	14.63	5.42%	(10.64)%
Kontoor Brands	Consumer Discretionary	$5	0.0%	27.25%	2.00	9.41	6.38%	-
Pilgrims Pride Corp New	Consumer Staples	$5,100	0.0%	26.21%	7.99	13.44	0.00%	(15.54)%
Western Digital Corp	Information Technology	$150,534	0.1%	25.43%	17.73	15.41	3.35%	(13.80)%
Target Corp	Consumer Discretionary	$451,518	0.2%	24.39%	54.62	16.58	2.47%	9.35%
Xpo Logistics Inc	Industrials	$12,217	0.0%	23.80%	6.60	16.13	0.00%	23.28%
Lam Research Corp	Information Technology	$159,644	0.1%	23.65%	33.47	15.66	1.99%	(0.06)%
Urban Outfitters Inc	Consumer Discretionary	$8,984	0.0%	23.47%	2.75	11.44	0.00%	8.02%

10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
2u Inc	Information Technology	$2,541	0.0%	(56.75)%	1.03	(16.13)	0.00%	-
Pg&e Corp	Utilities	$23,677	0.0%	(56.37)%	5.29	2.53	0.00%	5.60%
Covetrus Inc	Health Care	$6,614	0.0%	(51.39)%	1.33	21.70	0.00%	-
Nektar Therapeutics	Health Care	$24,675	0.0%	(48.81)%	3.19	(7.00)	0.00%	-
Dxc Technology Co	Information Technology	$67,279	0.0%	(46.15)%	7.73	3.77	2.85%	6.69%
Antero Res Corp	Energy	$3,451	0.0%	(45.39)%	0.93	(13.30)	0.00%	(29.80)%
Range Resources Corp	Energy	$3,419	0.0%	(45.02)%	0.96	11.72	2.09%	(14.95)%
Fluor Corp New	Industrials	$11,813	0.0%	(42.54)%	2.68	34.34	4.39%	13.54%
Centennial Resource Dev Inc Cl A	Energy	$3,694	0.0%	(40.51)%	1.19	10.88	0.00%	6.70%
Owens-Illinois	Materials	$7,217	0.0%	(40.23)%	1.60	4.03	1.95%	9.42%

*9/30/19 portfolio characteristics generated using most recently available holdings (6/30/19) modified based on a "buy-and-hold" assumption (repriced and adjusted for corporate actions). Analysis is then done using current market and company financial data.

Alliance S&P Index
Period Ended September 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

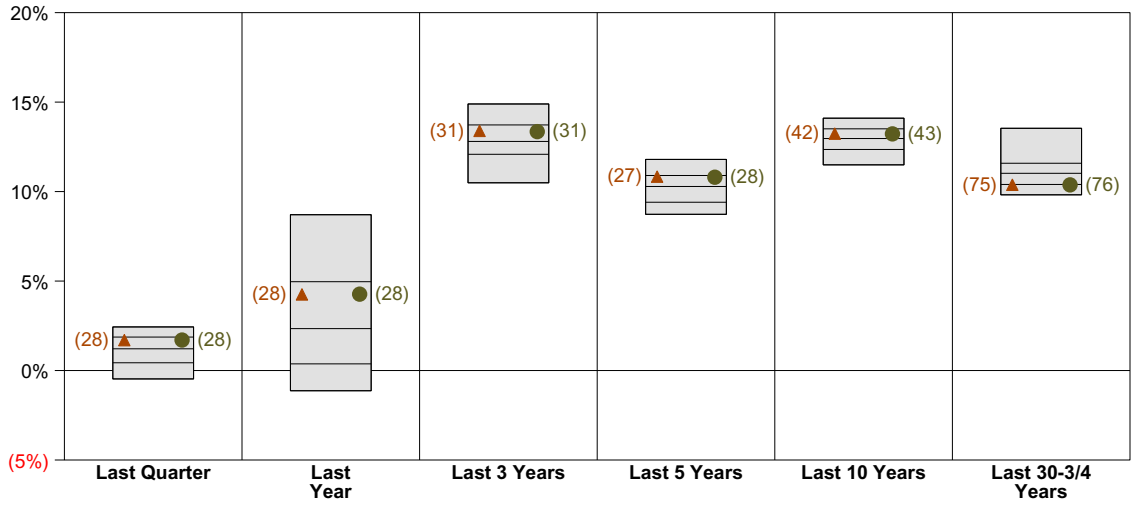
- Alliance S&P Index's portfolio posted a 1.70% return for the quarter placing it in the 28 percentile of the Callan Large Cap Core group for the quarter and in the 28 percentile for the last year.
- Alliance S&P Index's portfolio outperformed the S&P 500 Index by 0.01% for the quarter and outperformed the S&P 500 Index for the year by 0.01%.

Quarterly Asset Growth

Beginning Market Value	$67,345,430
Net New Investment	$-605,636
Investment Gains/(Losses)	$1,145,694
Ending Market Value	$67,885,488

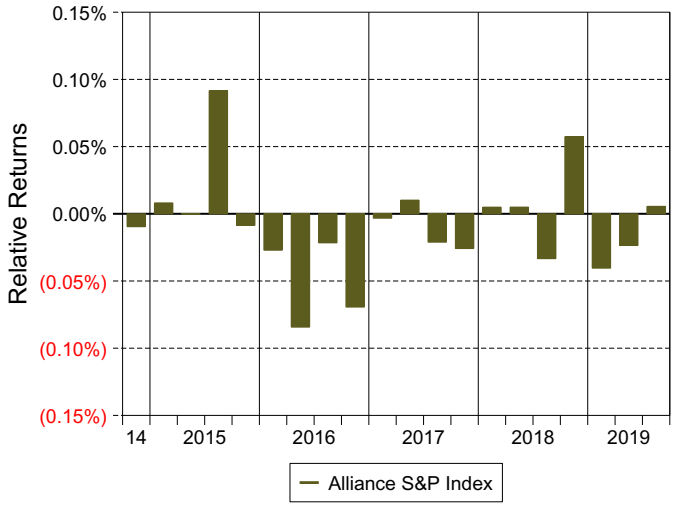
Percent Cash: 0.2%

Performance vs Callan Large Cap Core (Gross)

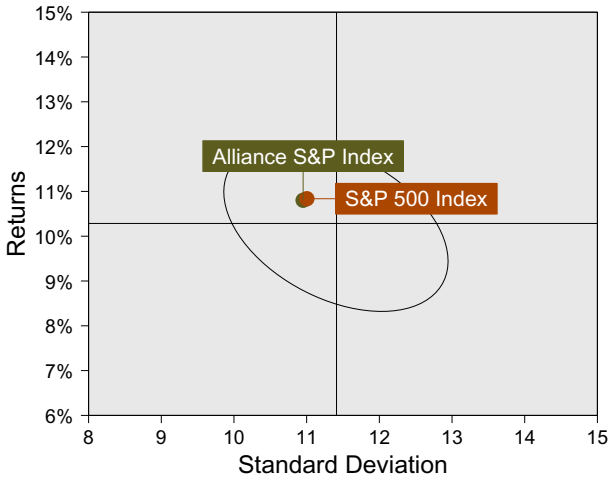


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 30-3/4 Years
10th Percentile	2.44	8.71	14.90	11.80	14.10	13.54
25th Percentile	1.87	4.96	13.73	10.90	13.51	11.58
Median	1.21	2.34	12.80	10.28	12.96	11.02
75th Percentile	0.43	0.37	12.08	9.40	12.35	10.40
90th Percentile	(0.47)	(1.13)	10.49	8.73	11.49	9.82
Alliance S&P Index ●	1.70	4.27	13.35	10.80	13.22	10.38
S&P 500 Index ▲	1.70	4.25	13.39	10.84	13.24	10.38

Relative Return vs S&P 500 Index



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

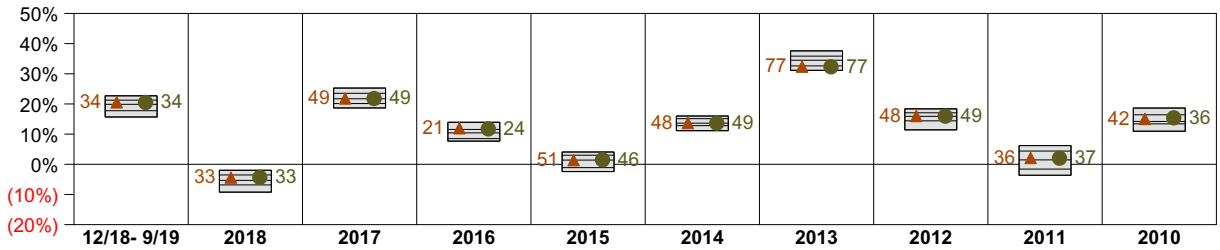


Alliance S&P Index
Return Analysis Summary

Return Analysis

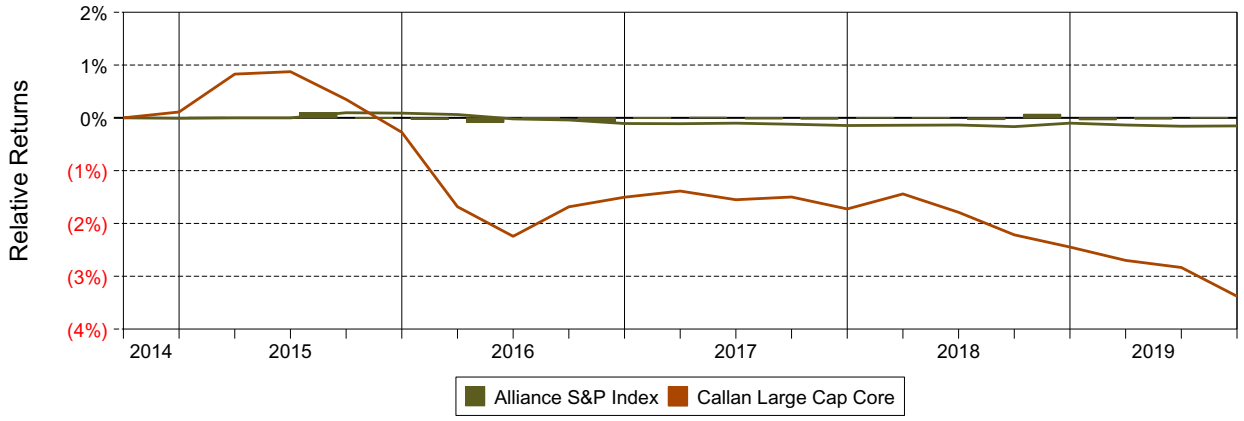
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

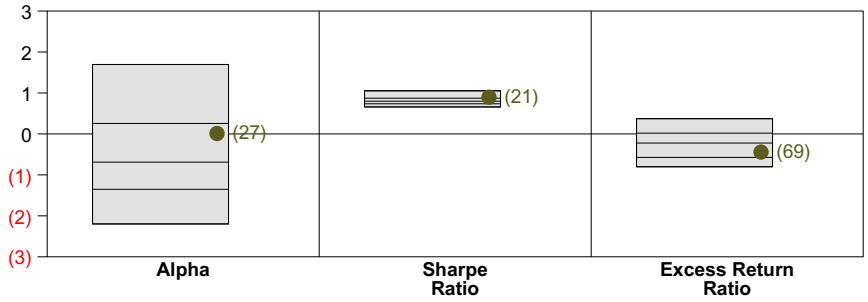


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	22.70	(1.97)	25.27	13.93	4.08	16.01	37.59	18.38	6.19	18.65
25th Percentile	21.27	(3.53)	23.53	11.55	3.01	15.12	35.85	17.07	4.38	16.40
Median	19.88	(5.33)	21.72	10.42	1.40	13.63	34.49	15.89	1.46	14.20
75th Percentile	17.76	(6.83)	20.14	8.50	(1.10)	12.82	32.61	14.41	(1.59)	13.41
90th Percentile	15.68	(9.24)	18.67	7.68	(2.41)	11.14	31.14	11.41	(3.64)	10.96
Alliance S&P Index ●	20.49	(4.34)	21.79	11.74	1.48	13.65	32.31	15.95	2.03	15.41
S&P 500 Index ▲	20.55	(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 September 30, 2019



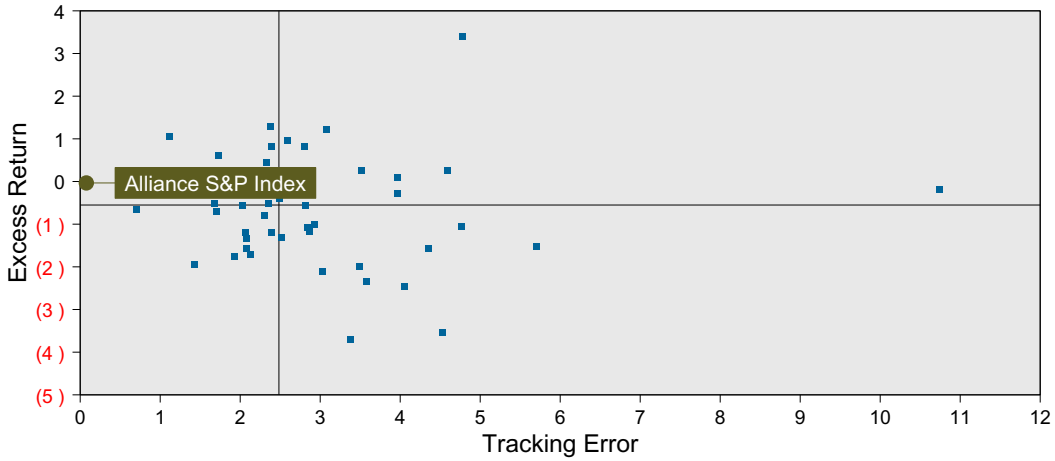
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.70	1.05	0.37
25th Percentile	0.26	0.87	0.02
Median	(0.69)	0.80	(0.22)
75th Percentile	(1.35)	0.74	(0.57)
90th Percentile	(2.20)	0.66	(0.80)
Alliance S&P Index ●	0.01	0.90	(0.44)

Alliance S&P Index
Risk Analysis Summary

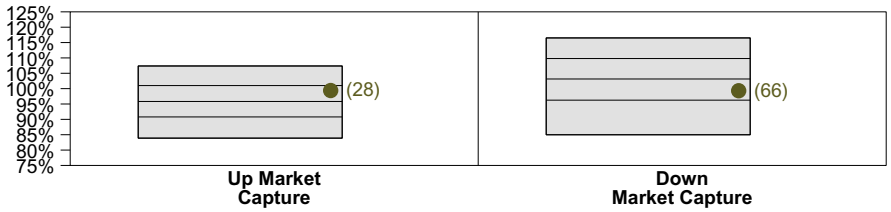
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

Risk Analysis vs Callan Large Cap Core (Gross)
Five Years Ended September 30, 2019

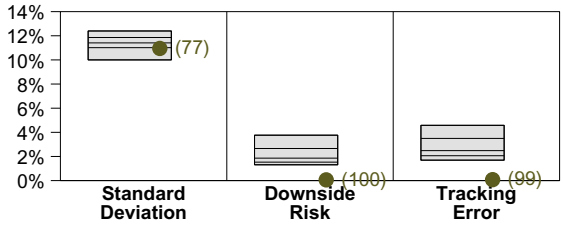


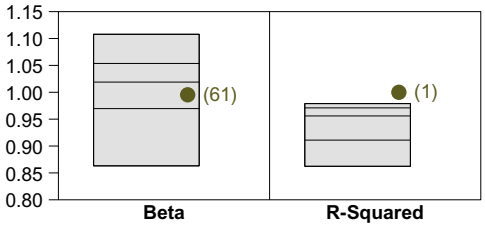
Market Capture vs S&P 500 Index
Rankings Against Callan Large Cap Core (Gross)
Five Years Ended September 30, 2019



	Up Market Capture	Down Market Capture
10th Percentile	107.38	116.51
25th Percentile	100.99	109.80
Median	95.82	103.14
75th Percentile	90.79	96.25
90th Percentile	83.89	84.98
Alliance S&P Index ●	99.38	99.31

Risk Statistics Rankings vs S&P 500 Index
Rankings Against Callan Large Cap Core (Gross)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	12.40	3.76	4.58
25th Percentile	11.86	2.66	3.50
Median	11.41	1.86	2.48
75th Percentile	11.01	1.53	2.06
90th Percentile	10.00	1.31	1.69
Alliance S&P Index ●	10.95	0.06	0.08

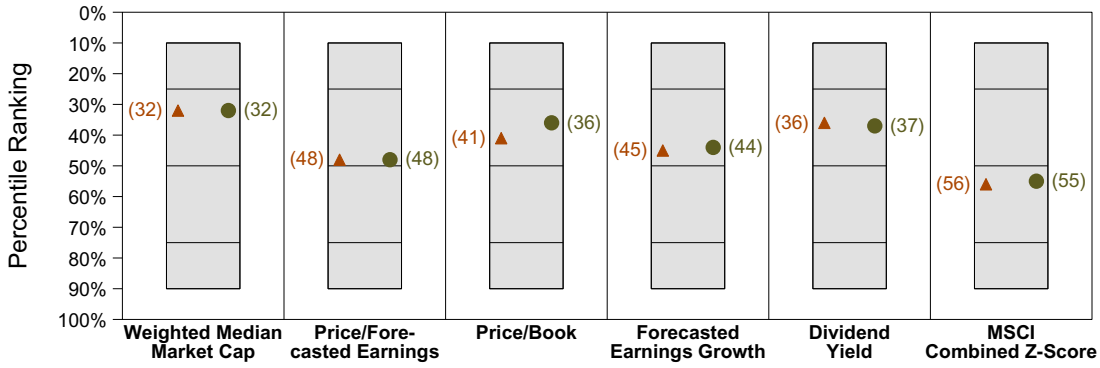
	Beta	R-Squared
10th Percentile	1.11	0.98
25th Percentile	1.05	0.97
Median	1.02	0.96
75th Percentile	0.97	0.91
90th Percentile	0.86	0.86
Alliance S&P Index ●	1.00	1.00

Alliance S&P Index
Equity Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings
Rankings Against Callan Large Cap Core
as of September 30, 2019

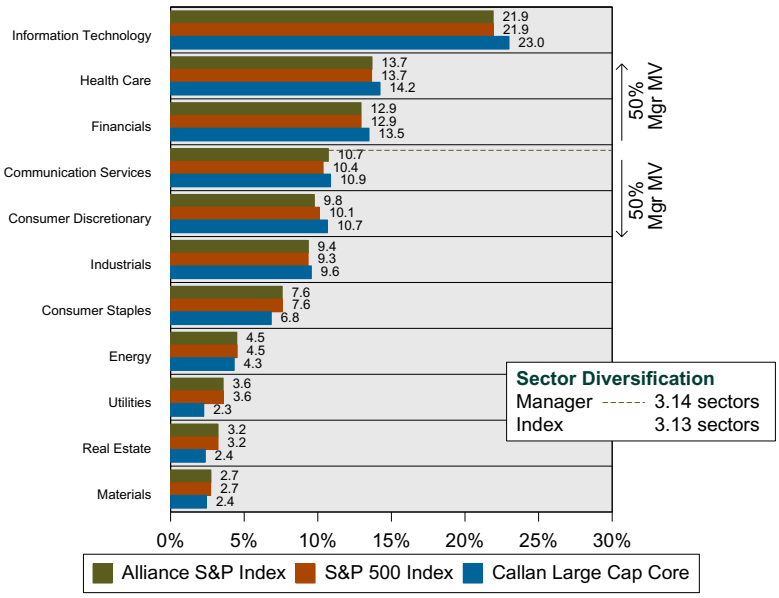


	Weighted Median Market Cap	Price/Forecasted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	188.74	18.97	3.49	15.89	2.21	0.29
25th Percentile	117.68	18.11	3.29	13.95	2.06	0.18
Median	103.99	16.68	3.04	11.47	1.80	(0.01)
75th Percentile	72.38	15.53	2.71	10.77	1.60	(0.17)
90th Percentile	51.17	13.59	2.38	9.90	1.46	(0.44)
Alliance S&P Index ●	115.80	17.02	3.13	11.92	1.96	(0.05)
S&P 500 Index ▲	115.91	17.00	3.11	11.87	1.97	(0.06)

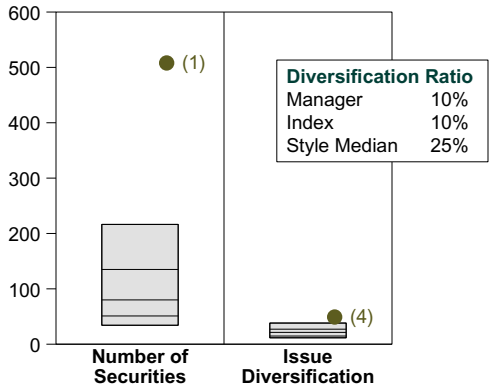
Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. Diversification by number and concentration of holdings are also compared to the benchmark and peer group. Issue Diversification represents by count, and Diversification Ratio by percent, the number of holdings that account for half of the portfolio's market value.

Sector Allocation
September 30, 2019



Diversification
September 30, 2019

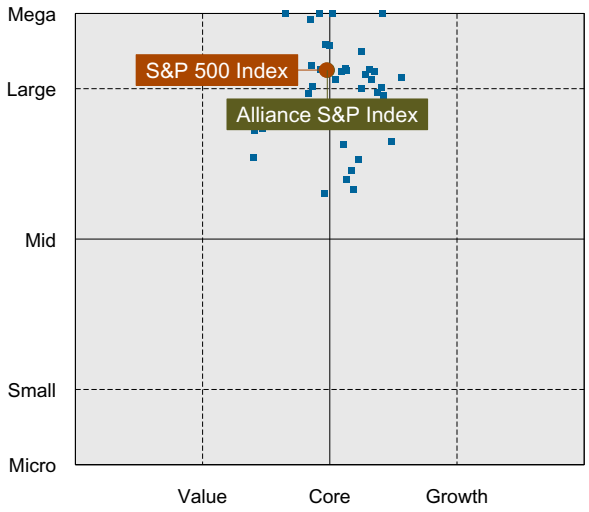


	Number of Securities	Issue Diversification
10th Percentile	216	38
25th Percentile	135	27
Median	80	21
75th Percentile	51	15
90th Percentile	34	12
Alliance S&P Index ●	508	49
S&P 500 Index ▲	505	49

Current Holdings Based Style Analysis
Alliance S&P Index
As of September 30, 2019

This page analyzes the current investment style of a portfolio utilizing a detailed holdings-based style analysis to determine actual exposures to various market capitalization and style segments of the domestic equity market. The market is segmented quarterly by capitalization and style. The capitalization segments are dictated by capitalization decile breakpoints. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the current market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the current portfolio and index weights and stock counts (in parentheses) in each capitalization/style segment of the market. The middle chart illustrates the total exposures and stock counts in the three style segments, with a legend showing the total growth, value, and "combined Z" (growth - value) scores. The bottom chart exhibits the sector weights as well as the style weights within each sector.

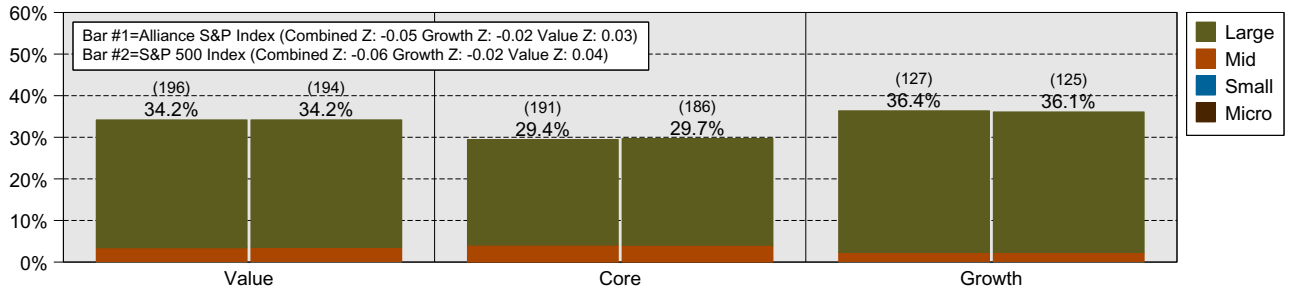
Style Map vs Callan Large Cap Core
Holdings as of September 30, 2019



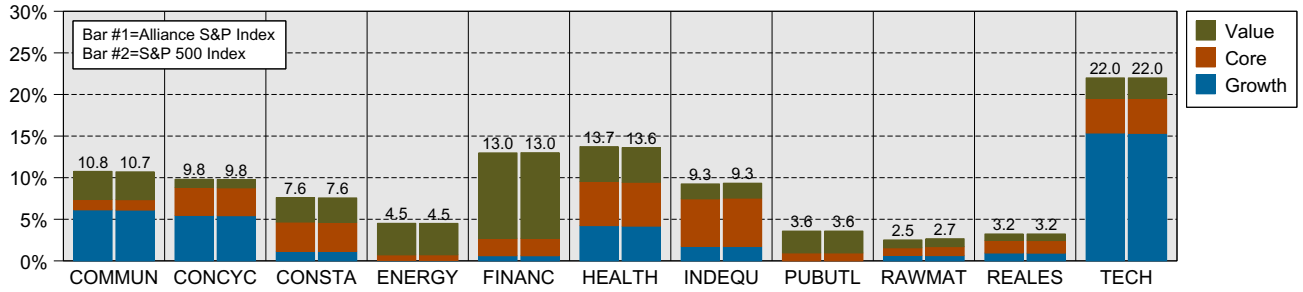
Style Exposure Matrix
Holdings as of September 30, 2019

	Value	Core	Growth	Total
Large	30.8% (103) 30.7% (103)	25.4% (100) 25.7% (101)	34.0% (80) 33.8% (80)	90.2% (283) 90.2% (284)
Mid	3.4% (91) 3.5% (89)	4.1% (87) 4.0% (85)	2.3% (43) 2.3% (43)	9.8% (221) 9.8% (217)
Small	0.0% (2) 0.0% (2)	0.0% (3) 0.0% (0)	0.0% (4) 0.0% (2)	0.0% (9) 0.0% (4)
Micro	0.0% (0) 0.0% (0)	0.0% (1) 0.0% (0)	0.0% (0) 0.0% (0)	0.0% (1) 0.0% (0)
Total	34.2% (196) 34.2% (194)	29.4% (191) 29.7% (186)	36.4% (127) 36.1% (125)	100.0% (514) 100.0% (505)

Combined Z-Score Style Distribution
Holdings as of September 30, 2019



Sector Weights Distribution
Holdings as of September 30, 2019



Alliance S&P Index
Top 10 Portfolio Holdings Characteristics
as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Microsoft Corp	Information Technology	$2,910,176	4.3%	4.14%	1061.55	25.67	1.47%	14.15%
Apple Inc	Information Technology	$2,611,490	3.8%	13.60%	1012.16	17.60	1.38%	9.68%
Amazon.Com	Consumer Discretionary	$1,980,673	2.9%	(8.33)%	858.68	56.36	0.00%	83.00%
Facebook Inc Cl A	Communication Services	$1,174,616	1.7%	(7.73)%	428.41	20.49	0.00%	20.05%
Berkshire Hathaway Inc Del Cl B New	Financials	$1,119,564	1.6%	(2.42)%	288.38	19.50	0.00%	4.64%
JPMorgan Chase & Co	Financials	$1,032,965	1.5%	6.02%	376.31	11.31	3.06%	5.45%
Alphabet Inc Cl C	Communication Services	$1,014,208	1.5%	12.78%	423.41	22.55	0.00%	12.56%
Alphabet Inc Cl A	Communication Services	$1,003,777	1.5%	12.78%	365.77	22.61	0.00%	12.56%
Johnson & Johnson	Health Care	$936,711	1.4%	(6.42)%	341.46	14.39	2.94%	6.54%
Procter & Gamble Co	Consumer Staples	$852,625	1.3%	14.17%	311.28	25.22	2.40%	7.09%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Kla-Tencor Corp	Information Technology	$70,158	0.1%	35.67%	25.27	16.19	1.88%	14.57%
Kontoor Brands	Consumer Discretionary	$5	0.0%	27.25%	2.00	9.41	6.38%	-
Western Digital Corp	Information Technology	$47,831	0.1%	25.44%	17.73	15.41	3.35%	(13.80)%
Target Corp	Consumer Discretionary	$149,674	0.2%	24.39%	54.62	16.58	2.47%	9.35%
Lam Research Corp	Information Technology	$93,600	0.1%	23.65%	33.47	15.66	1.99%	(0.06)%
Newell Brands Inc	Consumer Discretionary	$19,300	0.0%	23.12%	7.93	11.87	4.91%	(14.00)%
D.R. Horton	Consumer Discretionary	$47,439	0.1%	22.60%	19.49	11.47	1.14%	13.00%
Hunt (J.B.) Transport	Industrials	$25,118	0.0%	21.36%	11.81	18.66	0.94%	8.91%
Aramark	Consumer Discretionary	$0	0.0%	21.21%	10.76	17.52	1.01%	9.20%
Kellogg Co	Consumer Staples	$43,758	0.1%	21.20%	21.92	16.14	3.54%	0.75%

10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Covetrus Inc	Health Care	$0	0.0%	(51.39)%	1.33	21.70	0.00%	-
Nektar Therapeutics	Health Care	$8,689	0.0%	(48.84)%	3.19	(7.00)	0.00%	-
Dxc Technology Co	Information Technology	$21,092	0.0%	(46.15)%	7.73	3.77	2.85%	6.69%
Garrett Motion Inc Com	Consumer Discretionary	$0	0.0%	(35.11)%	0.74	2.91	0.00%	-
Concho Res Inc	Energy	$36,191	0.1%	(34.08)%	13.65	14.98	0.74%	12.03%
Align Technology Inc	Health Care	$34,375	0.1%	(33.90)%	14.45	29.80	0.00%	19.50%
Abiomed Inc	Health Care	$22,236	0.0%	(31.71)%	8.07	34.28	0.00%	24.20%
Ulta Salon Cosmetcs & Frag I	Consumer Discretionary	$43,613	0.1%	(27.74)%	14.75	19.46	0.00%	10.22%
Netflix Inc	Communication Services	$321,144	0.5%	(27.14)%	117.17	52.93	0.00%	47.60%
Macys Inc	Consumer Discretionary	$13,131	0.0%	(25.98)%	4.80	5.79	9.72%	(14.79)%

PIMCO StocksPLUS
Period Ended September 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

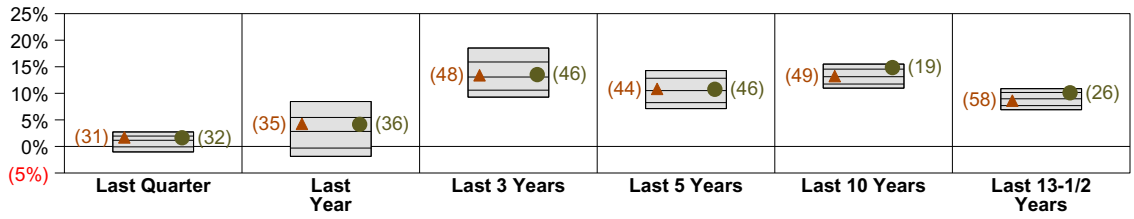
- PIMCO StocksPLUS's portfolio posted a 1.63% return for the quarter placing it in the 32 percentile of the Callan Large Capitalization group for the quarter and in the 36 percentile for the last year.
- PIMCO StocksPLUS's portfolio underperformed the S&P 500 Index by 0.07% for the quarter and underperformed the S&P 500 Index for the year by 0.10%.

Quarterly Asset Growth

Beginning Market Value	$34,150,105
Net New Investment	$0
Investment Gains/(Losses)	$556,743
Ending Market Value	$34,706,848

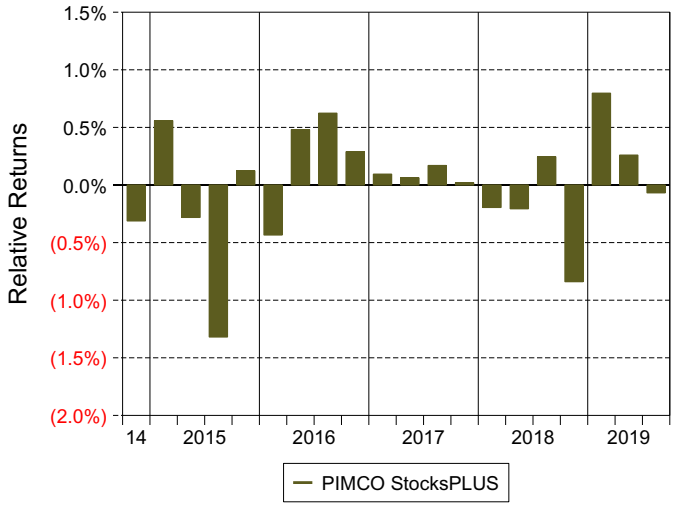
Percent Cash: 0.0%

Performance vs Callan Large Capitalization (Gross)

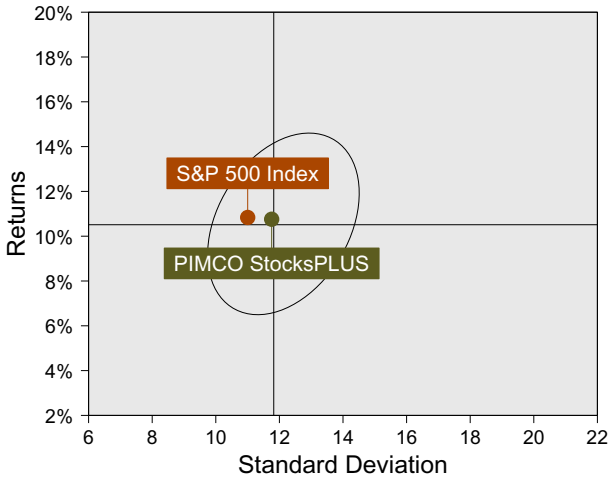


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 13-1/2 Years
10th Percentile	2.73	8.46	18.53	14.28	15.50	10.88
25th Percentile	1.95	5.46	15.90	12.84	14.55	10.16
Median	1.16	2.83	13.07	10.51	13.13	8.97
75th Percentile	(0.08)	(0.31)	10.59	8.25	11.75	7.69
90th Percentile	(1.03)	(1.87)	9.28	7.12	10.97	6.91
PIMCO StocksPLUS ●	1.63	4.15	13.52	10.76	14.85	10.10
S&P 500 Index ▲	1.70	4.25	13.39	10.84	13.24	8.62

Relative Return vs S&P 500 Index



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

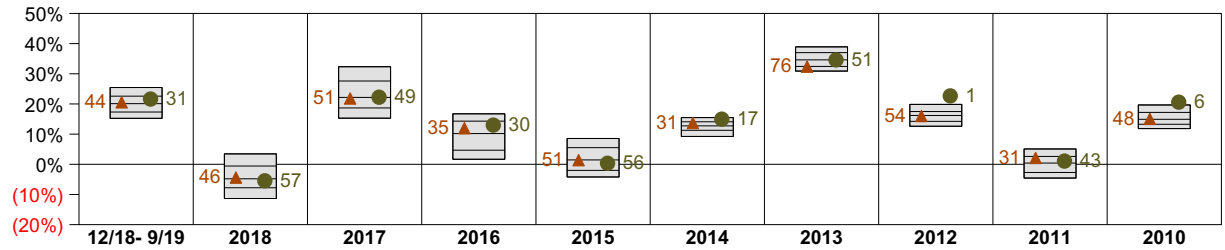


PIMCO StocksPLUS
Return Analysis Summary

Return Analysis

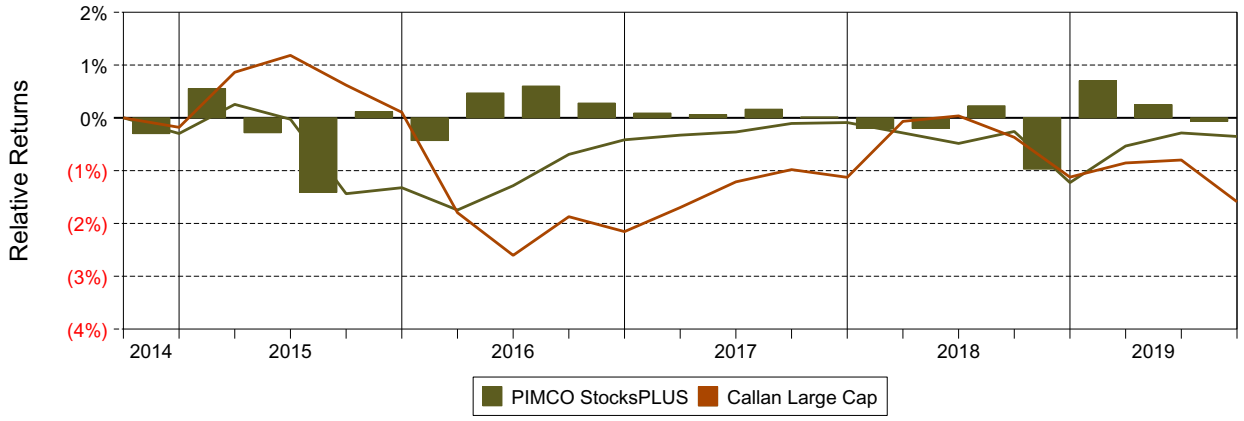
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

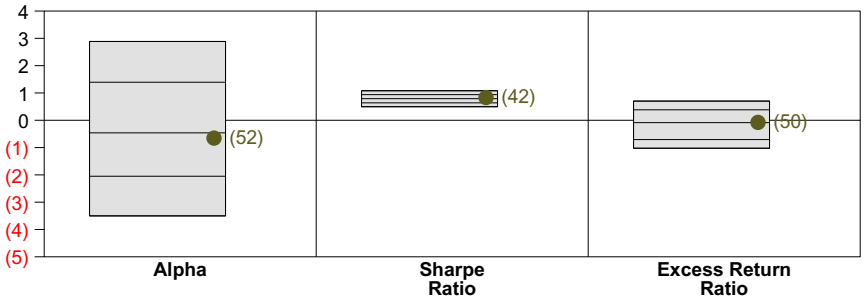


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	25.45	3.46	32.34	16.73	8.56	15.49	38.93	19.85	5.09	19.67
25th Percentile	22.58	(0.57)	27.61	14.30	5.52	14.09	37.01	17.48	2.61	17.20
Median	20.10	(4.80)	22.17	10.18	1.45	12.73	34.61	16.18	0.40	14.92
75th Percentile	17.33	(7.78)	18.68	4.67	(2.01)	11.27	32.43	14.23	(2.71)	13.26
90th Percentile	15.23	(11.33)	15.28	1.67	(4.21)	9.23	30.89	12.61	(4.56)	11.84
PIMCO StocksPLUS ●	21.62	(5.47)	22.23	12.99	0.34	14.97	34.59	22.68	1.07	20.60
S&P 500 Index ▲	20.55	(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 September 30, 2019



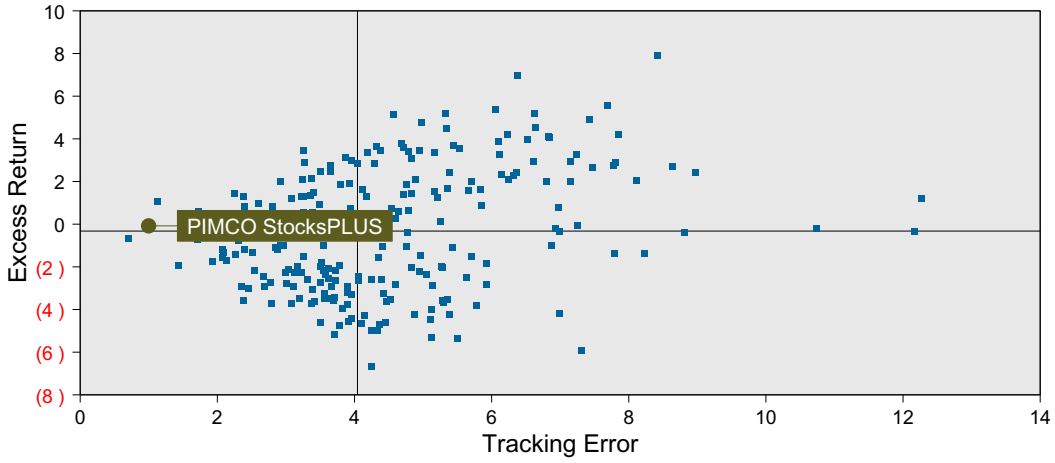
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.89	1.08	0.70
25th Percentile	1.39	0.94	0.38
Median	(0.46)	0.79	(0.09)
75th Percentile	(2.05)	0.64	(0.71)
90th Percentile	(3.50)	0.50	(1.02)
PIMCO StocksPLUS ●	(0.65)	0.83	(0.08)

PIMCO StocksPLUS
Risk Analysis Summary

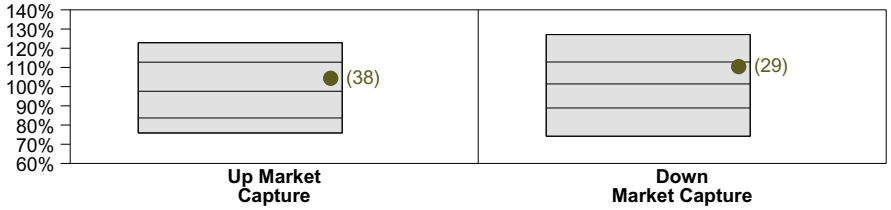
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

Risk Analysis vs Callan Large Capitalization (Gross)
Five Years Ended September 30, 2019

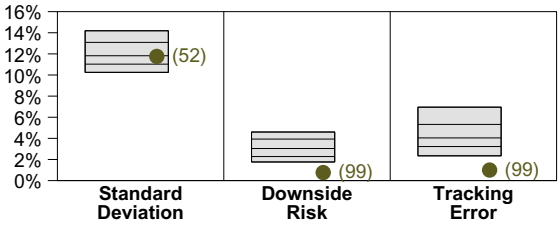


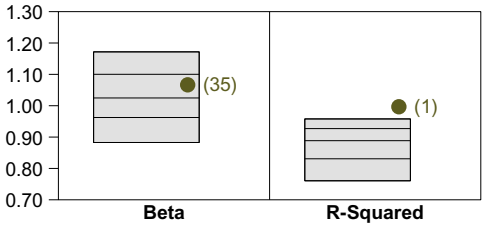
Market Capture vs S&P 500 Index
Rankings Against Callan Large Capitalization (Gross)
Five Years Ended September 30, 2019



	Up Market Capture	Down Market Capture
10th Percentile	122.88	127.13
25th Percentile	112.73	112.83
Median	97.59	101.40
75th Percentile	83.68	88.89
90th Percentile	75.87	74.17
PIMCO StocksPLUS ●	104.35	110.43

Risk Statistics Rankings vs S&P 500 Index
Rankings Against Callan Large Capitalization (Gross)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	14.19	4.60	6.95
25th Percentile	13.09	3.93	5.32
Median	11.82	3.04	4.04
75th Percentile	11.03	2.28	3.22
90th Percentile	10.25	1.76	2.35
PIMCO StocksPLUS ●	11.76	0.76	1.00

	Beta	R-Squared
10th Percentile	1.17	0.96
25th Percentile	1.10	0.93
Median	1.02	0.89
75th Percentile	0.96	0.83
90th Percentile	0.88	0.76
PIMCO StocksPLUS ●	1.07	1.00

BlackRock Russell 1000 Value
Period Ended September 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

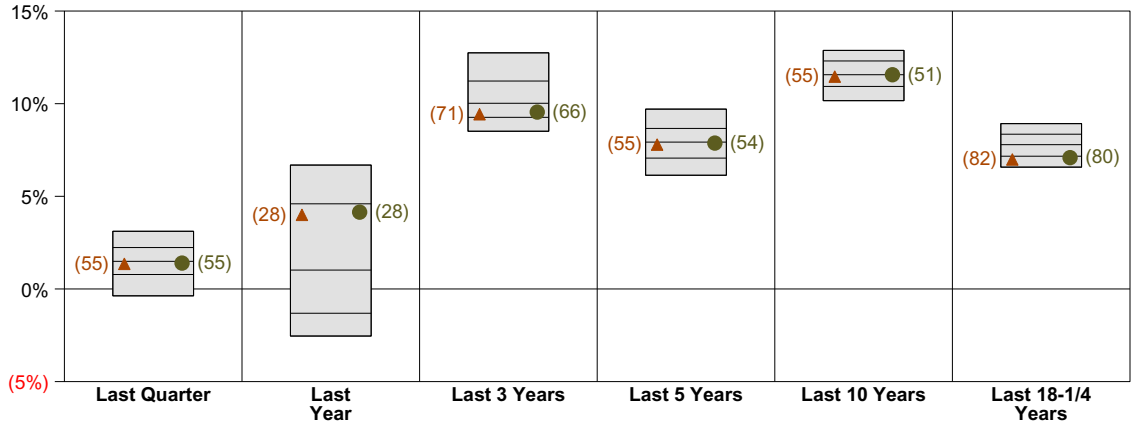
- BlackRock Russell 1000 Value's portfolio posted a 1.40% return for the quarter placing it in the 55 percentile of the Callan Large Cap Value group for the quarter and in the 28 percentile for the last year.
- BlackRock Russell 1000 Value's portfolio outperformed the Russell 1000 Value Index by 0.04% for the quarter and outperformed the Russell 1000 Value Index for the year by 0.14%.

Quarterly Asset Growth

Beginning Market Value	$60,419,879
Net New Investment	$-600,000
Investment Gains/(Losses)	$843,102
Ending Market Value	$60,662,981

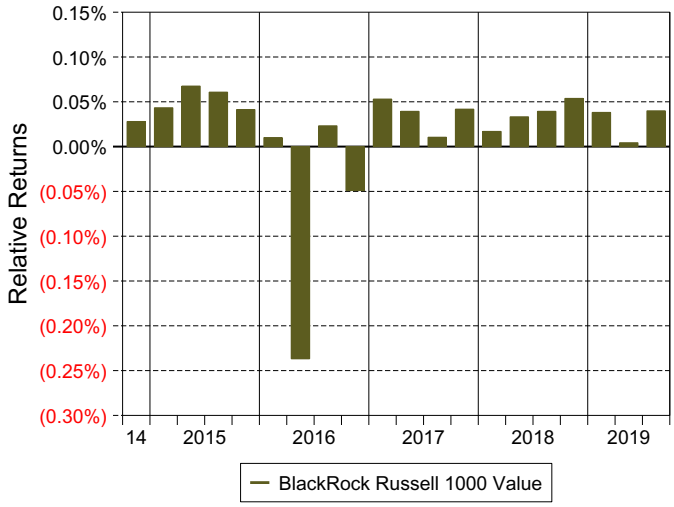
Percent Cash: 0.0%

Performance vs Callan Large Cap Value (Gross)

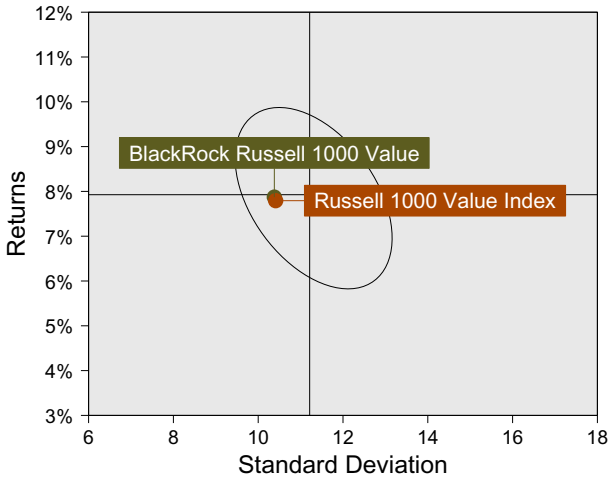


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 18-1/4 Years
10th Percentile	3.11	6.69	12.74	9.71	12.88	8.92
25th Percentile	2.23	4.60	11.22	8.66	12.31	8.35
Median	1.49	1.02	10.02	7.93	11.56	7.79
75th Percentile	0.78	(1.31)	9.26	7.06	10.93	7.16
90th Percentile	(0.37)	(2.54)	8.51	6.14	10.16	6.57
BlackRock Russell 1000 Value ●	1.40	4.14	9.55	7.87	11.56	7.09
Russell 1000 Value Index ▲	1.36	4.00	9.43	7.79	11.46	6.99

Relative Return vs Russell 1000 Value Index



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

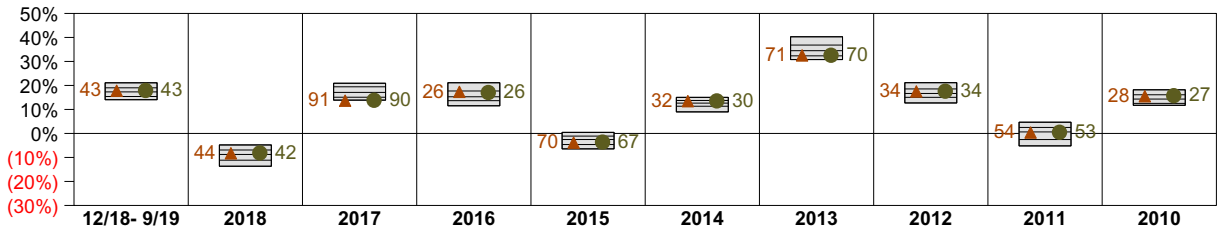


BlackRock Russell 1000 Value
Return Analysis Summary

Return Analysis

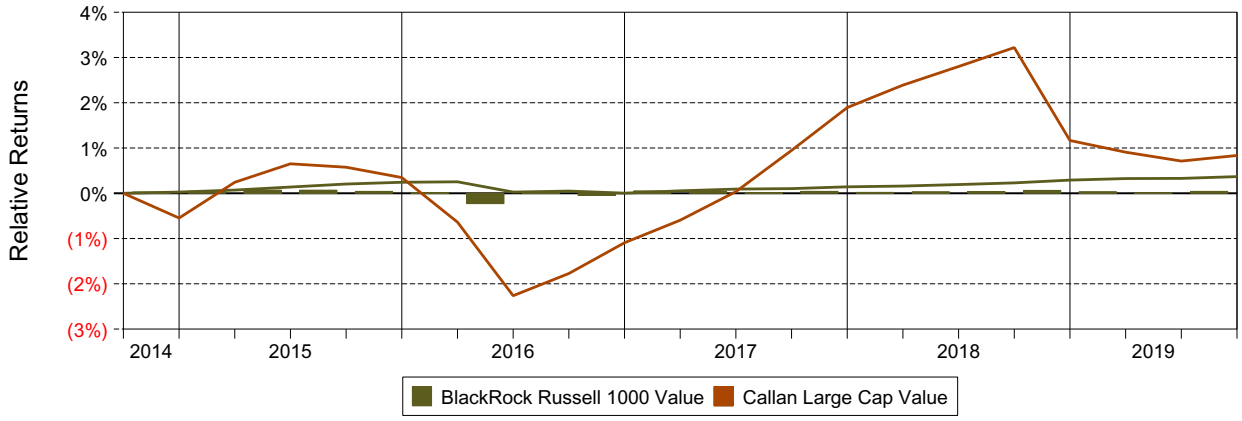
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

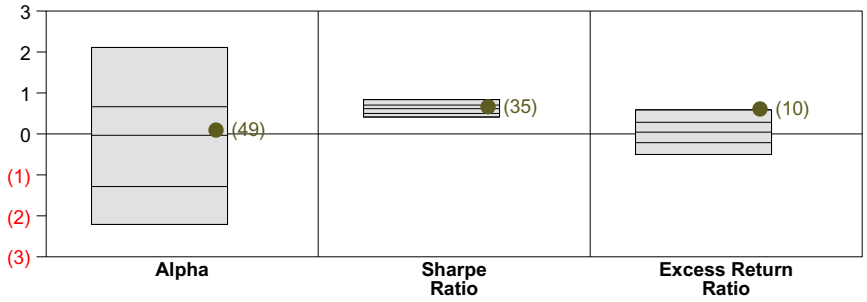


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	21.10	(4.79)	20.91	21.12	0.44	15.04	40.28	21.14	4.68	18.18
25th Percentile	19.01	(6.90)	19.44	17.69	(1.11)	13.74	36.82	18.54	2.50	16.11
Median	17.31	(8.76)	17.10	15.27	(2.53)	12.63	34.48	16.66	0.64	14.32
75th Percentile	15.39	(11.14)	15.09	13.66	(4.62)	11.33	32.34	15.04	(2.54)	12.53
90th Percentile	14.05	(13.67)	13.87	11.52	(6.43)	8.98	30.78	12.70	(5.19)	11.72
BlackRock Russell 1000 Value ●	17.90	(8.13)	13.82	17.06	(3.62)	13.56	32.57	17.60	0.49	15.73
Russell 1000 Value Index ▲	17.81	(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 September 30, 2019



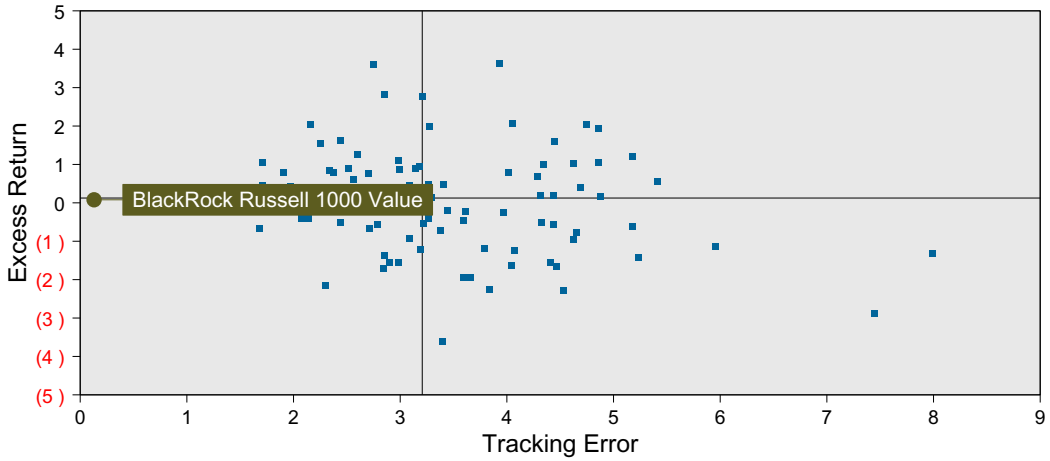
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.11	0.84	0.59
25th Percentile	0.66	0.70	0.28
Median	(0.03)	0.62	0.04
75th Percentile	(1.28)	0.50	(0.21)
90th Percentile	(2.21)	0.41	(0.50)
BlackRock Russell 1000 Value ●	0.09	0.66	0.61

BlackRock Russell 1000 Value
Risk Analysis Summary

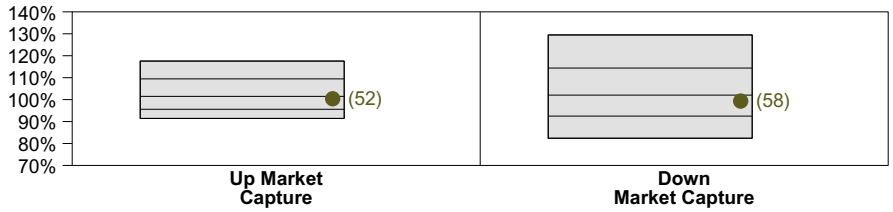
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

Risk Analysis vs Callan Large Cap Value (Gross)
Five Years Ended September 30, 2019

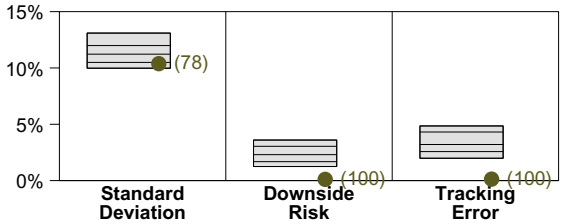


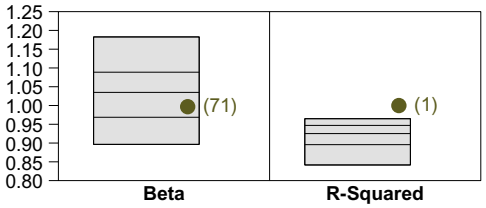
Market Capture vs Russell 1000 Value Index
Rankings Against Callan Large Cap Value (Gross)
Five Years Ended September 30, 2019



	Up Market Capture	Down Market Capture
10th Percentile	117.57	129.47
25th Percentile	109.45	114.38
Median	101.48	102.05
75th Percentile	95.59	92.49
90th Percentile	91.42	82.40
BlackRock Russell 1000 Value ●	100.39	99.33

Risk Statistics Rankings vs Russell 1000 Value Index
Rankings Against Callan Large Cap Value (Gross)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	13.10	3.60	4.85
25th Percentile	11.99	3.04	4.31
Median	11.22	2.30	3.21
75th Percentile	10.49	1.68	2.58
90th Percentile	9.98	1.25	1.98
BlackRock Russell 1000 Value ●	10.38	0.11	0.13

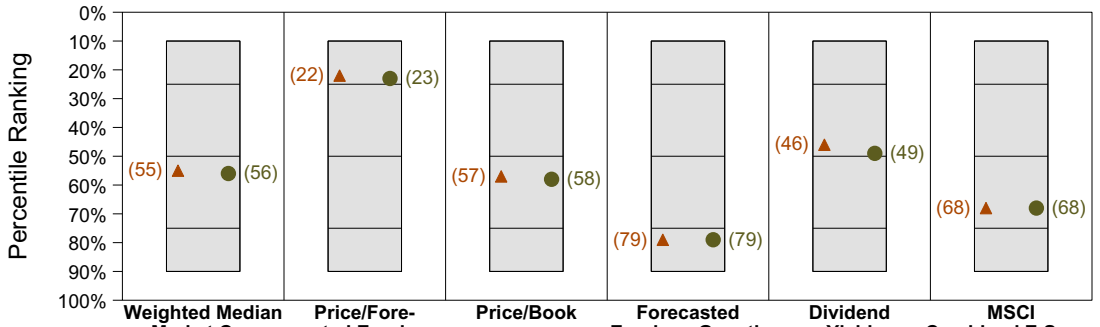
	Beta	R-Squared
10th Percentile	1.18	0.96
25th Percentile	1.09	0.95
Median	1.03	0.93
75th Percentile	0.97	0.90
90th Percentile	0.90	0.84
BlackRock Russell 1000 Value ●	1.00	1.00

BlackRock Russell 1000 Value
Equity Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings
Rankings Against Callan Large Cap Value
as of September 30, 2019

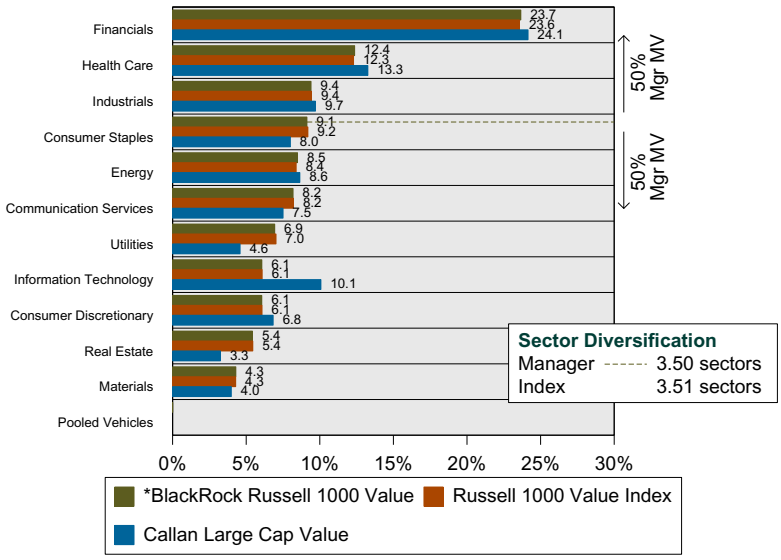


	Weighted Median Market Cap	Price/Fore-casted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	98.18	15.34	2.45	10.82	3.25	(0.55)
25th Percentile	78.82	14.38	2.26	9.49	2.83	(0.68)
Median	62.85	13.31	2.03	8.44	2.61	(0.85)
75th Percentile	46.50	12.15	1.75	7.43	2.34	(1.10)
90th Percentile	36.26	11.41	1.49	6.37	2.18	(1.32)
***BlackRock Russell 1000 Value** ●	55.28	14.40	1.93	7.14	2.62	(1.00)
Russell 1000 Value Index ▲	56.98	14.45	1.93	7.15	2.63	(1.00)

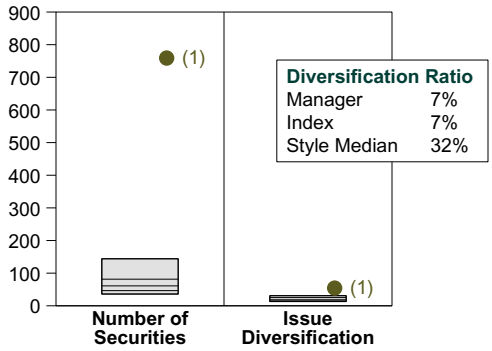
Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. Diversification by number and concentration of holdings are also compared to the benchmark and peer group. Issue Diversification represents by count, and Diversification Ratio by percent, the number of holdings that account for half of the portfolio's market value.

Sector Allocation
September 30, 2019



Diversification
September 30, 2019



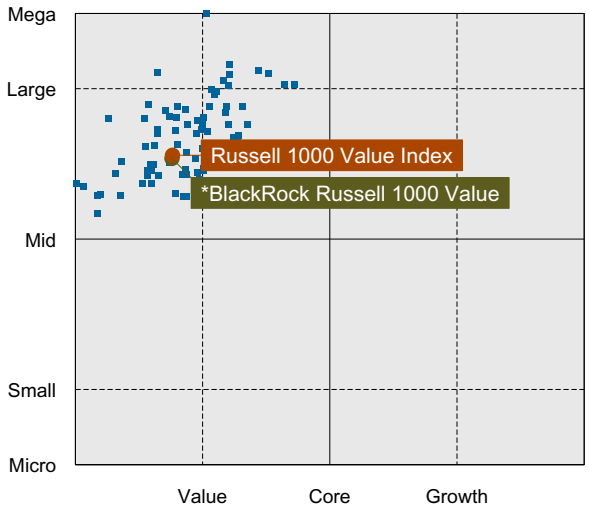
	Number of Securities	Issue Diversification
10th Percentile	144	31
25th Percentile	82	25
Median	61	18
75th Percentile	47	15
90th Percentile	36	13
***BlackRock Russell 1000 Value** ●	759	54
Russell 1000 Value Index ▲	756	54

*9/30/19 portfolio characteristics generated using most recently available holdings (6/30/19) modified based on a "buy-and-hold" assumption (repriced and adjusted for corporate actions). Analysis is then done using current market and company financial data.

Current Holdings Based Style Analysis
BlackRock Russell 1000 Value
As of September 30, 2019

This page analyzes the current investment style of a portfolio utilizing a detailed holdings-based style analysis to determine actual exposures to various market capitalization and style segments of the domestic equity market. The market is segmented quarterly by capitalization and style. The capitalization segments are dictated by capitalization decile breakpoints. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the current market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the current portfolio and index weights and stock counts (in parentheses) in each capitalization/style segment of the market. The middle chart illustrates the total exposures and stock counts in the three style segments, with a legend showing the total growth, value, and "combined Z" (growth - value) scores. The bottom chart exhibits the sector weights as well as the style weights within each sector.

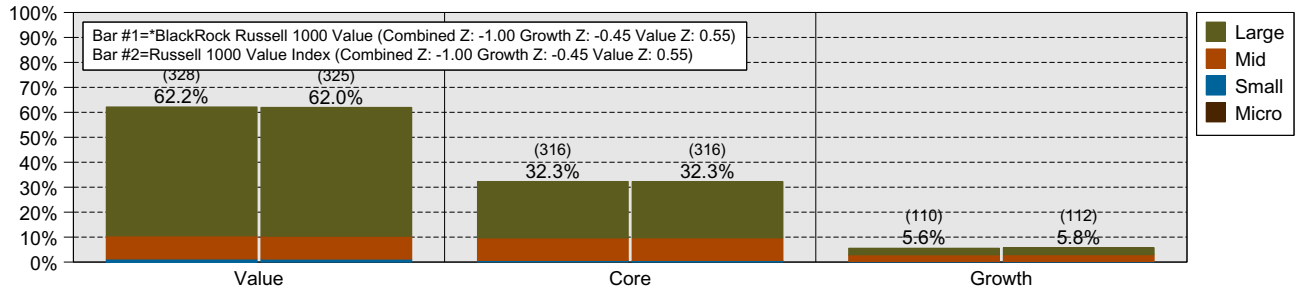
Style Map vs Callan Large Cap Value
Holdings as of September 30, 2019



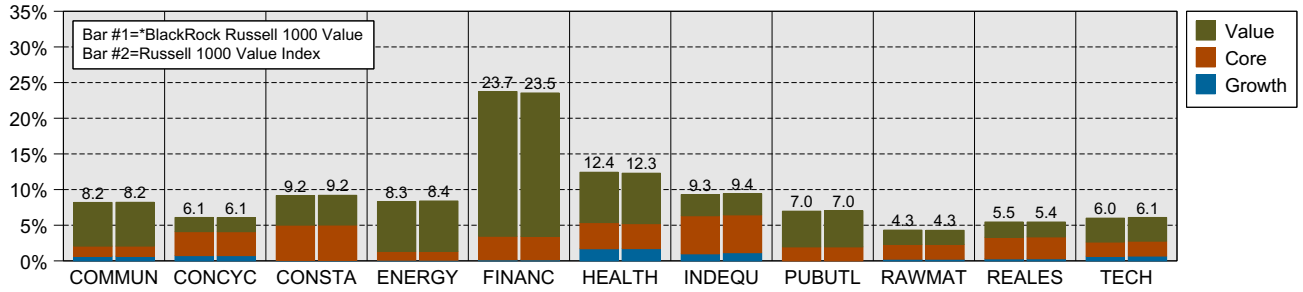
Style Exposure Matrix
Holdings as of September 30, 2019

	Value	Core	Growth	Total
Large	51.7% (105) 51.6% (105)	22.6% (85) 22.6% (84)	2.7% (18) 2.8% (18)	**76.9% (208)** **77.0% (207)**
Mid	9.2% (159) 9.1% (157)	8.9% (184) 9.0% (186)	2.7% (76) 2.7% (78)	**20.8% (419)** **20.9% (421)**
Small	1.2% (64) 1.2% (63)	0.7% (46) 0.7% (46)	0.2% (16) 0.2% (16)	**2.2% (126)** **2.1% (125)**
Micro	0.0% (0) 0.0% (0)	0.0% (1) 0.0% (0)	0.0% (0) 0.0% (0)	**0.0% (1)** **0.0% (0)**
Total	**62.2% (328)** **62.0% (325)**	**32.3% (316)** **32.3% (316)**	**5.6% (110)** **5.8% (112)**	**100.0% (754)** **100.0% (753)**

Combined Z-Score Style Distribution
Holdings as of September 30, 2019



Sector Weights Distribution
Holdings as of September 30, 2019



*9/30/19 portfolio characteristics generated using most recently available holdings (6/30/19) modified based on a "buy-and-hold" assumption (repriced and adjusted for corporate actions). Analysis is then done using current market and company financial data.

BlackRock Russell 1000 Value
Top 10 Portfolio Holdings Characteristics
as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Berkshire Hathaway Inc Del Cl B New	Financials	$1,814,287	3.0%	(2.42)%	288.38	19.50	0.00%	4.64%
JPMorgan Chase & Co	Financials	$1,692,548	2.8%	6.01%	376.31	11.31	3.06%	5.45%
Exxon Mobil Corp	Energy	$1,333,286	2.2%	(6.70)%	298.76	16.67	4.93%	10.00%
Johnson & Johnson	Health Care	$1,300,939	2.1%	(6.42)%	341.46	14.39	2.94%	6.54%
Procter & Gamble Co	Consumer Staples	$1,292,094	2.1%	14.17%	311.28	25.22	2.40%	7.09%
At&t Inc	Communication Services	$1,232,842	2.0%	14.64%	276.50	10.49	5.39%	4.00%
Bank Amer Corp	Financials	$1,119,012	1.8%	1.23%	271.52	9.81	2.47%	8.77%
Verizon Communications Inc	Communication Services	$1,114,519	1.8%	6.78%	249.63	12.39	4.08%	2.60%
Intel Corp	Information Technology	$1,030,123	1.7%	8.37%	228.28	11.62	2.45%	10.00%
Disney Walt Co Com Disney	Communication Services	$1,014,088	1.7%	(6.10)%	234.76	22.30	1.35%	(4.58)%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Cyrusone Inc	Real Estate	$39,361	0.1%	37.93%	8.95	354.71	2.53%	(3.18)%
New York Cmnty Bancorp Inc	Financials	$25,399	0.0%	27.61%	5.87	14.63	5.42%	(10.64)%
Pilgrims Pride Corp New	Consumer Staples	$5,100	0.0%	26.21%	7.99	13.44	0.00%	(15.54)%
Western Digital Corp	Information Technology	$77,893	0.1%	25.43%	17.73	15.41	3.35%	(13.80)%
Target Corp	Consumer Discretionary	$225,076	0.4%	24.39%	54.62	16.58	2.47%	9.35%
Xpo Logistics Inc	Industrials	$12,217	0.0%	23.80%	6.60	16.13	0.00%	23.28%
Lam Research Corp	Information Technology	$18,866	0.0%	23.65%	33.47	15.66	1.99%	(0.06)%
Urban Outfitters Inc	Consumer Discretionary	$8,984	0.0%	23.47%	2.75	11.44	0.00%	8.02%
Newell Brands Inc	Consumer Discretionary	$31,750	0.1%	23.10%	7.93	11.87	4.91%	(14.00)%
Colony Cap Inc New Cl A Com	Real Estate	$12,331	0.0%	22.64%	2.93	(7.72)	7.31%	5.44%

10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
2u Inc	Information Technology	$2,541	0.0%	(56.75)%	1.03	(16.13)	0.00%	-
Pg&e Corp	Utilities	$23,677	0.0%	(56.37)%	5.29	2.53	0.00%	5.60%
Covetrus Inc	Health Care	$5,005	0.0%	(51.39)%	1.33	21.70	0.00%	-
Nektar Therapeutics	Health Care	$11,499	0.0%	(48.81)%	3.19	(7.00)	0.00%	-
Dxc Technology Co	Information Technology	$35,326	0.1%	(46.15)%	7.73	3.77	2.85%	6.69%
Antero Res Corp	Energy	$3,451	0.0%	(45.39)%	0.93	(13.30)	0.00%	(29.80)%
Range Resources Corp	Energy	$3,419	0.0%	(45.02)%	0.96	11.72	2.09%	(14.95)%
Fluor Corp New	Industrials	$11,813	0.0%	(42.54)%	2.68	34.34	4.39%	13.54%
Centennial Resource Dev Inc Cl A	Energy	$3,694	0.0%	(40.51)%	1.19	10.88	0.00%	6.70%
Owens-Illinois	Materials	$7,217	0.0%	(40.23)%	1.60	4.03	1.95%	9.42%

*9/30/19 portfolio characteristics generated using most recently available holdings (6/30/19) modified based on a "buy-and-hold" assumption (repriced and adjusted for corporate actions). Analysis is then done using current market and company financial data.

T. Rowe Price Large Cap Growth
Period Ended September 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

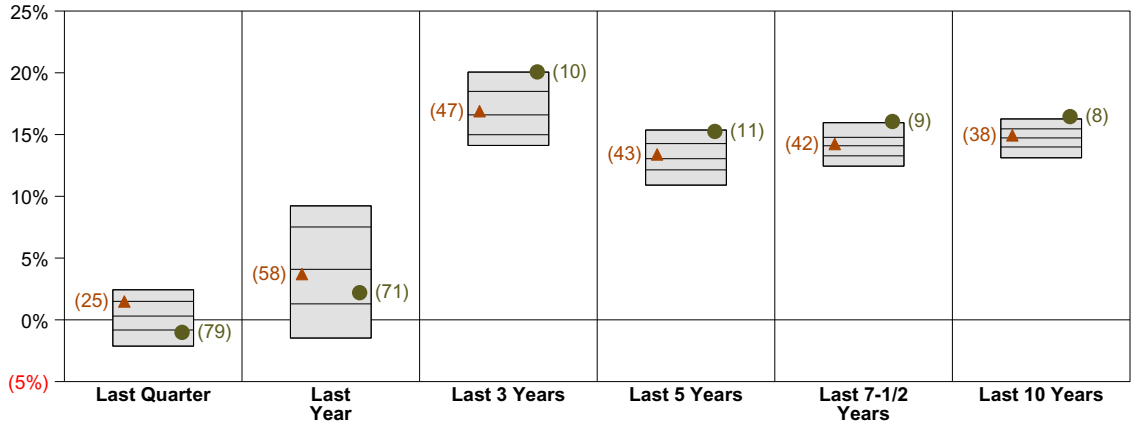
- T. Rowe Price Large Cap Growth's portfolio posted a (1.02)% return for the quarter placing it in the 79 percentile of the Callan Large Cap Growth group for the quarter and in the 71 percentile for the last year.
- T. Rowe Price Large Cap Growth's portfolio underperformed the Russell 1000 Growth Index by 2.50% for the quarter and underperformed the Russell 1000 Growth Index for the year by 1.51%.

Quarterly Asset Growth

Beginning Market Value	$60,229,989
Net New Investment	$-1,206,216
Investment Gains/(Losses)	$-625,622
Ending Market Value	$58,398,150

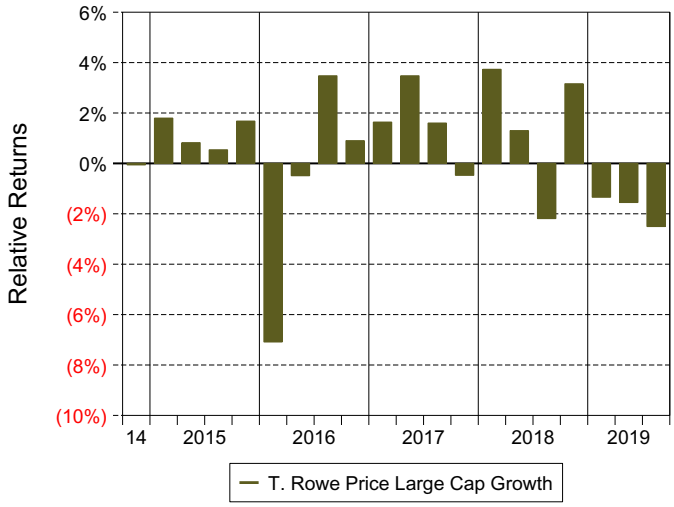
Percent Cash: 1.5%

Performance vs Callan Large Cap Growth (Gross)

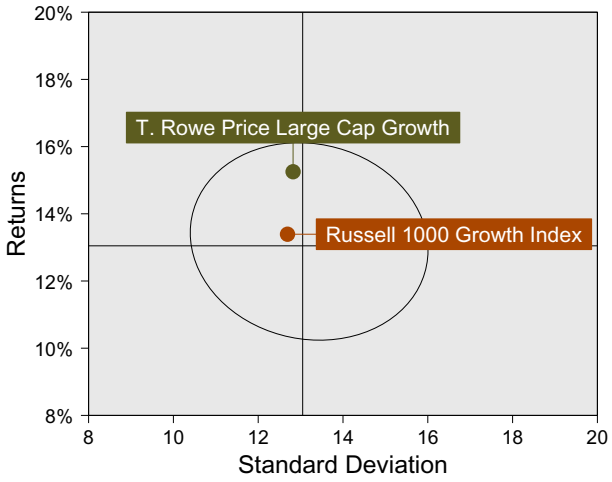


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7-1/2 Years	Last 10 Years
10th Percentile	2.43	9.23	20.06	15.37	15.96	16.26
25th Percentile	1.50	7.52	18.49	14.27	14.78	15.46
Median	0.30	4.09	16.59	13.05	14.09	14.73
75th Percentile	(0.82)	1.29	14.99	12.14	13.28	13.99
90th Percentile	(2.13)	(1.47)	14.12	10.91	12.44	13.12
T. Rowe Price Large Cap Growth ●	(1.02)	2.20	20.07	15.25	16.06	16.45
Russell 1000 Growth Index ▲	1.49	3.71	16.89	13.39	14.23	14.94

Relative Return vs Russell 1000 Growth Index



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

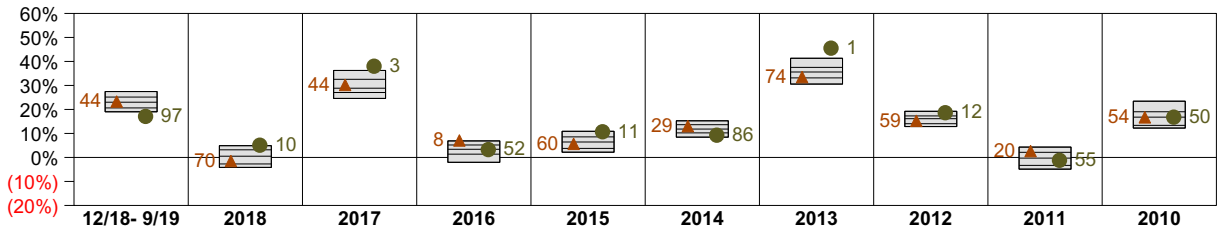


T. Rowe Price Large Cap Growth
Return Analysis Summary

Return Analysis

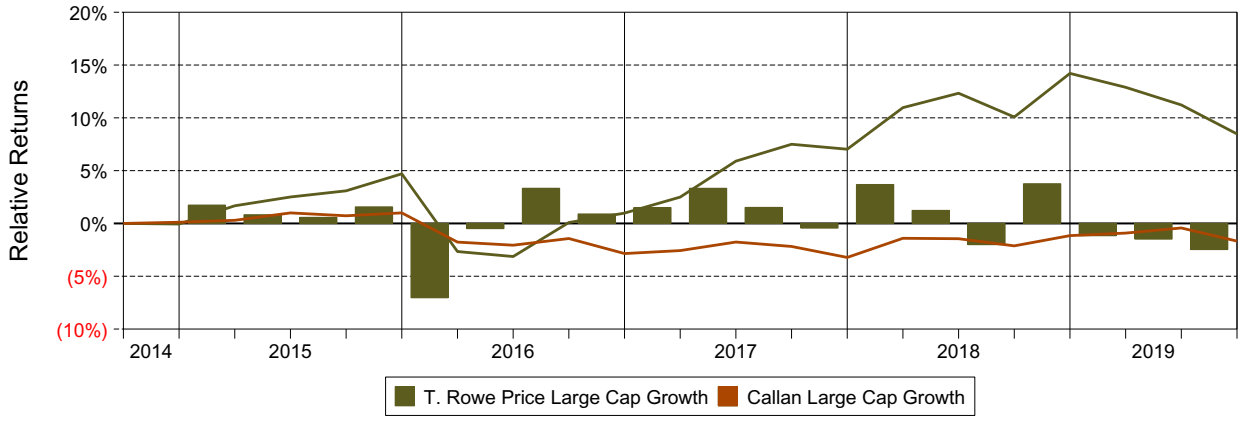
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

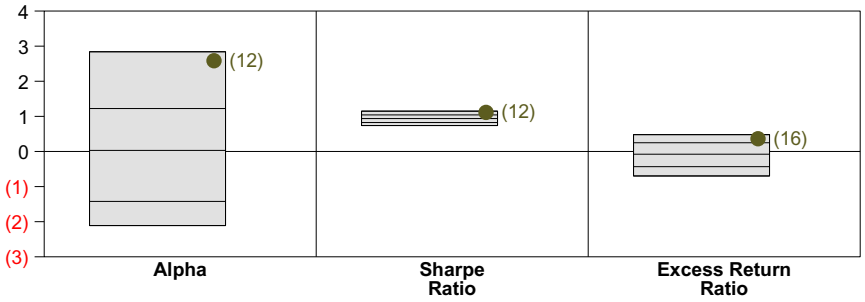


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	27.46	4.90	36.25	6.89	10.89	15.27	41.32	19.23	4.31	23.43
25th Percentile	25.16	3.18	32.56	5.19	8.56	13.65	37.53	17.30	2.13	19.03
Median	23.01	0.51	28.84	3.39	6.43	11.82	35.60	16.14	(0.28)	16.79
75th Percentile	20.63	(2.72)	27.06	1.37	3.77	10.23	33.14	14.05	(3.31)	13.37
90th Percentile	19.02	(4.16)	24.59	(2.03)	2.18	8.44	30.56	12.87	(4.87)	12.24
T. Rowe Price Large Cap Growth ●	17.10	5.10	38.01	3.27	10.69	9.27	45.54	18.63	(1.19)	16.79
Russell 1000 Growth Index ▲	23.30	(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 September 30, 2019



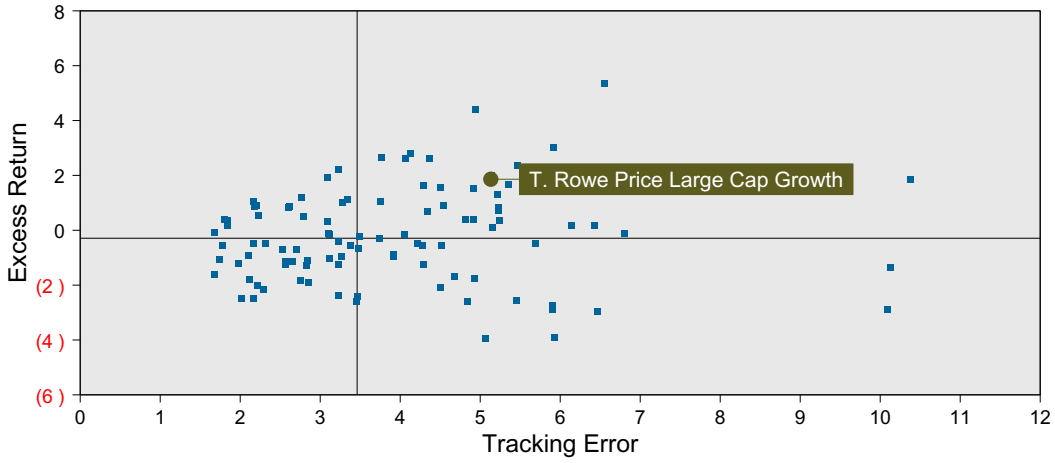
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.84	1.15	0.48
25th Percentile	1.22	1.04	0.25
Median	0.03	0.94	(0.08)
75th Percentile	(1.42)	0.82	(0.43)
90th Percentile	(2.11)	0.74	(0.70)
T. Rowe Price Large Cap Growth ●	2.58	1.11	0.36

T. Rowe Price Large Cap Growth
Risk Analysis Summary

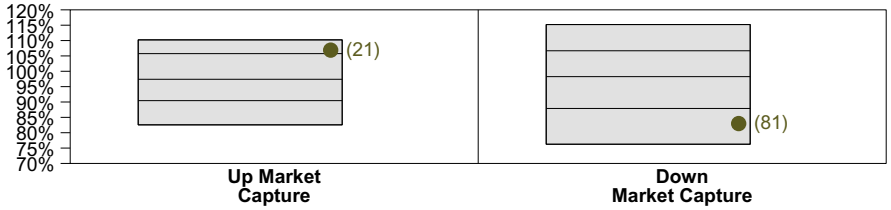
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

Risk Analysis vs Callan Large Cap Growth (Gross)
Five Years Ended September 30, 2019

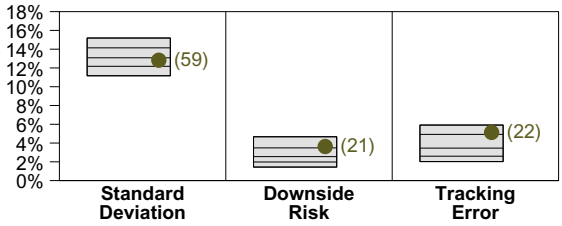


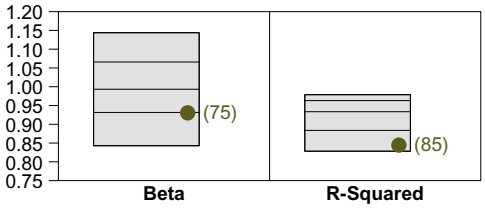
Market Capture vs Russell 1000 Growth Index
Rankings Against Callan Large Cap Growth (Gross)
Five Years Ended September 30, 2019



	Up Market Capture	Down Market Capture
10th Percentile	110.22	115.21
25th Percentile	105.74	106.68
Median	97.39	98.26
75th Percentile	90.44	87.90
90th Percentile	82.56	76.25
T. Rowe Price Large Cap Growth ●	106.88	82.98

Risk Statistics Rankings vs Russell 1000 Growth Index
Rankings Against Callan Large Cap Growth (Gross)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	15.19	4.67	5.92
25th Percentile	14.14	3.48	4.92
Median	13.08	2.55	3.46
75th Percentile	12.18	1.98	2.60
90th Percentile	11.17	1.44	2.03
T. Rowe Price Large Cap Growth ●	12.82	3.63	5.13

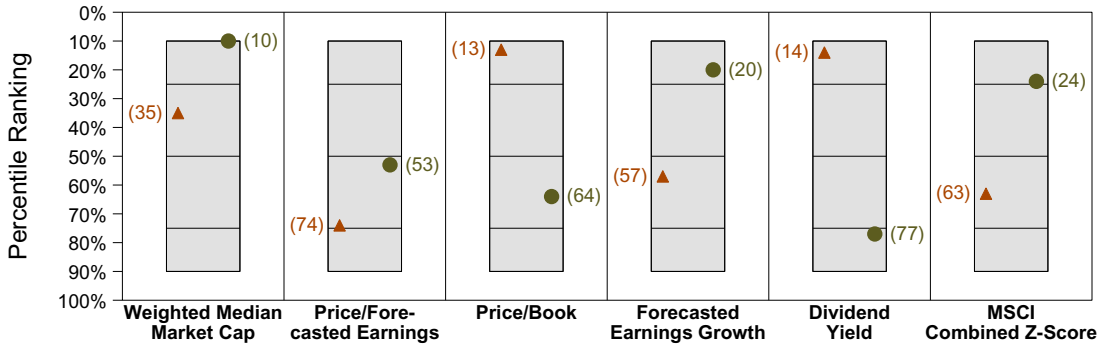
	Beta	R-Squared
10th Percentile	1.14	0.98
25th Percentile	1.07	0.96
Median	0.99	0.93
75th Percentile	0.93	0.88
90th Percentile	0.84	0.83
T. Rowe Price Large Cap Growth ●	0.93	0.84

T. Rowe Price Large Cap Growth
Equity Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings
Rankings Against Callan Large Cap Growth
as of September 30, 2019

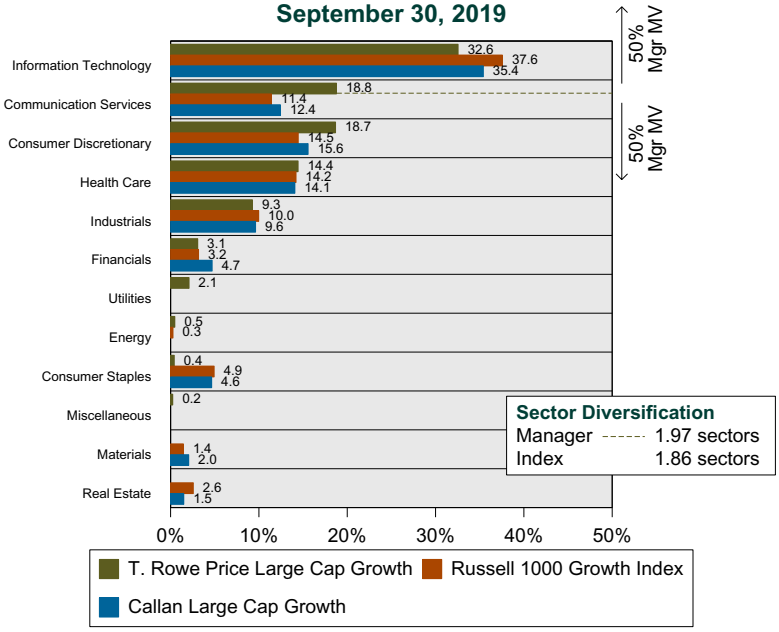


	Weighted Median Market Cap	Price/Forecasted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	162.02	28.74	7.46	21.74	1.26	1.47
25th Percentile	126.82	25.35	6.51	20.15	1.13	1.23
Median	117.45	23.13	5.94	17.63	0.93	1.02
75th Percentile	90.00	21.49	5.25	15.97	0.77	0.83
90th Percentile	55.95	18.74	4.56	12.53	0.55	0.60
T. Rowe Price Large Cap Growth ●	154.68	23.00	5.44	20.41	0.75	1.27
Russell 1000 Growth Index ▲	121.10	21.60	7.28	17.18	1.22	0.94

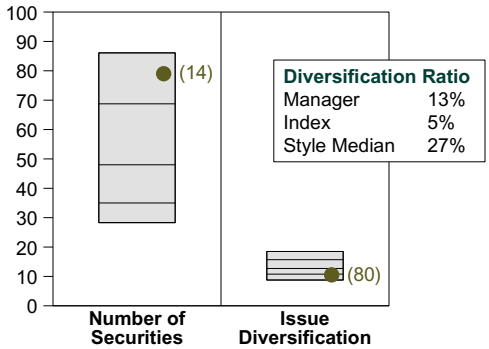
Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. Diversification by number and concentration of holdings are also compared to the benchmark and peer group. Issue Diversification represents by count, and Diversification Ratio by percent, the number of holdings that account for half of the portfolio's market value.

Sector Allocation
September 30, 2019



Diversification
September 30, 2019

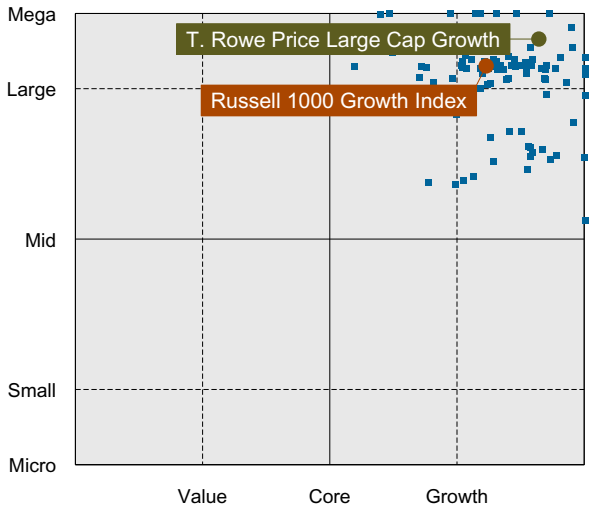


	Number of Securities	Issue Diversification
10th Percentile	86	18
25th Percentile	69	16
Median	48	13
75th Percentile	35	11
90th Percentile	28	9
T. Rowe Price Large Cap Growth ●	79	11
Russell 1000 Growth Index ▲	523	25

Current Holdings Based Style Analysis
T. Rowe Price Large Cap Growth
As of September 30, 2019

This page analyzes the current investment style of a portfolio utilizing a detailed holdings-based style analysis to determine actual exposures to various market capitalization and style segments of the domestic equity market. The market is segmented quarterly by capitalization and style. The capitalization segments are dictated by capitalization decile breakpoints. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the current market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the current portfolio and index weights and stock counts (in parentheses) in each capitalization/style segment of the market. The middle chart illustrates the total exposures and stock counts in the three style segments, with a legend showing the total growth, value, and "combined Z" (growth - value) scores. The bottom chart exhibits the sector weights as well as the style weights within each sector.

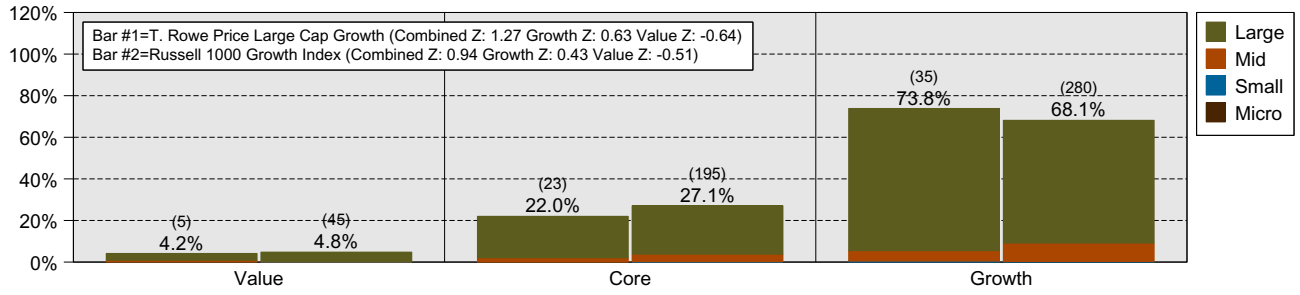
Style Map vs Callan Large Cap Growth
Holdings as of September 30, 2019



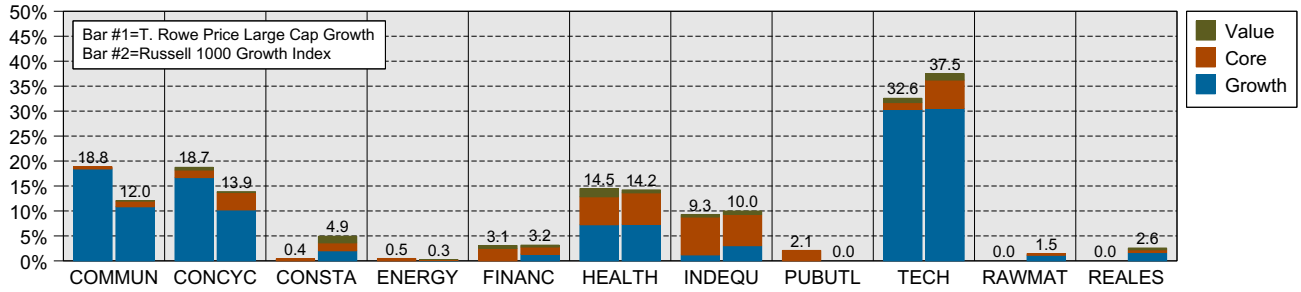
Style Exposure Matrix
Holdings as of September 30, 2019

	Value	Core	Growth	Total
Large	3.3% (4) 4.5% (22)	19.9% (17) 23.3% (72)	68.3% (28) 59.0% (90)	**91.6% (49)** **86.8% (184)**
Mid	0.9% (1) 0.3% (19)	2.1% (6) 3.7% (111)	5.1% (6) 8.9% (169)	**8.0% (13)** **12.8% (299)**
Small	0.0% (0) 0.0% (4)	0.0% (0) 0.2% (12)	0.4% (1) 0.3% (21)	**0.4% (1)** **0.4% (37)**
Micro	0.0% (0) 0.0% (0)	0.0% (0) 0.0% (0)	0.0% (0) 0.0% (0)	**0.0% (0)** **0.0% (0)**
Total	**4.2% (5)** **4.8% (45)**	**22.0% (23)** **27.1% (195)**	**73.8% (35)** **68.1% (280)**	**100.0% (63)** **100.0% (520)**

Combined Z-Score Style Distribution
Holdings as of September 30, 2019



Sector Weights Distribution
Holdings as of September 30, 2019



T. Rowe Price Large Cap Growth
Top 10 Portfolio Holdings Characteristics
as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Amazon.Com	Consumer Discretionary	$4,601,898	7.9%	(8.33)%	858.68	56.36	0.00%	83.00%
Microsoft Corp	Information Technology	$4,273,782	7.3%	4.14%	1061.55	25.67	1.47%	14.15%
Boeing Co	Industrials	$3,547,122	6.1%	4.87%	214.09	21.33	2.16%	9.61%
Facebook Inc Cl A	Communication Services	$3,455,642	5.9%	(7.75)%	428.41	20.49	0.00%	20.05%
Alphabet Inc Cl A	Communication Services	$3,419,192	5.9%	12.77%	365.77	22.61	0.00%	12.56%
Visa Inc Com Cl A	Information Technology	$2,989,362	5.1%	(0.75)%	297.06	27.46	0.58%	15.55%
Global Pmts Inc	Information Technology	$1,406,514	2.4%	(0.94)%	47.71	22.12	0.03%	16.66%
Stryker Corp	Health Care	$1,396,000	2.4%	5.46%	80.92	24.55	0.96%	10.12%
Alphabet Inc Cl C	Communication Services	$1,349,433	2.3%	12.78%	423.41	22.55	0.00%	12.56%
Alibaba Group Hldg Ltd Sponsored Ads	Consumer Discretionary	$1,348,877	2.3%	(1.28)%	435.39	21.60	0.00%	28.00%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Hunt (J.B.) Transport	Industrials	$241,770	0.4%	21.36%	11.81	18.66	0.94%	8.91%
Asml Holding N V N Y Registry Shs	Information Technology	$771,344	1.3%	19.07%	105.46	28.58	0.92%	16.86%
Dollar Gen Corp New	Consumer Discretionary	$944,104	1.6%	17.89%	40.86	22.34	0.81%	10.49%
Northrop Grumman Corp	Industrials	$677,995	1.2%	16.41%	63.41	17.16	1.41%	7.90%
Apple Inc	Information Technology	$1,069,905	1.8%	13.58%	1012.16	17.60	1.38%	9.68%
Alphabet Inc Cl C	Communication Services	$1,349,433	2.3%	12.78%	423.41	22.55	0.00%	12.56%
Alphabet Inc Cl A	Communication Services	$3,419,192	5.9%	12.77%	365.77	22.61	0.00%	12.56%
Nike Inc Cl B	Consumer Discretionary	$552,531	0.9%	12.17%	117.58	30.07	0.94%	16.78%
Ross Stores Inc	Consumer Discretionary	$669,755	1.1%	11.10%	39.74	22.89	0.93%	9.96%
Sempra Energy	Utilities	$407,846	0.7%	8.94%	40.53	21.70	2.62%	11.90%

10 Worst Performers

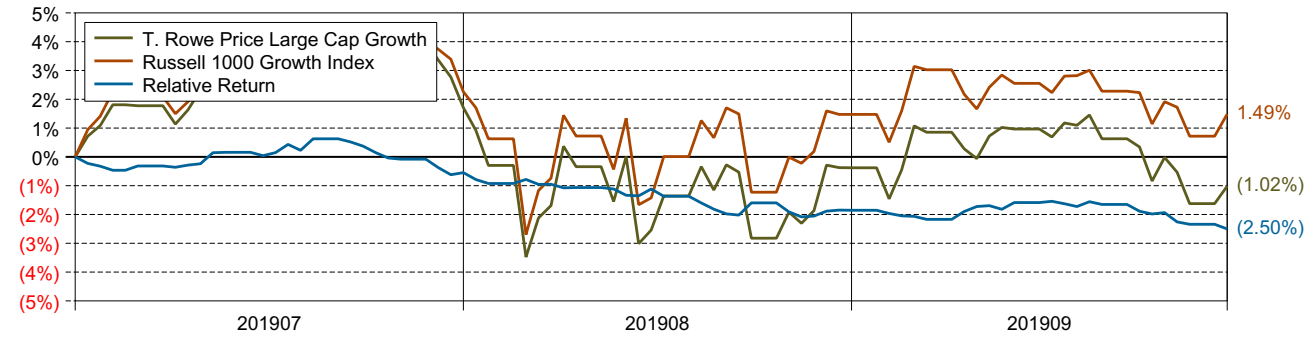
Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Concho Res Inc	Energy	$271,600	0.5%	(30.95)%	13.65	14.98	0.74%	12.03%
Netflix Inc	Communication Services	$572,707	1.0%	(27.14)%	117.17	52.93	0.00%	47.60%
Spotify Technology Sa	Communication Services	$303,354	0.5%	(25.32)%	20.49	(89.27)	0.00%	-
Alexion Pharmaceuticals Inc	Health Care	$214,978	0.4%	(25.23)%	21.96	9.13	0.00%	17.18%
Slack Technologies Inc Com Cl A	Information Technology	$86,211	0.1%	(23.72)%	6.11	(85.67)	0.00%	-
Avantor Inc Issuer_code 10	Health Care	$307,759	0.5%	(23.00)%	8.36	19.84	0.00%	27.40%
Centene Corp Del	Health Care	$207,432	0.4%	(17.51)%	17.89	9.01	0.00%	15.10%
Workday Inc Cl A	Information Technology	$440,366	0.8%	(17.33)%	27.87	83.11	0.00%	28.30%
Fortive Corp Ex Distributon	Industrials	$209,108	0.4%	(15.81)%	23.00	18.22	0.41%	10.80%
Tencent Music Entmt Group Spon Ads	Communication Services	$252,846	0.4%	(14.98)%	3.92	26.83	0.00%	38.65%

T. Rowe Price Large Cap Growth vs Russell 1000 Growth Index
Domestic Equity Daily Performance Attribution
One Quarter Ended September 30, 2019

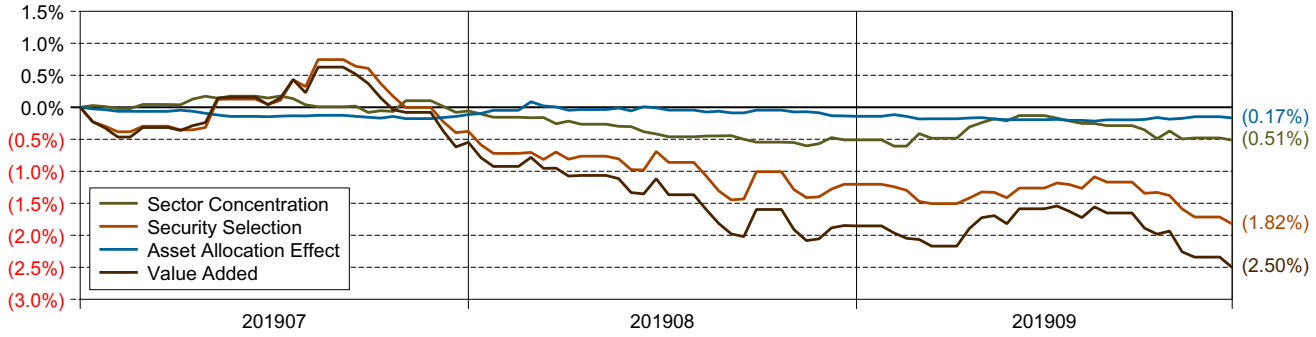
Return Sources and Timing

The charts below illustrate the timing and cumulative paths of the manager's performance, as well as attributing relative performance to three sources: Sector Concentration, Security Selection, and Asset Allocation. The first chart shows the cumulative absolute return paths for the manager and index. The second chart shows the cumulative relative return path of the manager and the attributed sources of that value-added. The bottom table breaks the annualized attribution factors down to the sector level for more insight into sources of return.

Cumulative Manager and Benchmark Returns



Cumulative Attribution Effects vs. Russell 1000 Growth Index



Attribution Effects by Sector vs. Russell 1000 Growth Index
One Quarter Ended September 30, 2019

Sector	Manager Eff Weight	Index Eff Weight	Manager Return	Index Return	Sector Concentration	Security Selection	Asset Allocation
Communication Services	17.87%	11.57%	(0.75)%	0.85%	(0.06)%	(0.29)%	-
Consumer Discretionary	19.32%	14.59%	(0.68)%	(0.49)%	(0.10)%	(0.03)%	-
Consumer Staples	0.67%	4.79%	(1.01)%	5.98%	(0.17)%	(0.05)%	-
Energy	0.53%	0.31%	(30.95)%	(7.64)%	(0.01)%	(0.13)%	-
Financials	3.31%	3.19%	2.72%	0.63%	0.00%	0.04%	-
Health Care	15.12%	14.45%	(5.18)%	(2.48)%	(0.02)%	(0.43)%	-
Industrials	9.33%	9.77%	4.15%	3.36%	(0.01)%	0.08%	-
Information Technology	32.34%	37.43%	(0.59)%	2.55%	(0.05)%	(1.01)%	-
Materials	0.00%	1.41%	0.00%	5.95%	(0.06)%	0.00%	-
Miscellaneous	0.25%	0.00%	(1.29)%	0.00%	(0.01)%	0.00%	-
Real Estate	0.00%	2.50%	0.00%	7.52%	(0.15)%	0.00%	-
Utilities	1.27%	0.00%	9.65%	0.00%	0.13%	0.00%	-
Non Equity	2.72%	0.00%	-	-	-	-	(0.17)%
Total	-	-	(1.02)%	1.49%	(0.51)%	(1.82)%	(0.17)%

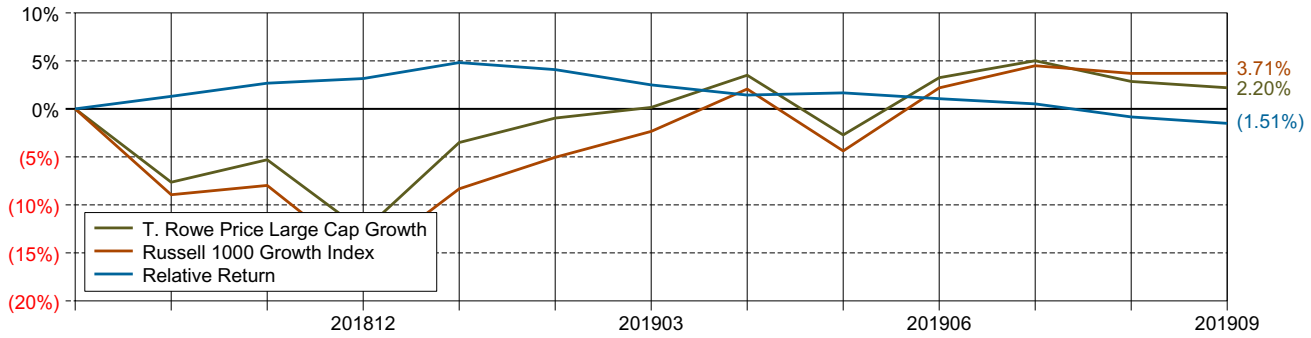
Manager Return	=	Index Return	+	Sector Concentration	+	Security Selection	+	Asset Allocation
(1.02%)		1.49%		(0.51%)		(1.82%)		(0.17%)

T. Rowe Price Large Cap Growth vs Russell 1000 Growth Index
Domestic Equity Daily Performance Attribution
One Year Ended September 30, 2019

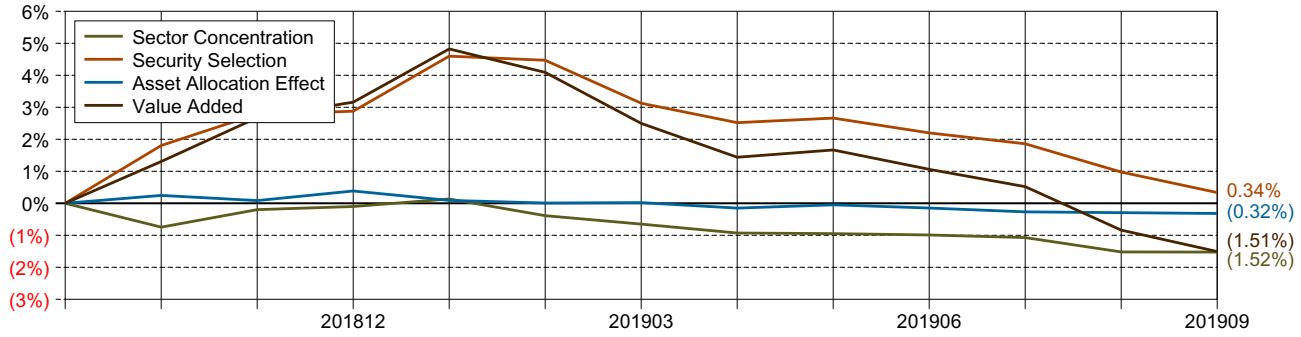
Return Sources and Timing

The charts below illustrate the timing and cumulative paths of the manager's performance, as well as attributing relative performance to three sources: Sector Concentration, Security Selection, and Asset Allocation. The first chart shows the cumulative absolute return paths for the manager and index. The second chart shows the cumulative relative return path of the manager and the attributed sources of that value-added. The bottom table breaks the annualized attribution factors down to the sector level for more insight into sources of return.

Cumulative Manager and Benchmark Returns



Cumulative Attribution Effects vs. Russell 1000 Growth Index



Attribution Effects by Sector vs. Russell 1000 Growth Index
One Year Ended September 30, 2019

Sector	Manager Eff Weight	Index Eff Weight	Manager Return	Index Return	Sector Concentration	Security Selection	Asset Allocation
Communication Services	15.59%	12.01%	(1.88)%	1.15%	(0.07)%	(0.45)%	-
Consumer Discretionary	19.86%	14.95%	1.66%	0.37%	(0.29)%	0.36%	-
Consumer Staples	0.94%	5.50%	(0.55)%	14.75%	(0.42)%	(0.14)%	-
Energy	0.22%	0.65%	(40.35)%	(26.83)%	0.14%	(0.16)%	-
Financials	3.83%	4.04%	(3.36)%	8.94%	(0.01)%	(0.52)%	-
Health Care	18.24%	13.74%	(11.53)%	(7.75)%	(0.72)%	(0.78)%	-
Industrials	9.53%	11.34%	3.98%	2.87%	0.02%	0.05%	-
Information Technology	30.42%	33.59%	15.55%	7.69%	(0.05)%	2.00%	-
Materials	0.00%	1.84%	0.00%	15.49%	(0.20)%	0.00%	-
Miscellaneous	0.15%	0.00%	14.70%	0.00%	0.14%	0.00%	-
Real Estate	0.05%	2.33%	(1.20)%	29.99%	(0.46)%	(0.02)%	-
Utilities	1.17%	0.00%	39.32%	0.00%	0.39%	0.00%	-
Non Equity	3.38%	0.00%	-	-	-	-	(0.32)%
Total	-	-	2.20%	3.71%	(1.52)%	0.34%	(0.32)%

Manager Return	=	Index Return	+	Sector Concentration	+	Security Selection	+	Asset Allocation
2.20%		3.71%		(1.52%)		0.34%		(0.32%)

Small/Mid Cap Equity
Period Ended September 30, 2019

Investment Philosophy

SMID Cap Equity Style managers invest in small to medium sized companies.

Quarterly Summary and Highlights

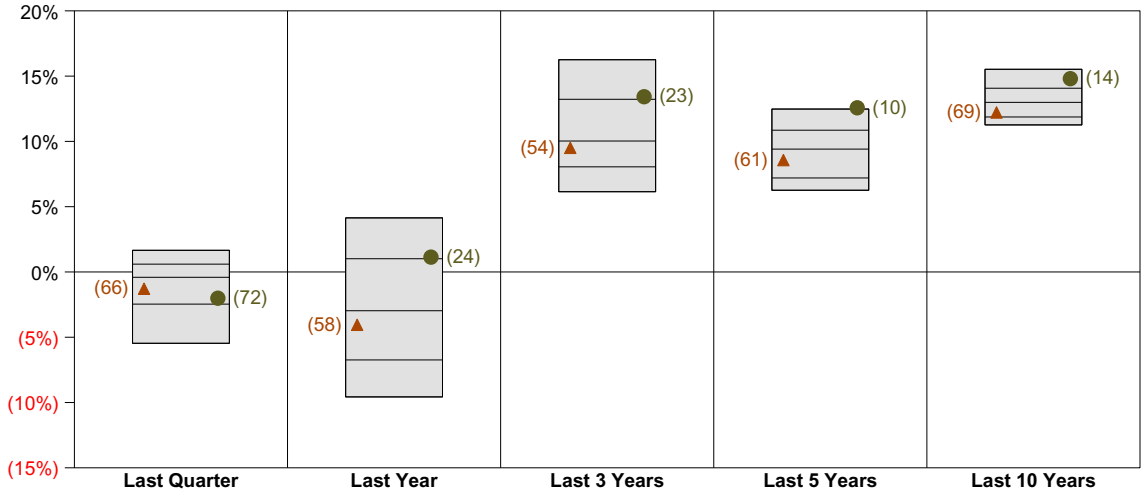
- Small/Mid Cap Equity's portfolio posted a (2.01)% return for the quarter placing it in the 72 percentile of the Callan Small/MidCap Broad group for the quarter and in the 24 percentile for the last year.
- Small/Mid Cap Equity's portfolio underperformed the Russell 2500 Index by 0.73% for the quarter and outperformed the Russell 2500 Index for the year by 5.18%.

Quarterly Asset Growth

Beginning Market Value	$69,245,588
Net New Investment	$-604,845
Investment Gains/(Losses)	$-1,371,853
Ending Market Value	$67,268,891

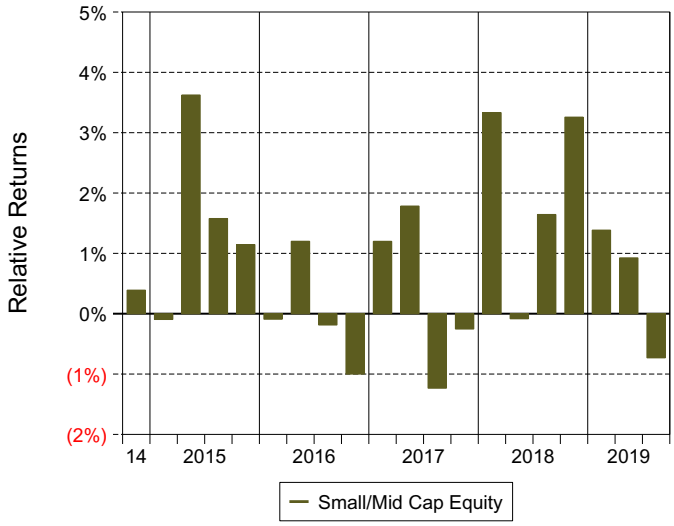
Percent Cash: 2.1%

Performance vs Callan Small/MidCap Broad (Gross)

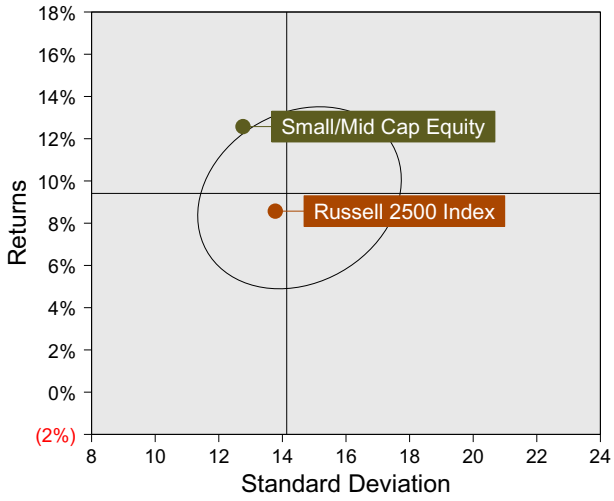


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	1.66	4.14	16.26	12.48	15.52
25th Percentile	0.60	1.01	13.22	10.86	14.07
Median	(0.41)	(2.97)	10.03	9.41	12.99
75th Percentile	(2.46)	(6.74)	8.05	7.20	11.87
90th Percentile	(5.46)	(9.57)	6.15	6.26	11.26
Small/Mid Cap Equity ●	(2.01)	1.14	13.42	12.57	14.80
Russell 2500 Index ▲	(1.28)	(4.04)	9.51	8.57	12.22

Relative Return vs Russell 2500 Index



Callan Small/MidCap Broad (Gross) Annualized Five Year Risk vs Return

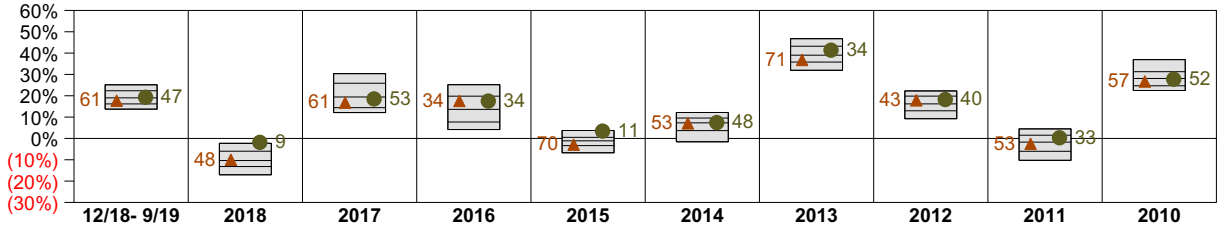


Small/Mid Cap Equity
Return Analysis Summary

Return Analysis

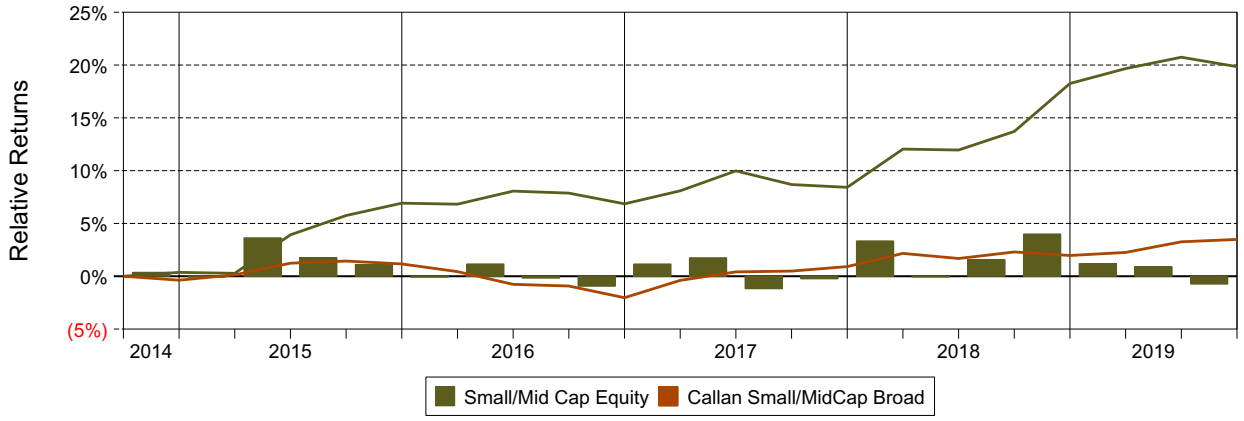
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate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

Performance vs Callan Small/MidCap Broad (Gross)

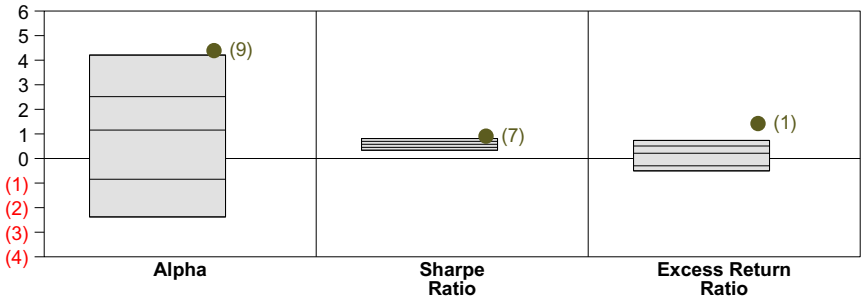


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	25.15	(2.28)	30.38	25.20	3.73	12.17	46.77	22.27	4.49	36.95
25th Percentile	22.35	(5.98)	25.88	19.82	0.52	9.56	43.23	19.84	1.51	31.29
Median	19.02	(10.36)	19.43	13.62	(1.13)	7.31	39.02	16.20	(1.72)	28.12
75th Percentile	16.19	(13.18)	14.43	7.70	(3.36)	3.68	35.80	12.97	(6.03)	24.69
90th Percentile	13.72	(17.04)	12.12	4.18	(6.72)	(1.57)	31.94	9.24	(10.27)	22.47
Small/Mid Cap Equity ●	19.31	(1.84)	18.52	17.52	3.44	7.42	41.37	18.23	0.31	27.76
Russell 2500 Index ▲	17.72	(10.00)	16.81	17.59	(2.90)	7.07	36.80	17.88	(2.51)	26.71

Cumulative and Quarterly Relative Return vs Russell 2500 Index



Risk Adjusted Return Measures vs Russell 2500 Index
Rankings Against Callan Small/MidCap Broad (Gross)
Five Years Ended September 30, 2019



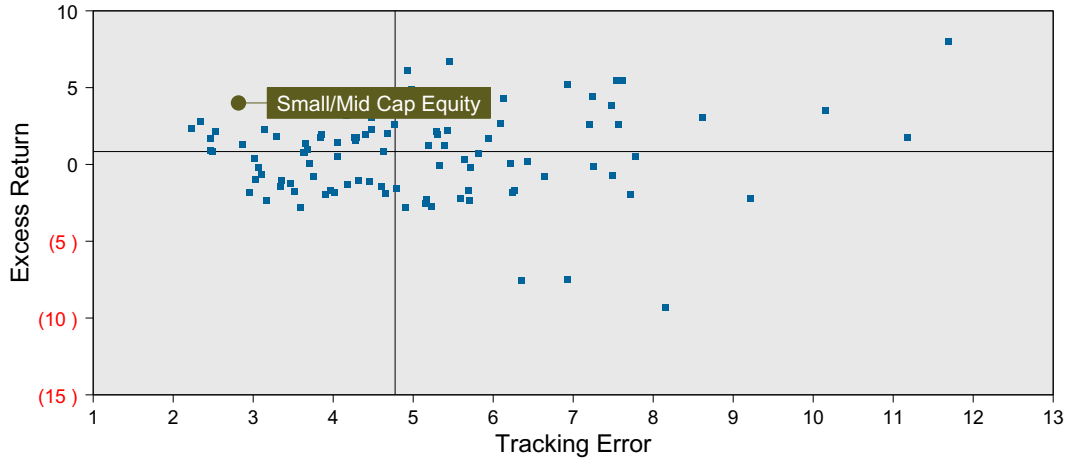
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	4.21	0.81	0.74
25th Percentile	2.52	0.70	0.51
Median	1.16	0.58	0.21
75th Percentile	(0.84)	0.45	(0.30)
90th Percentile	(2.38)	0.34	(0.50)
Small/Mid Cap Equity ●	4.39	0.91	1.42

Small/Mid Cap Equity
Risk Analysis Summary

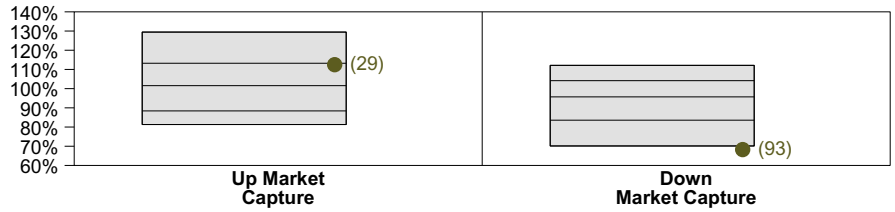
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

Risk Analysis vs Callan Small/MidCap Broad (Gross)
Five Years Ended September 30, 2019

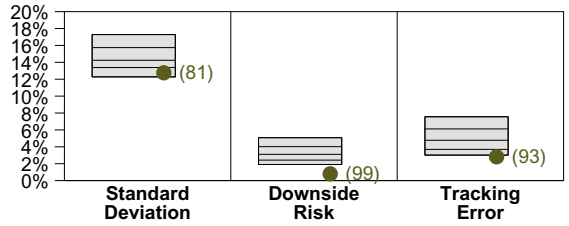


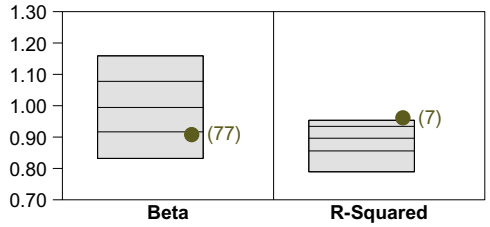
Market Capture vs Russell 2500 Index
Rankings Against Callan Small/MidCap Broad (Gross)
Five Years Ended September 30, 2019



	Up Market Capture	Down Market Capture
10th Percentile	129.46	112.13
25th Percentile	113.22	104.15
Median	101.56	95.71
75th Percentile	88.40	83.56
90th Percentile	81.31	70.15
Small/Mid Cap Equity ●	112.47	68.25

Risk Statistics Rankings vs Russell 2500 Index
Rankings Against Callan Small/MidCap Broad (Gross)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	17.28	5.08	7.56
25th Percentile	15.74	4.02	6.12
Median	14.24	3.11	4.77
75th Percentile	13.38	2.42	3.70
90th Percentile	12.27	1.91	3.02
Small/Mid Cap Equity ●	12.76	0.80	2.82

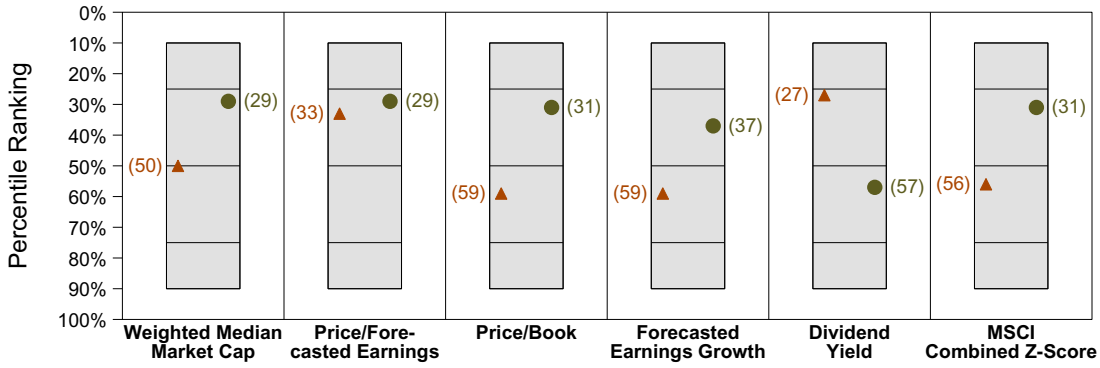
	Beta	R-Squared
10th Percentile	1.16	0.95
25th Percentile	1.08	0.93
Median	0.99	0.90
75th Percentile	0.92	0.86
90th Percentile	0.83	0.79
Small/Mid Cap Equity ●	0.91	0.96

Small/Mid Cap Equity
Equity Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings
Rankings Against Callan Small/MidCap Broad
as of September 30, 2019

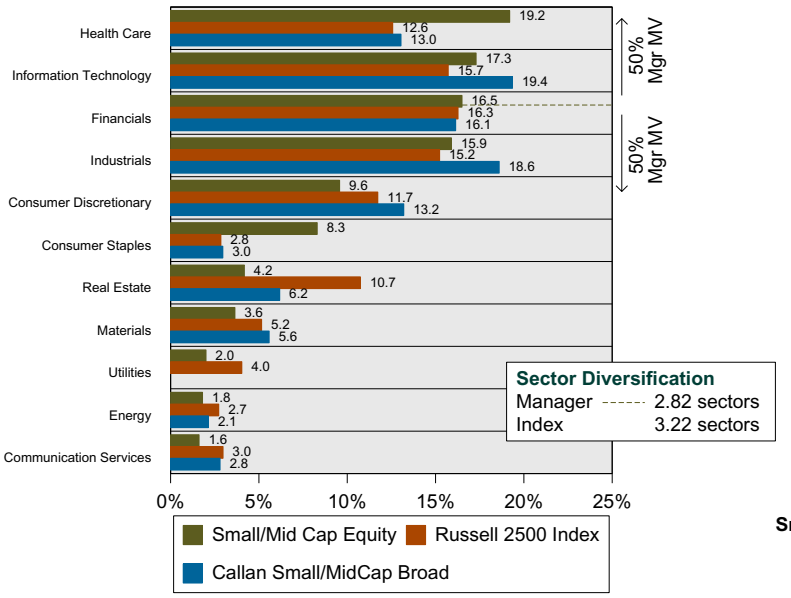


	Weighted Median Market Cap	Price/Fore-casted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	6.40	31.78	4.29	20.34	2.01	0.83
25th Percentile	5.23	23.23	3.14	15.33	1.78	0.44
Median	4.65	17.00	2.23	13.04	1.24	0.03
75th Percentile	4.02	14.56	1.95	10.64	0.77	(0.29)
90th Percentile	2.69	12.71	1.52	7.90	0.36	(0.48)
Small/Mid Cap Equity ●	5.06	20.57	2.65	14.15	1.14	0.19
Russell 2500 Index ▲	4.65	20.10	2.12	12.54	1.69	(0.04)

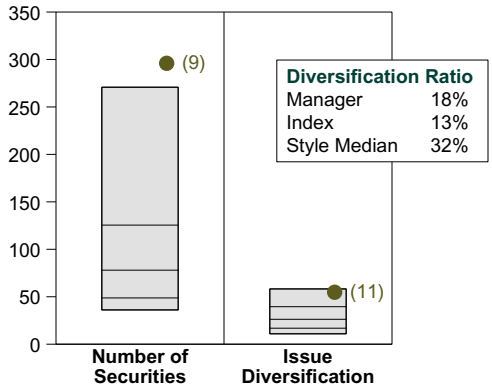
Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. Diversification by number and concentration of holdings are also compared to the benchmark and peer group. Issue Diversification represents by count, and Diversification Ratio by percent, the number of holdings that account for half of the portfolio's market value.

Sector Allocation
September 30, 2019



Diversification
September 30, 2019

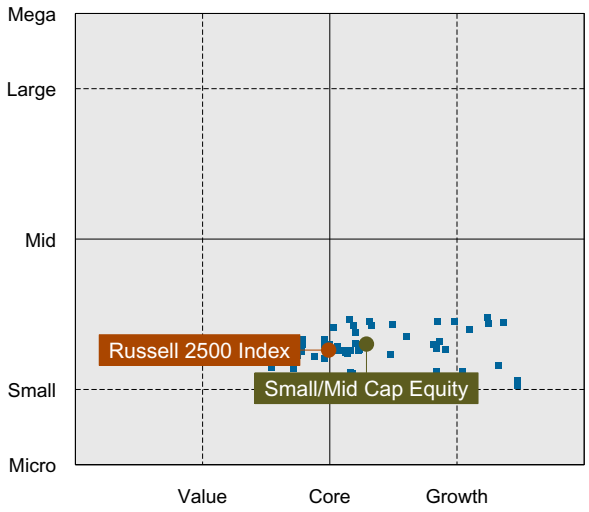


	Number of Securities	Issue Diversification
10th Percentile	271	58
25th Percentile	126	40
Median	78	26
75th Percentile	49	17
90th Percentile	36	11
Small/Mid Cap Equity ●	296	55
Russell 2500 Index ▲	2534	337

Current Holdings Based Style Analysis
Small/Mid Cap Equity
As of September 30, 2019

This page analyzes the current investment style of a portfolio utilizing a detailed holdings-based style analysis to determine actual exposures to various market capitalization and style segments of the domestic equity market. The market is segmented quarterly by capitalization and style. The capitalization segments are dictated by capitalization decile breakpoints. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the current market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the current portfolio and index weights and stock counts (in parentheses) in each capitalization/style segment of the market. The middle chart illustrates the total exposures and stock counts in the three style segments, with a legend showing the total growth, value, and "combined Z" (growth - value) scores. The bottom chart exhibits the sector weights as well as the style weights within each sector.

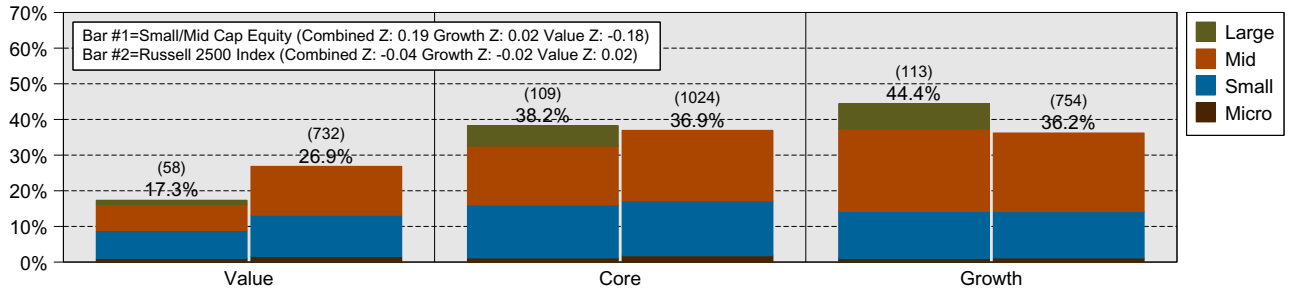
Style Map vs Callan Small/MidCap Broad
Holdings as of September 30, 2019



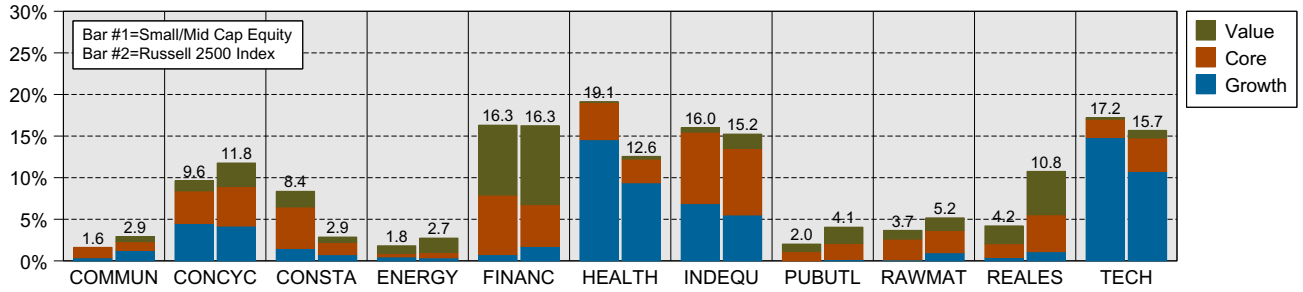
Style Exposure Matrix
Holdings as of September 30, 2019

	Value	Core	Growth	Total
Large	1.2% (1) 0.0% (0)	5.7% (5) 0.0% (0)	7.1% (8) 0.0% (0)	**14.1% (14)** **0.0% (0)**
Mid	7.2% (19) 13.7% (105)	16.5% (31) 19.8% (151)	23.0% (44) 22.1% (155)	**46.8% (94)** **55.6% (411)**
Small	7.9% (31) 11.5% (332)	14.8% (63) 15.4% (483)	13.2% (51) 13.0% (382)	**35.9% (145)** **39.9% (1197)**
Micro	1.0% (7) 1.6% (295)	1.1% (10) 1.8% (390)	1.1% (10) 1.2% (217)	**3.3% (27)** **4.5% (902)**
Total	**17.3% (58)** **26.9% (732)**	**38.2% (109)** **36.9% (1024)**	**44.4% (113)** **36.2% (754)**	**100.0% (280)** **100.0% (2510)**

Combined Z-Score Style Distribution
Holdings as of September 30, 2019



Sector Weights Distribution
Holdings as of September 30, 2019



Small/Mid Cap Equity
Top 10 Portfolio Holdings Characteristics
as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Everest Re Group Ltd	Financials	$1,154,831	1.7%	8.27%	10.84	10.87	2.10%	74.69%
Nordson Corp	Industrials	$982,136	1.5%	3.80%	8.41	22.62	1.04%	11.20%
Rockwell Automation	Industrials	$947,600	1.4%	1.23%	19.28	18.79	2.35%	5.59%
Waters Corp	Health Care	$926,404	1.4%	3.71%	14.90	22.61	0.00%	10.05%
Fortive Corp Ex Distributon	Industrials	$925,560	1.4%	(15.81)%	23.00	18.22	0.41%	10.80%
Ametek Inc New	Industrials	$918,200	1.4%	1.23%	20.97	21.32	0.61%	6.80%
Edwards Lifesciences Corp	Health Care	$845,554	1.3%	19.04%	45.73	37.77	0.00%	11.34%
Integra Lifesciences Hldgs C	Health Care	$841,280	1.3%	7.56%	5.14	20.25	0.00%	12.00%
Gallagher Arthur J & Co	Financials	$837,479	1.2%	2.75%	16.67	21.94	1.92%	10.07%
Splunk Inc	Information Technology	$836,806	1.2%	(6.27)%	17.84	52.97	0.00%	30.40%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Stamps Com Inc	Consumer Discretionary	$134,010	0.2%	64.46%	1.28	21.34	0.00%	30.73%
Liveperson Inc	Information Technology	$210,630	0.3%	27.32%	2.34	(258.70)	0.00%	30.00%
Trex Co Inc	Industrials	$129,121	0.2%	26.82%	5.31	32.97	0.00%	34.48%
Fti Consulting	Industrials	$148,386	0.2%	26.42%	3.98	19.86	0.00%	36.44%
Entegris Inc	Information Technology	$223,535	0.3%	26.33%	6.36	21.37	0.68%	16.33%
Tri Pointe Homes Inc	Consumer Discretionary	$105,280	0.2%	25.65%	2.14	10.52	0.00%	(2.30)%
Taylor Morrison Home Ii	Consumer Discretionary	$213,746	0.3%	23.76%	2.73	8.76	0.00%	5.40%
Option Care Health Inc	Health Care	$88,320	0.1%	23.08%	2.24	266.67	0.00%	(9.93)%
Federal Signal Corp	Industrials	$221,650	0.3%	22.71%	1.98	17.91	0.98%	16.00%
Builders Firstsource Inc	Industrials	$215,420	0.3%	22.03%	2.38	10.81	0.00%	66.32%

10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Viewray Inc	Health Care	$51,040	0.1%	(67.08)%	0.29	(2.95)	0.00%	10.00%
2u Inc	Information Technology	$123,728	0.2%	(56.75)%	1.03	(16.13)	0.00%	-
Propetro Hldg Corp	Energy	$57,267	0.1%	(56.09)%	0.91	3.93	0.00%	-
Sarepta Therapeutics Inc	Health Care	$105,448	0.2%	(50.43)%	5.60	(13.45)	0.00%	-
Merit Medical Systems	Health Care	$98,081	0.1%	(48.86)%	1.68	15.52	0.00%	11.00%
Kalvista Pharmaceuticals Inc	Health Care	$40,600	0.1%	(47.63)%	0.21	(7.73)	0.00%	-
Sunopta Inc	Consumer Staples	$26,460	0.0%	(45.29)%	0.16	(6.52)	0.00%	(36.48)%
Polarityte Inc	Health Care	$10,013	0.0%	(43.33)%	0.08	(0.90)	0.00%	66.95%
Centennial Resource Dev Inc Cl A	Energy	$59,146	0.1%	(40.51)%	1.19	10.88	0.00%	6.70%
Duluth Hldgs Inc Com Cl B	Consumer Discretionary	$60,208	0.1%	(37.60)%	0.25	12.47	0.00%	39.95%

Champlain Mid Cap
Period Ended September 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

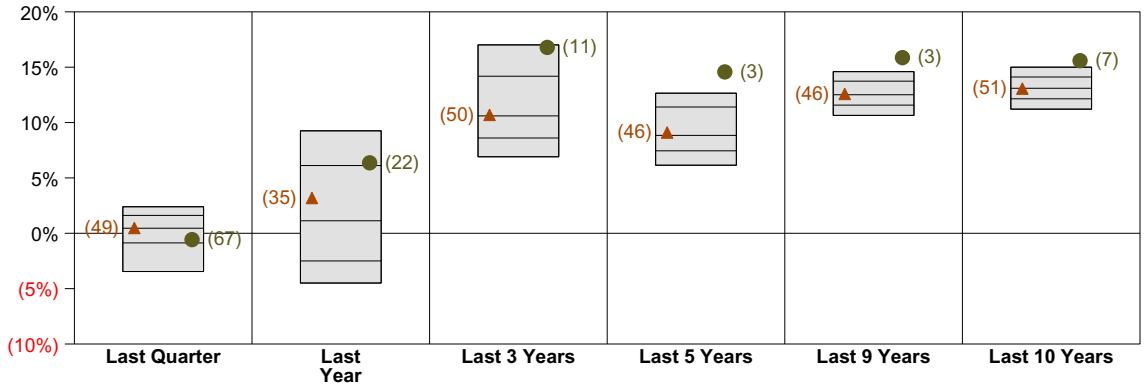
- Champlain Mid Cap's portfolio posted a (0.57)% return for the quarter placing it in the 67 percentile of the Callan Mid Capitalization group for the quarter and in the 22 percentile for the last year.
- Champlain Mid Cap's portfolio underperformed the Russell MidCap Index by 1.05% for the quarter and outperformed the Russell MidCap Index for the year by 3.18%.

Quarterly Asset Growth

Beginning Market Value	$34,290,459
Net New Investment	$-1,040
Investment Gains/(Losses)	$-196,681
Ending Market Value	$34,092,738

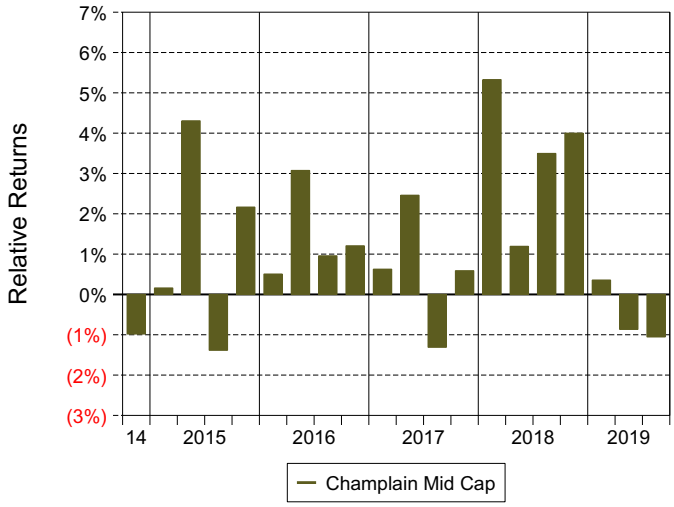
Percent Cash: 3.0%

Performance vs Callan Mid Capitalization (Gross)

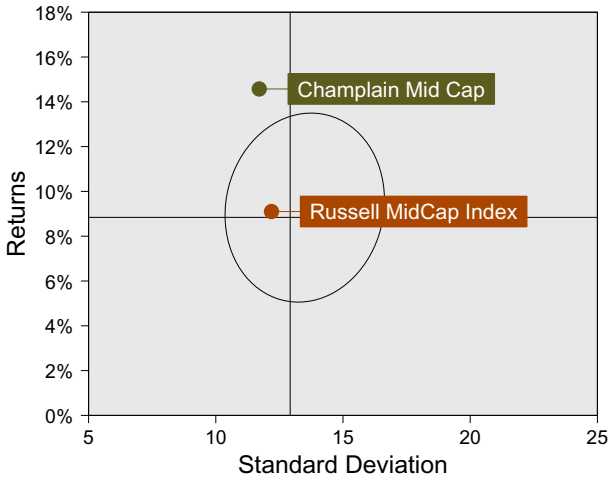


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 9 Years	Last 10 Years
10th Percentile	2.40	9.25	17.02	12.65	14.60	15.00
25th Percentile	1.61	6.12	14.18	11.40	13.74	14.11
Median	0.45	1.13	10.60	8.84	12.51	13.10
75th Percentile	(0.87)	(2.50)	8.61	7.45	11.58	12.15
90th Percentile	(3.45)	(4.49)	6.91	6.15	10.65	11.21
Champlain Mid Cap ●	(0.57)	6.36	16.79	14.57	15.86	15.59
Russell MidCap Index ▲	0.48	3.19	10.69	9.10	12.59	13.07

Relative Return vs Russell MidCap Index



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

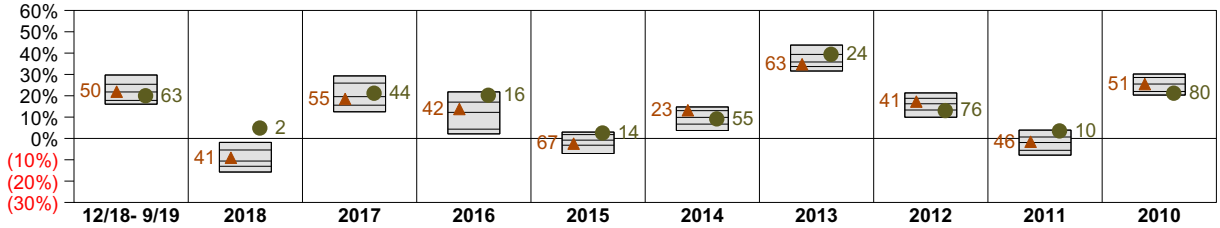


Champlain Mid Cap
Return Analysis Summary

Return Analysis

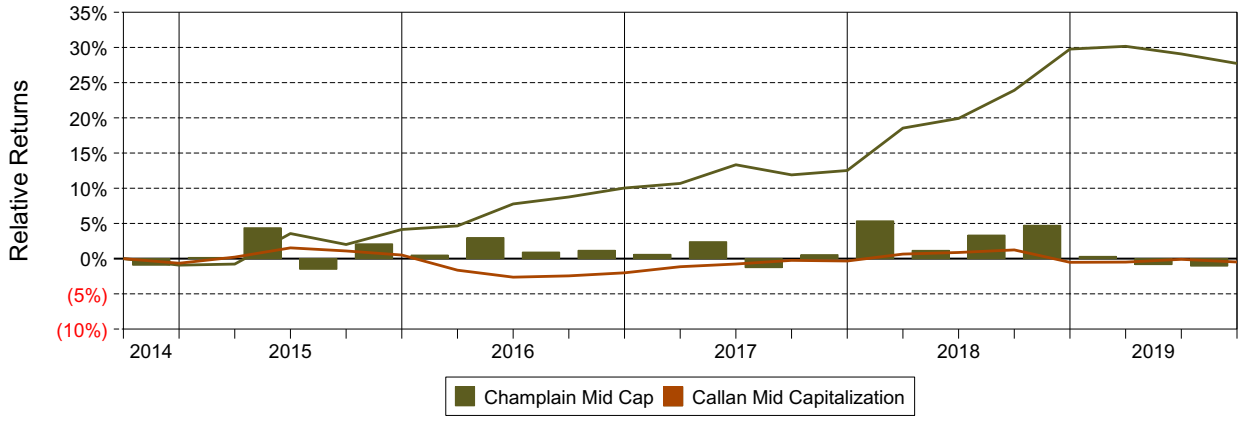
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

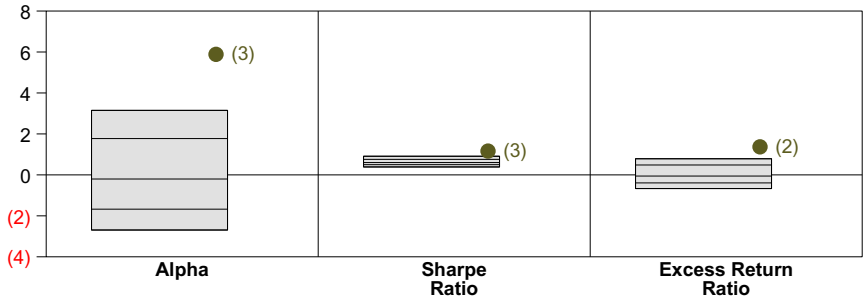


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	29.73	(1.85)	29.31	21.83	2.97	14.76	43.76	21.34	3.90	30.19
25th Percentile	25.39	(5.41)	25.93	17.03	1.80	13.03	39.39	18.82	0.68	28.56
Median	21.79	(10.60)	19.58	12.23	(0.80)	9.88	35.84	16.26	(1.92)	25.49
75th Percentile	17.82	(13.05)	15.59	4.35	(3.18)	6.72	33.70	13.33	(5.57)	22.01
90th Percentile	16.06	(15.75)	12.48	2.13	(7.07)	3.72	31.60	9.94	(7.83)	20.33
Champlain Mid Cap ●	20.01	4.88	21.20	20.24	2.55	9.17	39.44	13.05	3.53	21.21
Russell MidCap Index ▲	21.93	(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 September 30, 2019



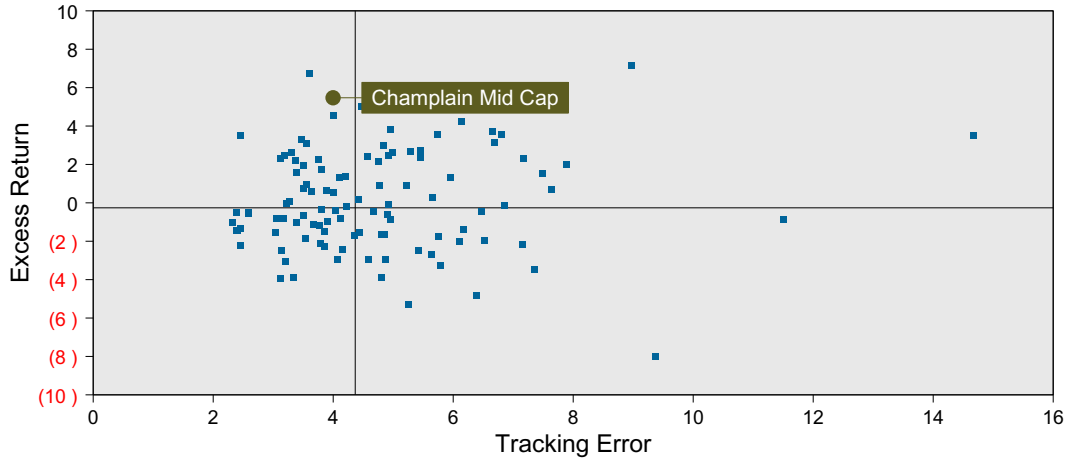
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	3.15	0.91	0.79
25th Percentile	1.77	0.76	0.48
Median	(0.20)	0.60	(0.06)
75th Percentile	(1.68)	0.50	(0.39)
90th Percentile	(2.69)	0.39	(0.67)
Champlain Mid Cap ●	5.89	1.16	1.37

Champlain Mid Cap
Risk Analysis Summary

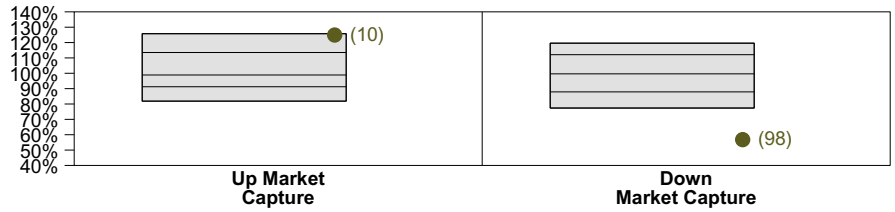
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

Risk Analysis vs Callan Mid Capitalization (Gross)
Five Years Ended September 30, 2019

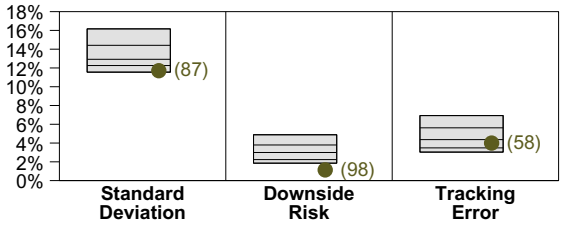


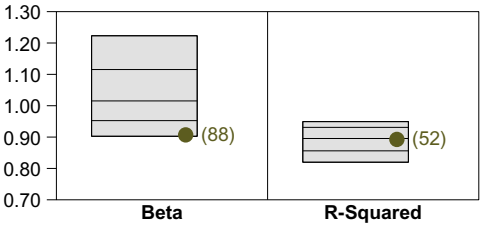
Market Capture vs Russell Mid-Cap Index
Rankings Against Callan Mid Capitalization (Gross)
Five Years Ended September 30, 2019



	Up Market Capture	Down Market Capture
10th Percentile	125.76	119.60
25th Percentile	113.52	112.10
Median	98.89	99.63
75th Percentile	91.24	87.88
90th Percentile	81.86	77.36
Champlain Mid Cap ●	124.90	56.79

Risk Statistics Rankings vs Russell Mid-Cap Index
Rankings Against Callan Mid Capitalization (Gross)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	16.16	4.88	6.92
25th Percentile	14.41	3.79	5.62
Median	12.92	3.00	4.37
75th Percentile	12.26	2.24	3.49
90th Percentile	11.55	1.85	3.03
Champlain Mid Cap ●	11.71	1.14	4.00

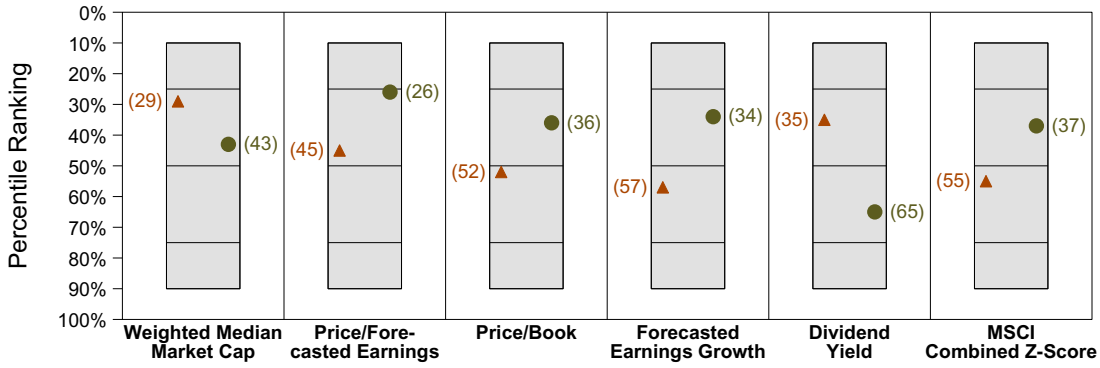
	Beta	R-Squared
10th Percentile	1.22	0.95
25th Percentile	1.12	0.93
Median	1.02	0.90
75th Percentile	0.95	0.86
90th Percentile	0.90	0.82
Champlain Mid Cap ●	0.91	0.89

Champlain Mid Cap
Equity Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings
Rankings Against Callan Mid Capitalization
as of September 30, 2019

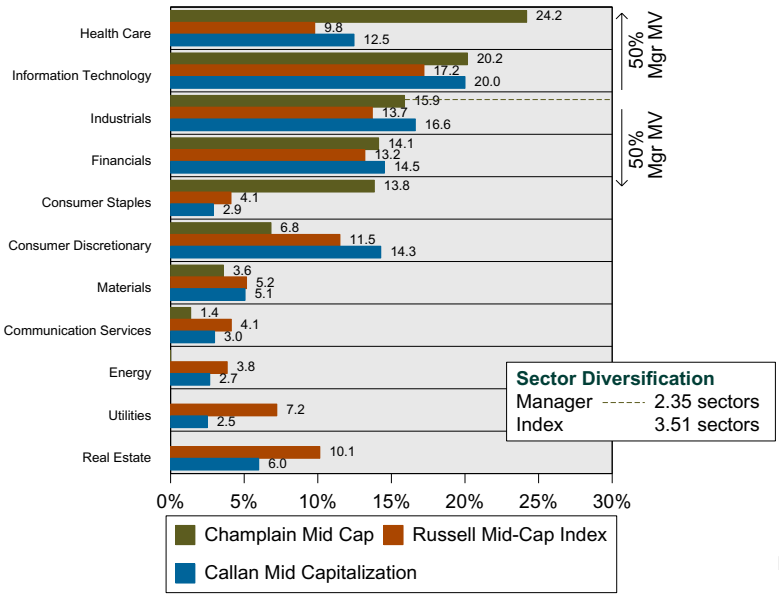


	Weighted Median Market Cap	Price/Forecasted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	17.30	27.47	5.09	18.01	2.22	0.96
25th Percentile	14.74	23.58	4.36	15.39	1.95	0.75
Median	11.74	16.59	2.54	12.00	1.41	(0.01)
75th Percentile	9.82	14.43	2.06	9.28	0.65	(0.44)
90th Percentile	7.20	13.06	1.75	7.32	0.50	(0.63)
Champlain Mid Cap ●	12.41	23.14	3.70	13.48	0.94	0.35
Russell Mid-Cap Index ▲	14.39	17.88	2.46	11.19	1.77	(0.15)

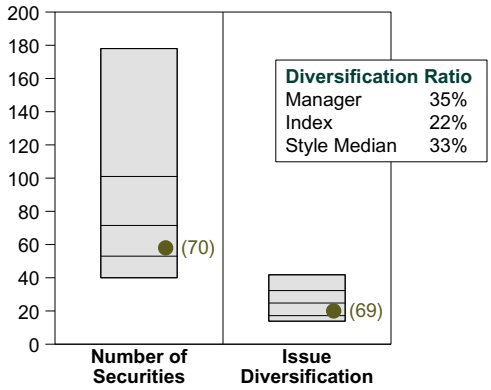
Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. Diversification by number and concentration of holdings are also compared to the benchmark and peer group. Issue Diversification represents by count, and Diversification Ratio by percent, the number of holdings that account for half of the portfolio's market value.

Sector Allocation
September 30, 2019



Diversification
September 30, 2019

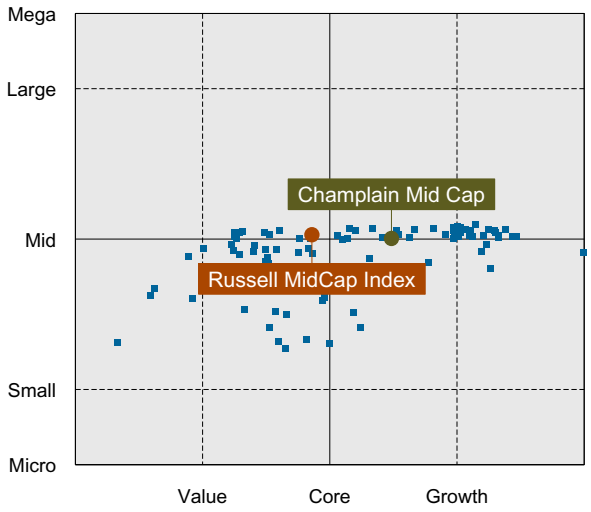


	Number of Securities	Issue Diversification
10th Percentile	178	42
25th Percentile	101	32
Median	72	25
75th Percentile	53	17
90th Percentile	40	14
Champlain Mid Cap ●	58	20
Russell Mid-Cap Index ▲	804	180

Current Holdings Based Style Analysis
Champlain Mid Cap
As of September 30, 2019

This page analyzes the current investment style of a portfolio utilizing a detailed holdings-based style analysis to determine actual exposures to various market capitalization and style segments of the domestic equity market. The market is segmented quarterly by capitalization and style. The capitalization segments are dictated by capitalization decile breakpoints. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the current market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the current portfolio and index weights and stock counts (in parentheses) in each capitalization/style segment of the market. The middle chart illustrates the total exposures and stock counts in the three style segments, with a legend showing the total growth, value, and "combined Z" (growth - value) scores. The bottom chart exhibits the sector weights as well as the style weights within each sector.

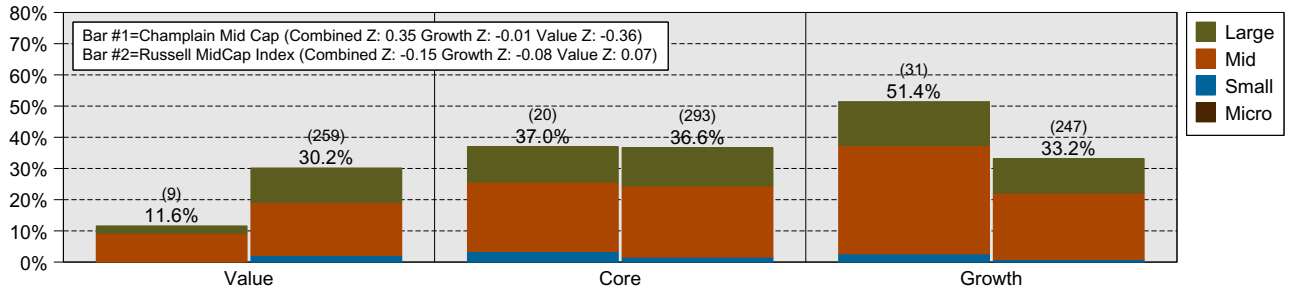
Style Map vs Callan Mid Capitalization
Holdings as of September 30, 2019



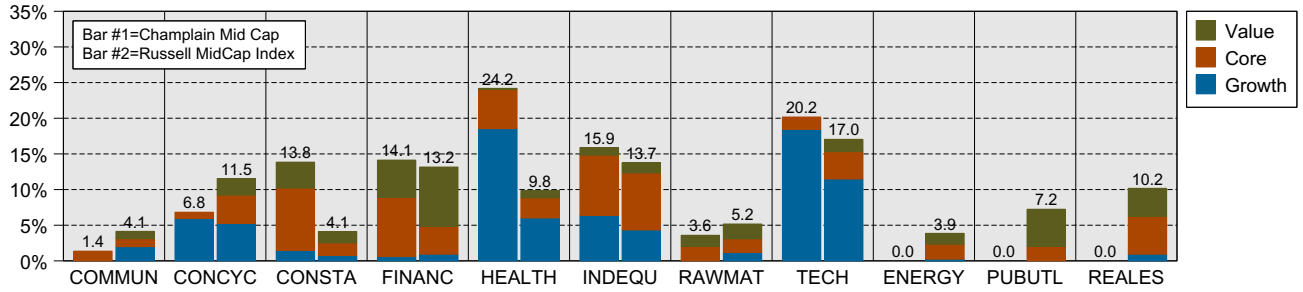
Style Exposure Matrix
Holdings as of September 30, 2019

	Value	Core	Growth	Total
Large	2.4% (1) 10.9% (34)	11.3% (5) 12.2% (39)	14.0% (8) 11.1% (32)	**27.8% (14)** **34.2% (105)**
Mid	9.2% (7) 17.0% (160)	22.1% (12) 22.9% (204)	34.8% (21) 21.2% (187)	**66.0% (40)** **61.0% (551)**
Small	0.0% (1) 2.2% (65)	3.5% (3) 1.6% (50)	2.6% (2) 0.9% (28)	**6.1% (6)** **4.7% (143)**
Micro	0.0% (0) 0.0% (0)	0.0% (0) 0.0% (0)	0.0% (0) 0.0% (0)	**0.0% (0)** **0.0% (0)**
Total	**11.6% (9)** **30.2% (259)**	**37.0% (20)** **36.6% (293)**	**51.4% (31)** **33.2% (247)**	**100.0% (60)** **100.0% (799)**

Combined Z-Score Style Distribution
Holdings as of September 30, 2019



Sector Weights Distribution
Holdings as of September 30, 2019



Champlain Mid Cap
Top 10 Portfolio Holdings Characteristics
as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Everest Re Group Ltd	Financials	$1,154,831	3.4%	8.27%	10.84	10.87	2.10%	74.69%
Nordson Corp	Industrials	$982,136	2.9%	3.67%	8.41	22.62	1.04%	11.20%
Rockwell Automation	Industrials	$947,600	2.8%	1.47%	19.28	18.79	2.35%	5.59%
Waters Corp	Health Care	$926,404	2.7%	3.71%	14.90	22.61	0.00%	10.05%
Fortive Corp Ex Distributon	Industrials	$925,560	2.7%	(15.45)%	23.00	18.22	0.41%	10.80%
Ametek Inc New	Industrials	$918,200	2.7%	1.26%	20.97	21.32	0.61%	6.80%
Edwards Lifesciences Corp	Health Care	$845,554	2.5%	19.04%	45.73	37.77	0.00%	11.34%
Integra Lifesciences Hldgs C	Health Care	$841,280	2.5%	7.56%	5.14	20.25	0.00%	12.00%
Gallagher Arthur J & Co	Financials	$837,479	2.5%	2.80%	16.67	21.94	1.92%	10.07%
Splunk Inc	Information Technology	$836,806	2.5%	(5.83)%	17.84	52.97	0.00%	30.40%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Envista Holdings Corp	Health Care	$47,257	0.1%	21.63%	4.42	20.09	0.00%	-
Edwards Lifesciences Corp	Health Care	$845,554	2.5%	19.04%	45.73	37.77	0.00%	11.34%
Campbell Soup Co (Us)	Consumer Staples	$445,740	1.3%	18.10%	14.13	18.37	2.98%	(4.00)%
Akamai Technologies Inc	Information Technology	$371,917	1.1%	14.03%	15.08	19.84	0.00%	12.00%
West Pharmaceutical Svsc Inc	Health Care	$368,732	1.1%	13.46%	10.46	42.59	0.45%	13.27%
Brown Forman Corp B	Consumer Staples	$502,240	1.5%	13.38%	19.37	33.88	1.06%	6.79%
Sally Beauty Hldgs Inc	Consumer Discretionary	$286,633	0.8%	11.62%	1.79	6.81	0.00%	1.50%
Pure Storage Inc Cl A	Information Technology	$579,348	1.7%	10.95%	4.34	48.12	0.00%	35.63%
Lamb Weston Hldgs Inc Com	Consumer Staples	$701,748	2.1%	10.81%	10.62	20.59	1.10%	7.20%
Hormel Foods Corp	Consumer Staples	$616,593	1.8%	8.42%	23.35	24.93	1.92%	5.00%

10 Worst Performers

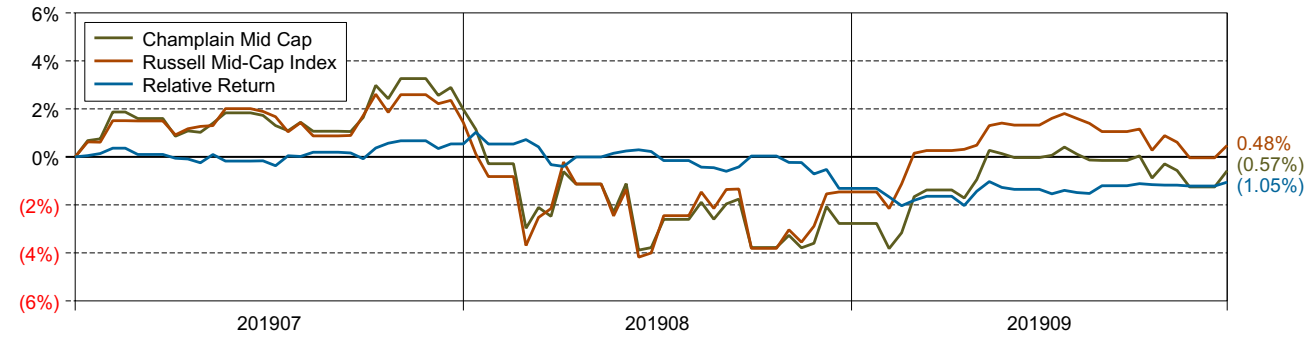
Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
New Relic Inc	Information Technology	$374,845	1.1%	(28.46)%	3.59	88.67	0.00%	20.00%
Ulta Salon Cosmetcs & Frag I	Consumer Discretionary	$567,722	1.7%	(26.58)%	14.75	19.46	0.00%	10.22%
Ptc Inc	Information Technology	$0	0.0%	(24.04)%	7.85	28.24	0.00%	30.17%
Okta Inc Cl A	Information Technology	$310,149	0.9%	(20.13)%	10.50	(377.24)	0.00%	25.00%
Workday Inc Cl A	Information Technology	$739,326	2.2%	(17.39)%	27.87	83.11	0.00%	28.30%
Tractor Supply Co	Consumer Discretionary	$599,165	1.8%	(16.60)%	10.79	17.61	1.55%	11.20%
Fortive Corp Ex Distributon	Industrials	$925,560	2.7%	(15.45)%	23.00	18.22	0.41%	10.80%
International Flavors&fragra	Materials	$518,365	1.5%	(14.91)%	13.10	18.71	2.45%	3.80%
Catalent Inc	Health Care	$517,111	1.5%	(12.08)%	6.97	23.33	0.00%	8.20%
Cooper Cos	Health Care	$594,000	1.7%	(11.37)%	14.72	22.68	0.02%	13.11%

Champlain Mid Cap vs Russell Mid-Cap Index
Domestic Equity Daily Performance Attribution
One Quarter Ended September 30, 2019

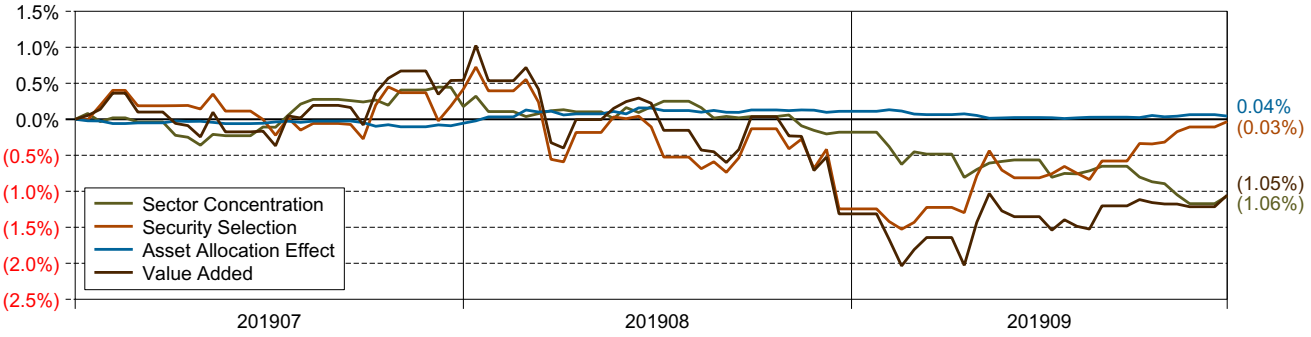
Return Sources and Timing

The charts below illustrate the timing and cumulative paths of the manager's performance, as well as attributing relative performance to three sources: Sector Concentration, Security Selection, and Asset Allocation. The first chart shows the cumulative absolute return paths for the manager and index. The second chart shows the cumulative relative return path of the manager and the attributed sources of that value-added. The bottom table breaks the annualized attribution factors down to the sector level for more insight into sources of return.

Cumulative Manager and Benchmark Returns



Cumulative Attribution Effects vs. Russell Mid-Cap Index



Attribution Effects by Sector vs. Russell Mid-Cap Index
One Quarter Ended September 30, 2019

Sector	Manager Eff Weight	Index Eff Weight	Manager Return	Index Return	Sector Concentration	Security Selection	Asset Allocation
Communication Services	1.31%	4.38%	(3.45)%	(2.95)%	0.09%	(0.00)%	-
Consumer Discretionary	6.75%	11.41%	(9.48)%	0.56%	(0.01)%	(0.70)%	-
Consumer Staples	13.05%	3.94%	5.73%	6.80%	0.55%	(0.12)%	-
Energy	0.00%	4.10%	0.00%	(12.29)%	0.55%	0.00%	-
Financials	13.60%	13.06%	3.37%	1.51%	0.01%	0.25%	-
Health Care	24.40%	10.26%	(0.46)%	(6.41)%	(1.01)%	1.47%	-
Industrials	15.58%	13.61%	(1.62)%	1.07%	0.00%	(0.40)%	-
Information Technology	20.68%	17.67%	(2.75)%	(0.76)%	(0.03)%	(0.42)%	-
Materials	4.62%	5.18%	(2.93)%	(0.95)%	(0.02)%	(0.11)%	-
Real Estate	0.00%	9.59%	0.00%	8.22%	(0.73)%	0.00%	-
Utilities	0.00%	6.80%	0.00%	7.30%	(0.47)%	0.00%	-
Non Equity	3.14%	0.00%	-	-	-	-	0.04%
Total	-	-	(0.57)%	0.48%	(1.06)%	(0.03)%	0.04%

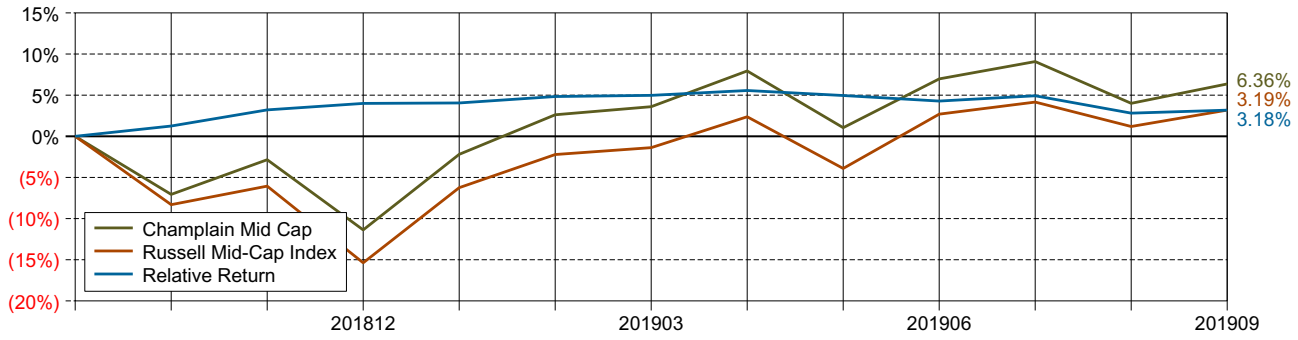
Manager Return	=	Index Return	+	Sector Concentration	+	Security Selection	+	Asset Allocation
(0.57%)		0.48%		(1.06%)		(0.03%)		0.04%

Champlain Mid Cap vs Russell Mid-Cap Index
Domestic Equity Daily Performance Attribution
One Year Ended September 30, 2019

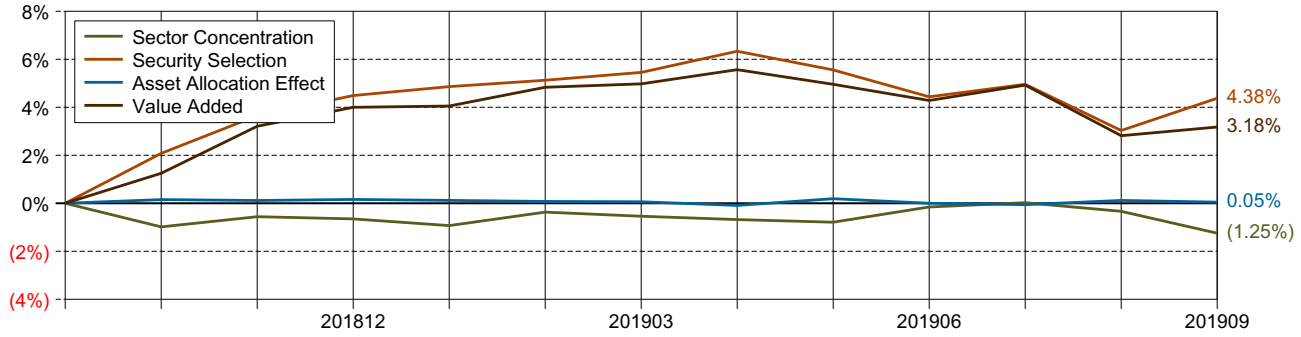
Return Sources and Timing

The charts below illustrate the timing and cumulative paths of the manager's performance, as well as attributing relative performance to three sources: Sector Concentration, Security Selection, and Asset Allocation. The first chart shows the cumulative absolute return paths for the manager and index. The second chart shows the cumulative relative return path of the manager and the attributed sources of that value-added. The bottom table breaks the annualized attribution factors down to the sector level for more insight into sources of return.

Cumulative Manager and Benchmark Returns



Cumulative Attribution Effects vs. Russell Mid-Cap Index



Attribution Effects by Sector vs. Russell Mid-Cap Index
One Year Ended September 30, 2019

Sector	Manager Eff Weight	Index Eff Weight	Manager Return	Index Return	Sector Concentration	Security Selection	Asset Allocation
Communication Services	1.37%	3.76%	(25.40)%	(3.92)%	0.17%	(0.37)%	-
Consumer Discretionary	6.89%	11.80%	(4.11)%	0.86%	0.10%	(0.35)%	-
Consumer Staples	12.61%	4.08%	21.75%	5.25%	0.23%	1.98%	-
Energy	0.00%	4.22%	0.00%	(35.23)%	2.02%	0.00%	-
Financials	13.04%	13.11%	5.12%	3.85%	(0.01)%	0.16%	-
Health Care	22.94%	10.12%	11.04%	(6.98)%	(1.45)%	4.42%	-
Industrials	15.86%	13.73%	(2.68)%	4.45%	0.04%	(1.20)%	-
Information Technology	22.07%	18.31%	4.14%	7.93%	0.25%	(0.65)%	-
Materials	5.22%	5.06%	4.39%	(1.84)%	(0.02)%	0.38%	-
Real Estate	0.00%	9.21%	0.00%	19.36%	(1.40)%	0.00%	-
Utilities	0.00%	6.60%	0.00%	22.22%	(1.17)%	0.00%	-
Non Equity	2.49%	0.00%	-	-	-	-	0.05%
Total	-	-	6.36%	3.19%	(1.25)%	4.38%	0.05%

Manager Return	=	Index Return	+	Sector Concentration	+	Security Selection	+	Asset Allocation
6.36%		3.19%		(1.25%)		4.38%		0.05%

FIAM Small Cap
Period Ended September 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. Pyramis Global Advisers was re-organized into Fidelity Institutional Asset Management (FIAM) in fourth quarter 2015.

Quarterly Summary and Highlights

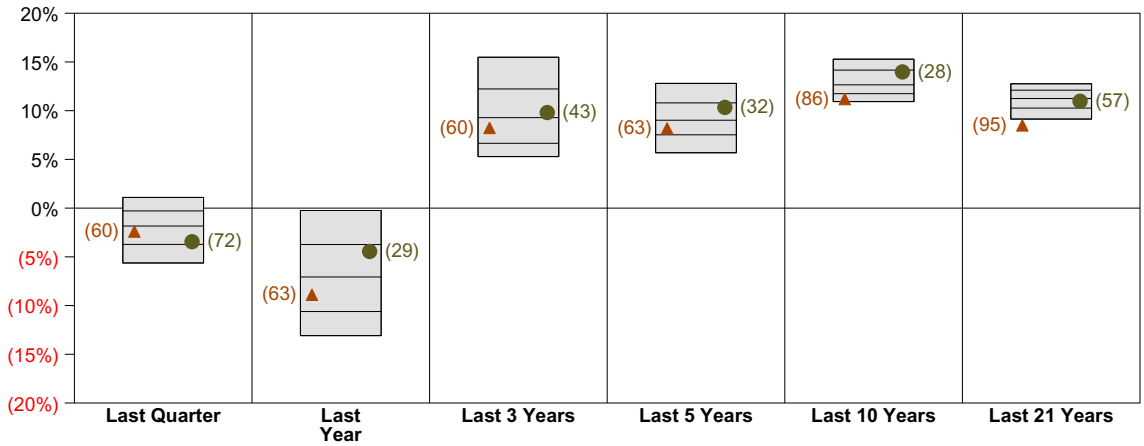
- FIAM Small Cap's portfolio posted a (3.45)% return for the quarter placing it in the 72 percentile of the Callan Small Capitalization group for the quarter and in the 29 percentile for the last year.
- FIAM Small Cap's portfolio underperformed the Russell 2000 Index by 1.04% for the quarter and outperformed the Russell 2000 Index for the year by 4.44%.

Quarterly Asset Growth

Beginning Market Value	$34,955,130
Net New Investment	$-603,805
Investment Gains/(Losses)	$-1,175,172
Ending Market Value	$33,176,153

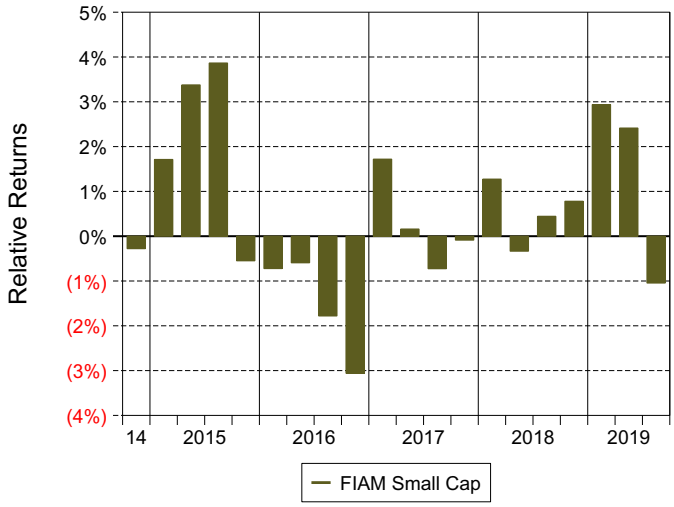
Percent Cash: 1.2%

Performance vs Callan Small Capitalization (Gross)

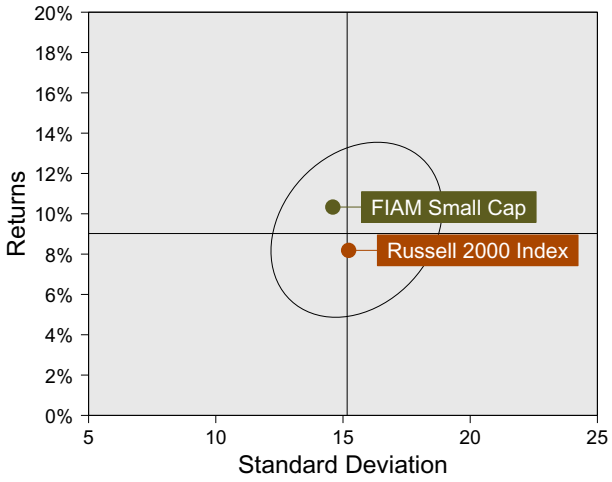


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 21 Years
10th Percentile	1.10	(0.24)	15.48	12.80	15.28	12.76
25th Percentile	(0.29)	(3.74)	12.23	10.80	14.16	12.10
Median	(1.84)	(7.07)	9.29	9.02	12.65	11.24
75th Percentile	(3.72)	(10.61)	6.65	7.52	11.75	10.27
90th Percentile	(5.63)	(13.09)	5.29	5.68	10.93	9.14
FIAM Small Cap ●	(3.45)	(4.45)	9.81	10.33	13.98	10.97
Russell 2000 Index ▲	(2.40)	(8.89)	8.23	8.19	11.19	8.50

Relative Return vs Russell 2000 Index



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

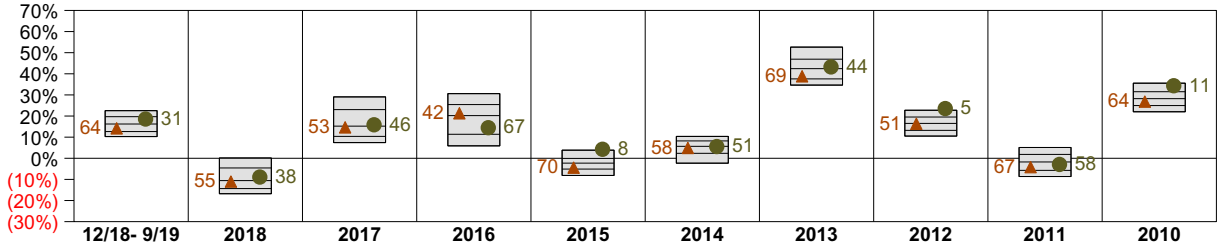


FIAM Small Cap
Return Analysis Summary

Return Analysis

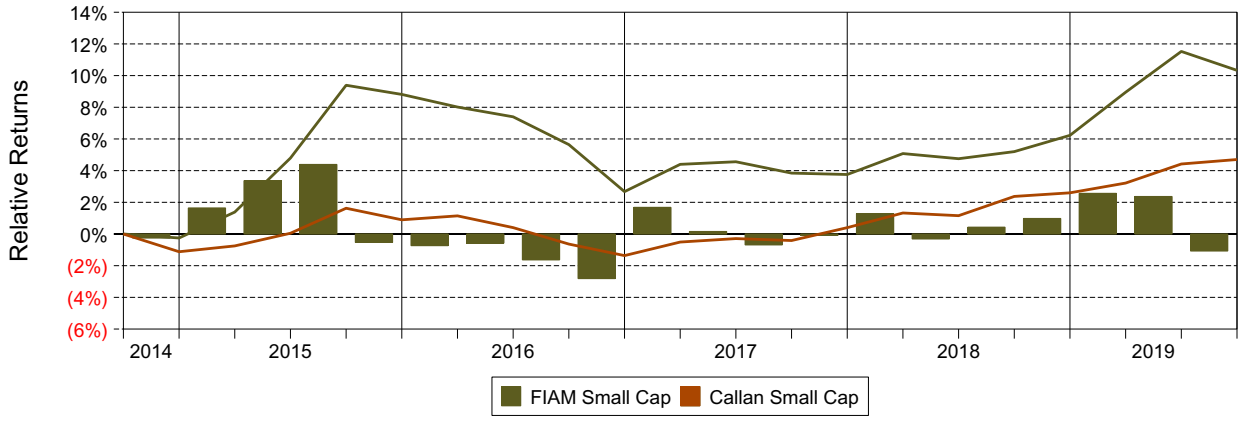
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

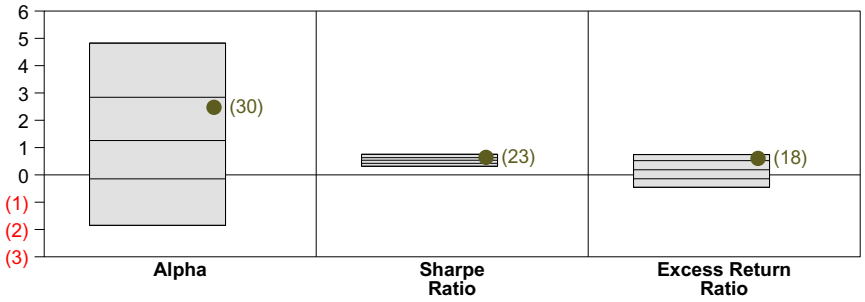


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	22.55	0.12	29.07	30.60	3.84	10.36	52.64	22.74	5.11	35.55
25th Percentile	19.70	(4.58)	23.04	25.44	(0.06)	8.23	46.93	19.53	1.84	31.52
Median	16.22	(10.56)	15.21	20.21	(2.30)	5.66	42.44	16.51	(1.75)	28.24
75th Percentile	12.65	(14.34)	10.37	11.37	(5.11)	2.35	37.59	13.22	(5.72)	24.96
90th Percentile	10.28	(16.78)	7.42	5.88	(8.14)	(2.32)	34.65	10.51	(8.64)	22.03
FIAM Small Cap ●	18.59	(8.89)	15.85	14.47	4.27	5.54	43.26	23.54	(2.91)	34.34
Russell 2000 Index ▲	14.18	(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 September 30, 2019



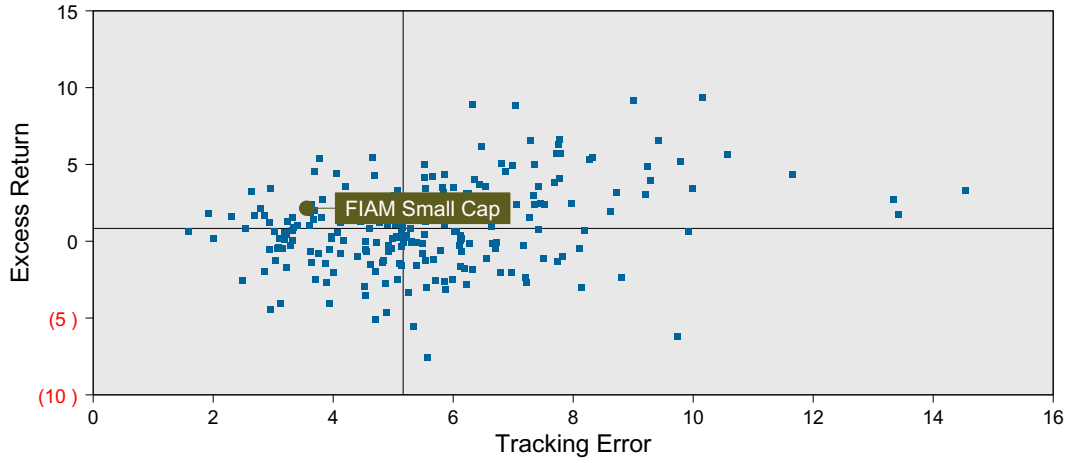
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	4.83	0.75	0.74
25th Percentile	2.84	0.63	0.52
Median	1.26	0.54	0.19
75th Percentile	(0.15)	0.42	(0.14)
90th Percentile	(1.85)	0.32	(0.45)
FIAM Small Cap ●	2.47	0.64	0.60

FIAM Small Cap
Risk Analysis Summary

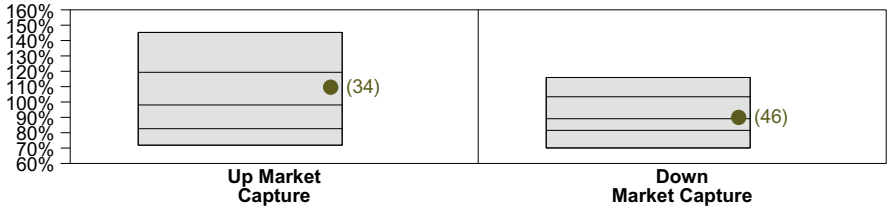
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

Risk Analysis vs Callan Small Capitalization (Gross)
Five Years Ended September 30, 2019

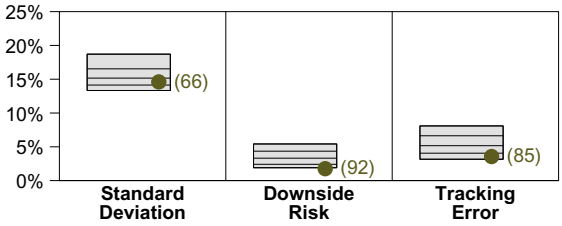


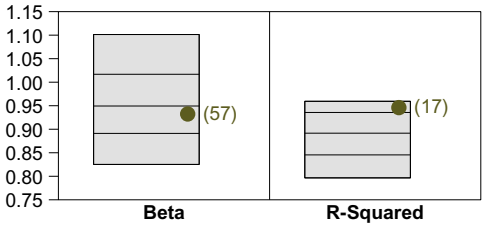
Market Capture vs Russell 2000 Index
Rankings Against Callan Small Capitalization (Gross)
Five Years Ended September 30, 2019



	Up Market Capture	Down Market Capture
10th Percentile	145.30	115.96
25th Percentile	119.34	103.40
Median	98.07	89.12
75th Percentile	82.62	81.53
90th Percentile	71.88	70.06
FIAM Small Cap ●	109.63	89.96

Risk Statistics Rankings vs Russell 2000 Index
Rankings Against Callan Small Capitalization (Gross)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	18.71	5.42	8.09
25th Percentile	16.54	4.35	6.63
Median	15.16	3.32	5.17
75th Percentile	14.14	2.41	4.06
90th Percentile	13.33	1.90	3.16
FIAM Small Cap ●	14.60	1.76	3.56

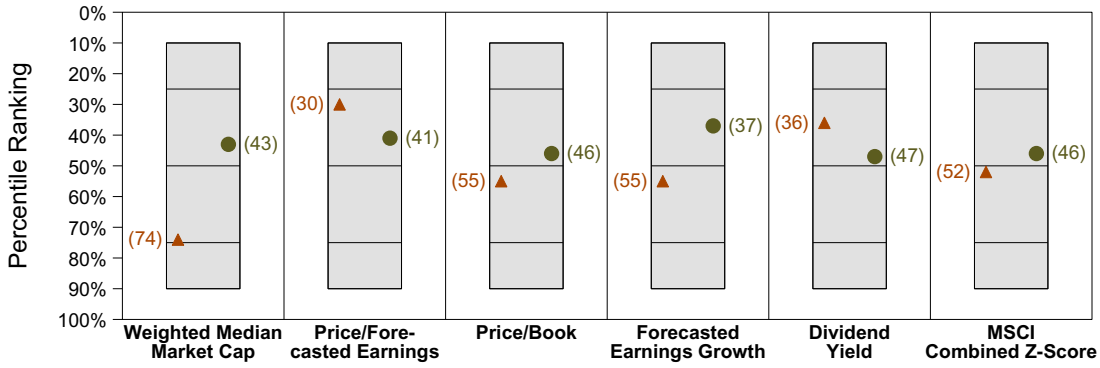
	Beta	R-Squared
10th Percentile	1.10	0.96
25th Percentile	1.02	0.94
Median	0.95	0.89
75th Percentile	0.89	0.85
90th Percentile	0.83	0.80
FIAM Small Cap ●	0.93	0.95

FIAM Small Cap
Equity Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings
Rankings Against Callan Small Capitalization
as of September 30, 2019

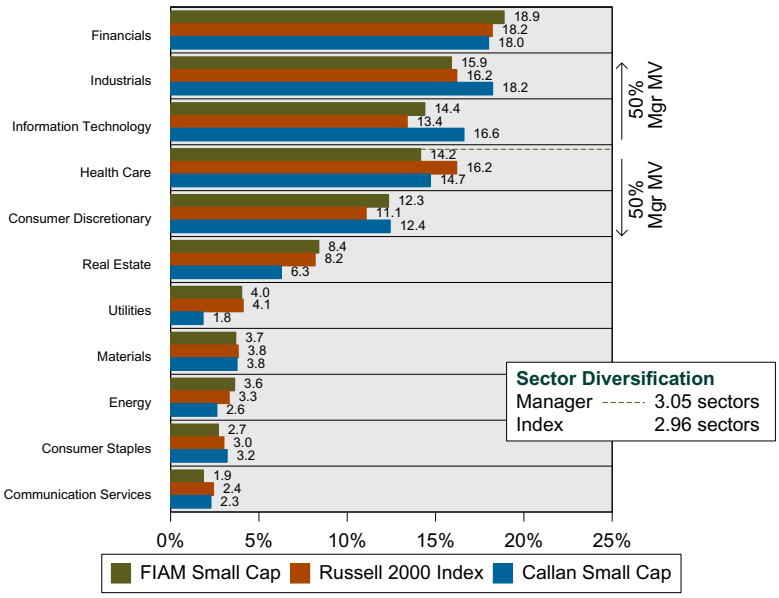


	Weighted Median Market Cap	Price/Fore-casted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	3.43	36.55	4.20	21.42	2.07	0.80
25th Percentile	3.06	24.77	3.28	17.51	1.73	0.53
Median	2.52	16.91	1.99	13.15	1.32	(0.02)
75th Percentile	1.99	14.34	1.61	10.67	0.64	(0.34)
90th Percentile	1.60	12.54	1.38	8.63	0.31	(0.53)
FIAM Small Cap ●	2.68	18.47	2.06	14.91	1.34	0.03
Russell 2000 Index ▲	2.02	22.44	1.89	12.61	1.52	(0.05)

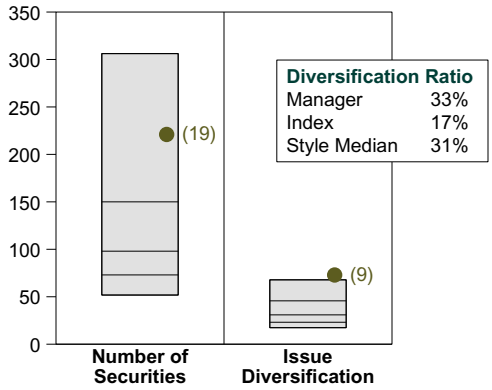
Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. Diversification by number and concentration of holdings are also compared to the benchmark and peer group. Issue Diversification represents by count, and Diversification Ratio by percent, the number of holdings that account for half of the portfolio's market value.

Sector Allocation
September 30, 2019



Diversification
September 30, 2019

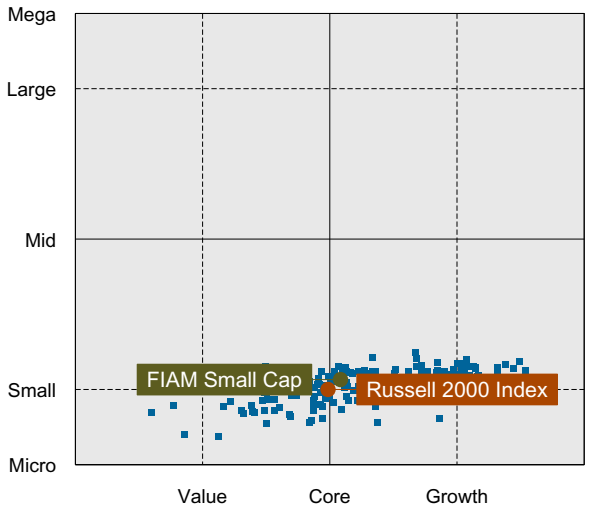


	Number of Securities	Issue Diversification
10th Percentile	306	68
25th Percentile	150	46
Median	98	31
75th Percentile	73	23
90th Percentile	52	17
FIAM Small Cap ●	221	73
Russell 2000 Index ▲	2030	339

Current Holdings Based Style Analysis
FIAM Small Cap
As of September 30, 2019

This page analyzes the current investment style of a portfolio utilizing a detailed holdings-based style analysis to determine actual exposures to various market capitalization and style segments of the domestic equity market. The market is segmented quarterly by capitalization and style. The capitalization segments are dictated by capitalization decile breakpoints. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the current market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the current portfolio and index weights and stock counts (in parentheses) in each capitalization/style segment of the market. The middle chart illustrates the total exposures and stock counts in the three style segments, with a legend showing the total growth, value, and "combined Z" (growth - value) scores. The bottom chart exhibits the sector weights as well as the style weights within each sector.

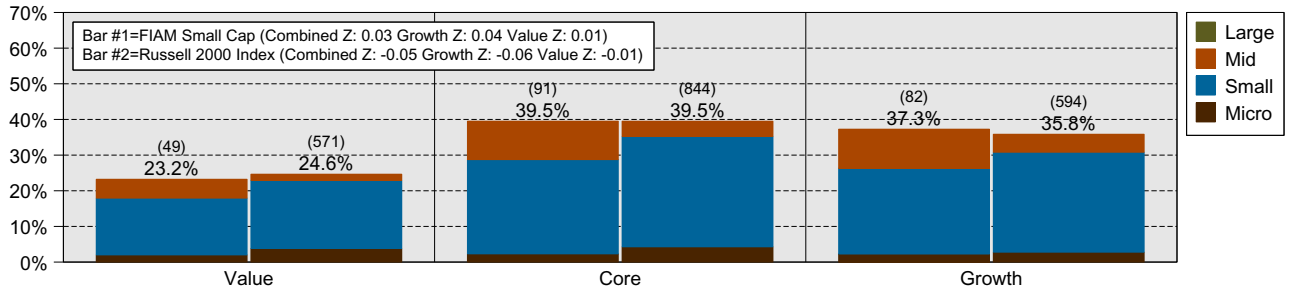
Style Map vs Callan Small Cap
Holdings as of September 30, 2019



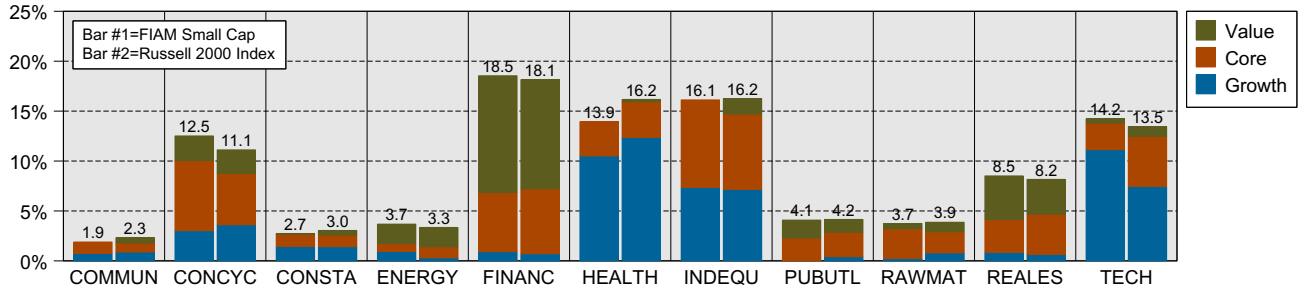
Style Exposure Matrix
Holdings as of September 30, 2019

	Value	Core	Growth	Total
Large	0.0% (0) 0.0% (0)	0.0% (0) 0.0% (0)	0.0% (0) 0.0% (0)	**0.0% (0)** **0.0% (0)**
Mid	5.3% (12) 1.7% (8)	10.8% (20) 4.2% (19)	11.0% (23) 5.0% (21)	**27.0% (55)** **11.0% (48)**
Small	15.9% (30) 19.1% (268)	26.4% (61) 31.0% (435)	24.0% (49) 28.0% (356)	**66.4% (140)** **78.1% (1059)**
Micro	2.0% (7) 3.8% (295)	2.3% (10) 4.3% (390)	2.3% (10) 2.8% (217)	**6.6% (27)** **10.9% (902)**
Total	**23.2% (49)** **24.6% (571)**	**39.5% (91)** **39.5% (844)**	**37.3% (82)** **35.8% (594)**	**100.0% (222)** **100.0% (2009)**

Combined Z-Score Style Distribution
Holdings as of September 30, 2019



Sector Weights Distribution
Holdings as of September 30, 2019



FIAM Small Cap
Top 10 Portfolio Holdings Characteristics
as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
South Jersey Inds Inc	Utilities	$346,213	1.0%	(1.57)%	3.04	22.81	3.49%	4.60%
Cbiz Inc	Industrials	$323,595	1.0%	19.95%	1.29	18.02	0.00%	14.90%
Performance Food Group Co	Consumer Staples	$294,464	0.9%	14.92%	4.84	22.33	0.00%	10.90%
Itt Inc	Industrials	$293,712	0.9%	(6.32)%	5.38	15.74	0.96%	7.73%
Fnb Corp Pa	Financials	$290,049	0.9%	(0.94)%	3.75	9.83	4.16%	9.05%
Sabra Health Care Reit Inc	Real Estate	$284,704	0.9%	18.81%	4.35	35.27	7.84%	8.41%
Exlservice Holdings Inc	Information Technology	$274,536	0.8%	1.27%	2.29	20.81	0.00%	9.90%
Rexford Indl Rlty Inc	Real Estate	$272,924	0.8%	9.50%	4.83	102.85	1.68%	107.57%
Medical Pptys Trust Inc	Real Estate	$271,884	0.8%	13.72%	8.73	19.06	5.32%	(26.18)%
New Jersey Res	Utilities	$271,320	0.8%	(8.51)%	4.07	21.09	2.76%	6.00%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Liveperson Inc	Information Technology	$210,630	0.6%	27.29%	2.34	(258.70)	0.00%	30.00%
Stamps Com Inc	Consumer Discretionary	$134,010	0.4%	27.25%	1.28	21.34	0.00%	30.73%
Trex Co Inc	Industrials	$129,121	0.4%	26.96%	5.31	32.97	0.00%	34.48%
Fti Consulting	Industrials	$148,386	0.4%	26.42%	3.98	19.86	0.00%	36.44%
Entegris Inc	Information Technology	$223,535	0.7%	26.27%	6.36	21.37	0.68%	16.33%
Taylor Morrison Home Ii	Consumer Discretionary	$213,746	0.6%	23.75%	2.73	8.76	0.00%	5.40%
Option Care Health Inc	Health Care	$88,320	0.3%	23.10%	2.24	266.67	0.00%	(9.93)%
Federal Signal Corp	Industrials	$221,650	0.7%	22.79%	1.98	17.91	0.98%	16.00%
Builders Firstsource Inc	Industrials	$215,420	0.7%	21.98%	2.38	10.81	0.00%	66.32%
Inphi Corp	Information Technology	$262,515	0.8%	21.85%	2.77	32.11	0.00%	20.00%

10 Worst Performers

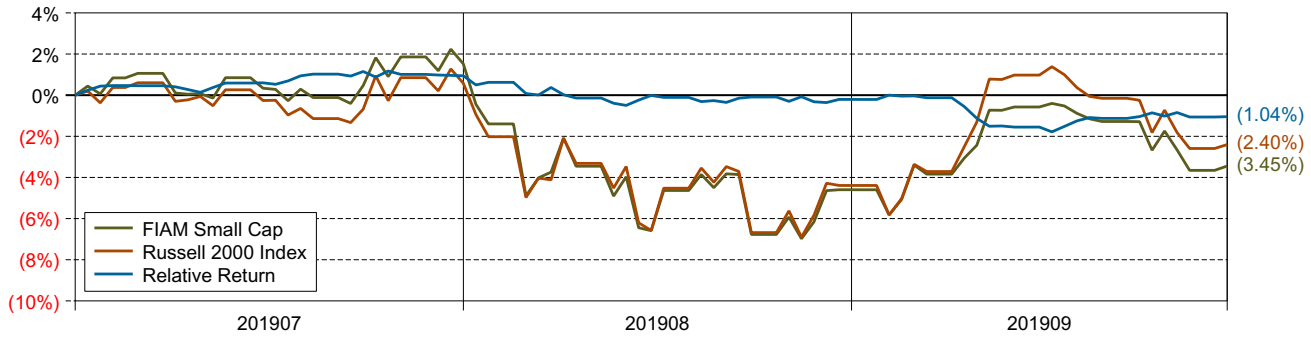
Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Viewray Inc	Health Care	$51,040	0.2%	(67.08)%	0.29	(2.95)	0.00%	10.00%
Propetro Hldg Corp	Energy	$57,267	0.2%	(56.10)%	0.91	3.93	0.00%	-
Sarepta Therapeutics Inc	Health Care	$105,448	0.3%	(50.38)%	5.60	(13.45)	0.00%	-
Merit Medical Systems	Health Care	$98,081	0.3%	(49.00)%	1.68	15.52	0.00%	11.00%
Kalvista Pharmaceuticals Inc	Health Care	$40,600	0.1%	(47.62)%	0.21	(7.73)	0.00%	-
Sunopta Inc	Consumer Staples	$26,460	0.1%	(45.32)%	0.16	(6.52)	0.00%	(36.48)%
Polarityte Inc	Health Care	$10,013	0.0%	(43.27)%	0.08	(0.90)	0.00%	66.95%
Centennial Resource Dev Inc Cl A	Energy	$59,146	0.2%	(40.51)%	1.19	10.88	0.00%	6.70%
Duluth Hldgs Inc Com Cl B	Consumer Discretionary	$60,208	0.2%	(37.61)%	0.25	12.47	0.00%	39.95%
Everbridge Inc	Information Technology	$148,104	0.4%	(31.08)%	2.07	(522.97)	0.00%	-

FIAM Small Cap vs Russell 2000 Index
Domestic Equity Daily Performance Attribution
One Quarter Ended September 30, 2019

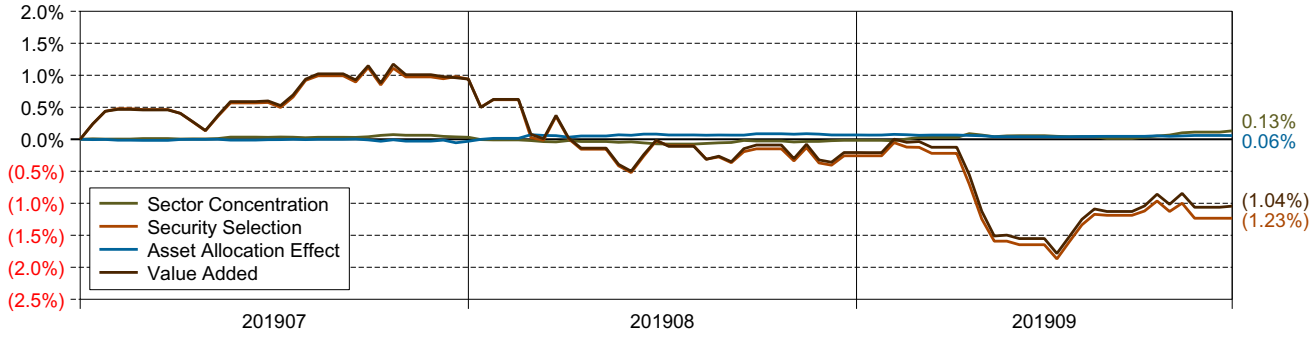
Return Sources and Timing

The charts below illustrate the timing and cumulative paths of the manager's performance, as well as attributing relative performance to three sources: Sector Concentration, Security Selection, and Asset Allocation. The first chart shows the cumulative absolute return paths for the manager and index. The second chart shows the cumulative relative return path of the manager and the attributed sources of that value-added. The bottom table breaks the annualized attribution factors down to the sector level for more insight into sources of return.

Cumulative Manager and Benchmark Returns



Cumulative Attribution Effects vs. Russell 2000 Index



Attribution Effects by Sector vs. Russell 2000 Index
One Quarter Ended September 30, 2019

Sector	Manager Eff Weight	Index Eff Weight	Manager Return	Index Return	Sector Concentration	Security Selection	Asset Allocation
Communication Services	2.24%	2.56%	(6.95)%	(8.10)%	0.02%	0.04%	-
Consumer Discretionary	12.33%	10.99%	1.98%	(0.16)%	0.03%	0.26%	-
Consumer Staples	2.45%	2.89%	2.09%	4.19%	(0.03)%	(0.05)%	-
Energy	3.79%	3.68%	(17.55)%	(20.63)%	(0.01)%	0.14%	-
Financials	18.18%	17.93%	(1.73)%	(0.31)%	0.01%	(0.26)%	-
Health Care	15.63%	17.04%	(17.27)%	(9.39)%	0.14%	(1.32)%	-
Industrials	15.70%	15.90%	(1.52)%	(0.28)%	(0.01)%	(0.19)%	-
Information Technology	14.52%	13.45%	(0.13)%	(0.52)%	0.02%	0.05%	-
Materials	3.82%	3.83%	(3.58)%	(5.53)%	(0.01)%	0.08%	-
Real Estate	7.68%	7.81%	7.52%	4.90%	(0.01)%	0.19%	-
Utilities	3.66%	3.91%	0.05%	5.38%	(0.02)%	(0.18)%	-
Non Equity	1.15%	0.00%	-	-	-	-	0.06%
Total	-	-	(3.45)%	(2.40)%	0.13%	(1.23)%	0.06%

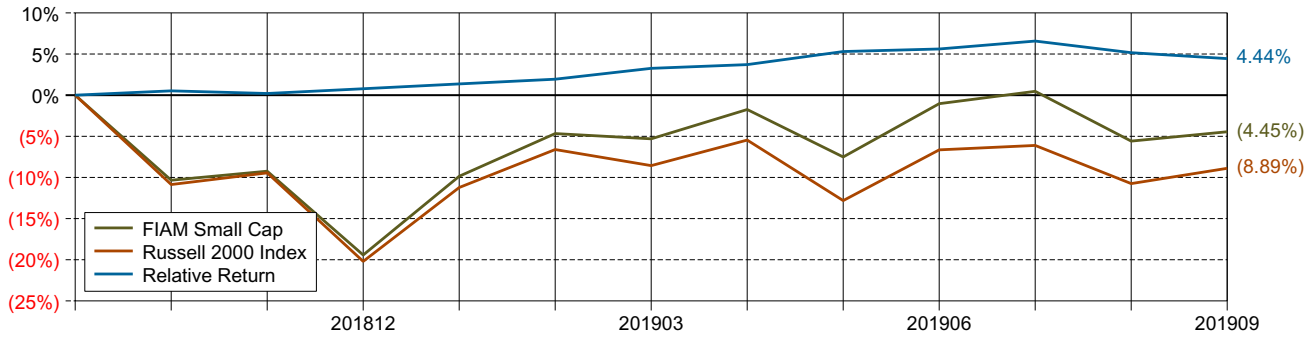
Manager Return	=	Index Return	+	Sector Concentration	+	Security Selection	+	Asset Allocation
(3.45%)		(2.40%)		0.13%		(1.23%)		0.06%

FIAM Small Cap vs Russell 2000 Index
Domestic Equity Daily Performance Attribution
One Year Ended September 30, 2019

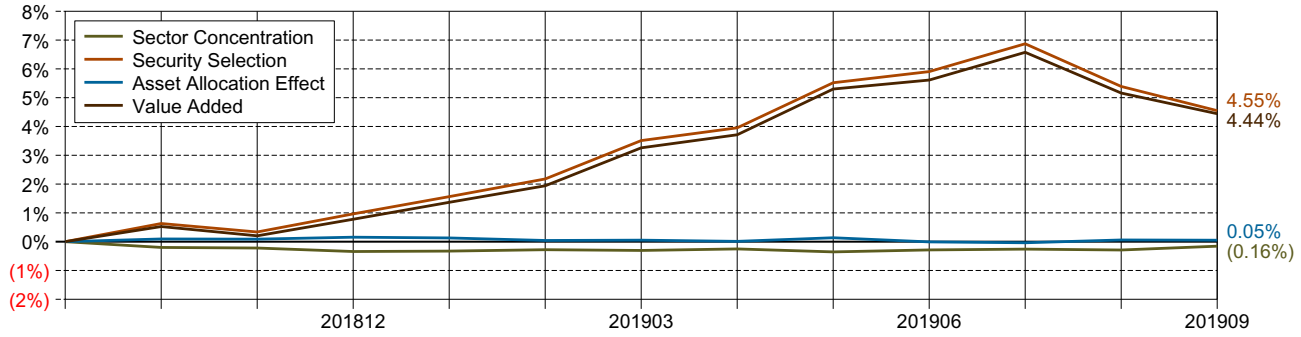
Return Sources and Timing

The charts below illustrate the timing and cumulative paths of the manager's performance, as well as attributing relative performance to three sources: Sector Concentration, Security Selection, and Asset Allocation. The first chart shows the cumulative absolute return paths for the manager and index. The second chart shows the cumulative relative return path of the manager and the attributed sources of that value-added. The bottom table breaks the annualized attribution factors down to the sector level for more insight into sources of return.

Cumulative Manager and Benchmark Returns



Cumulative Attribution Effects vs. Russell 2000 Index



Attribution Effects by Sector vs. Russell 2000 Index
One Year Ended September 30, 2019

Sector	Manager Eff Weight	Index Eff Weight	Manager Return	Index Return	Sector Concentration	Security Selection	Asset Allocation
Miscellaneous	0.01%	0.00%	3.02%	0.00%	0.00%	0.00%	-
Communication Services	2.54%	3.09%	(11.71)%	(19.06)%	0.01%	0.28%	-
Consumer Discretionary	12.00%	11.88%	(1.34)%	(10.42)%	0.05%	1.08%	-
Consumer Staples	2.69%	2.82%	4.20%	(5.96)%	(0.04)%	0.28%	-
Energy	3.99%	3.79%	(39.11)%	(49.81)%	(0.08)%	0.73%	-
Financials	18.03%	17.86%	(6.52)%	(4.89)%	(0.01)%	(0.28)%	-
Health Care	16.19%	16.07%	(16.90)%	(21.60)%	0.09%	1.02%	-
Industrials	15.34%	15.14%	1.53%	(4.29)%	0.01%	0.80%	-
Information Technology	15.18%	14.43%	0.87%	4.29%	0.04%	(0.45)%	-
Materials	3.91%	3.83%	(7.24)%	(19.21)%	(0.03)%	0.53%	-
Real Estate	6.76%	7.40%	22.79%	6.95%	(0.12)%	0.87%	-
Utilities	3.36%	3.69%	8.47%	20.11%	(0.08)%	(0.33)%	-
Non Equity	1.37%	0.00%	-	-	-	-	0.05%
Total	-	-	(4.45)%	(8.89)%	(0.16)%	4.55%	0.05%

Manager Return	=	Index Return	+	Sector Concentration	+	Security Selection	+	Asset Allocation
(4.45%)		(8.89%)		(0.16%)		4.55%		0.05%

International Equity
Period Ended September 30, 2019

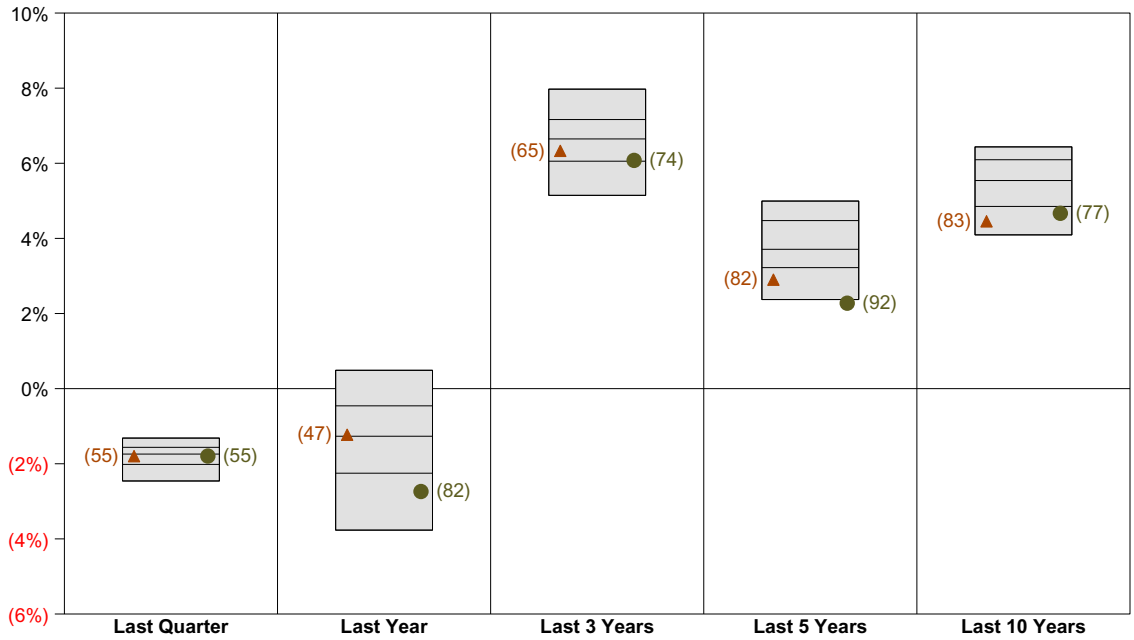
Quarterly Summary and Highlights

- International Equity's portfolio posted a (1.80)% return for the quarter placing it in the 55 percentile of the Public Fund - International Equity group for the quarter and in the 82 percentile for the last year.
- International Equity's portfolio outperformed the MSCI ACWI ex US by 0.00% for the quarter and underperformed the MSCI ACWI ex US for the year by 1.51%.

Quarterly Asset Growth

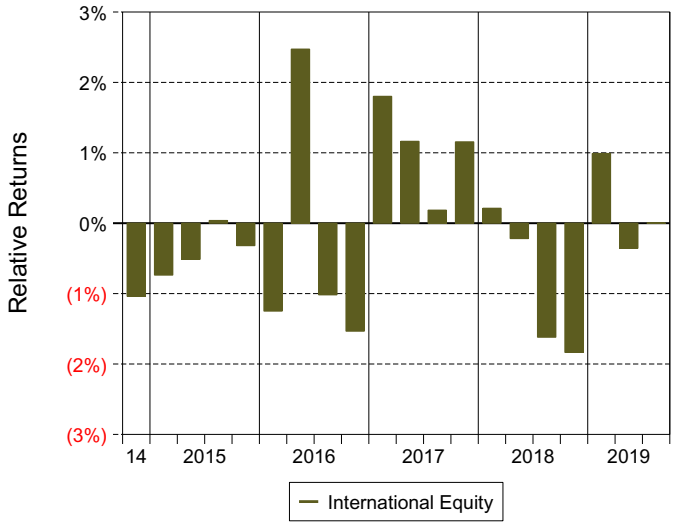
Beginning Market Value	$201,638,481
Net New Investment	$-137,084
Investment Gains/(Losses)	$-3,713,741
Ending Market Value	$197,787,656

Performance vs Public Fund - International Equity (Gross)

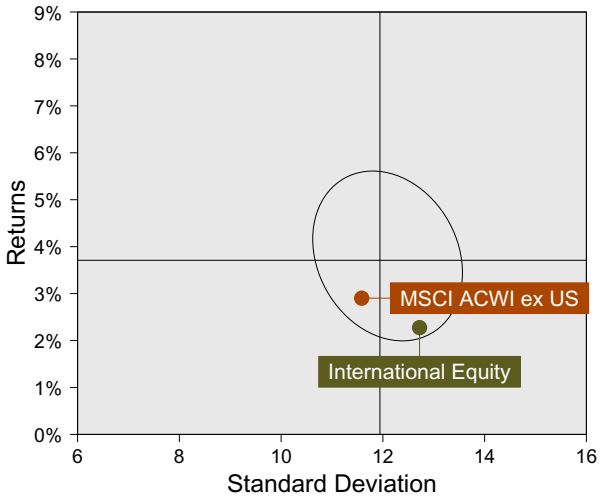


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	(1.32)	0.49	7.97	4.99	6.44
25th Percentile	(1.56)	(0.46)	7.16	4.47	6.09
Median	(1.74)	(1.27)	6.65	3.71	5.54
75th Percentile	(2.02)	(2.25)	6.06	3.22	4.85
90th Percentile	(2.46)	(3.77)	5.15	2.37	4.09
International Equity ●	(1.80)	(2.74)	6.08	2.28	4.67
MSCI ACWI ex US ▲	(1.80)	(1.23)	6.33	2.90	4.46

Relative Return vs MSCI ACWI ex US



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

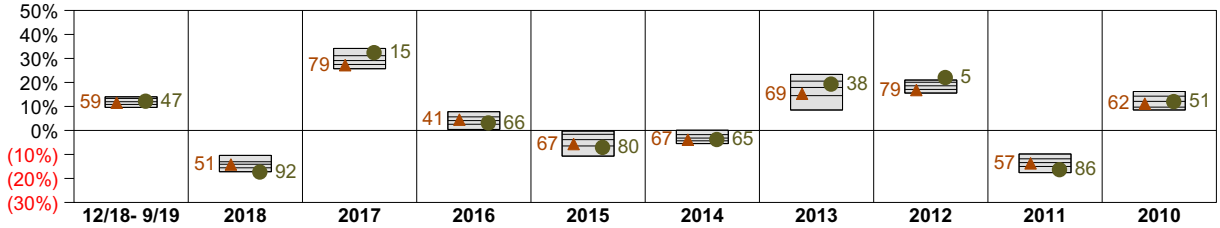


International Equity
Return Analysis Summary

Return Analysis

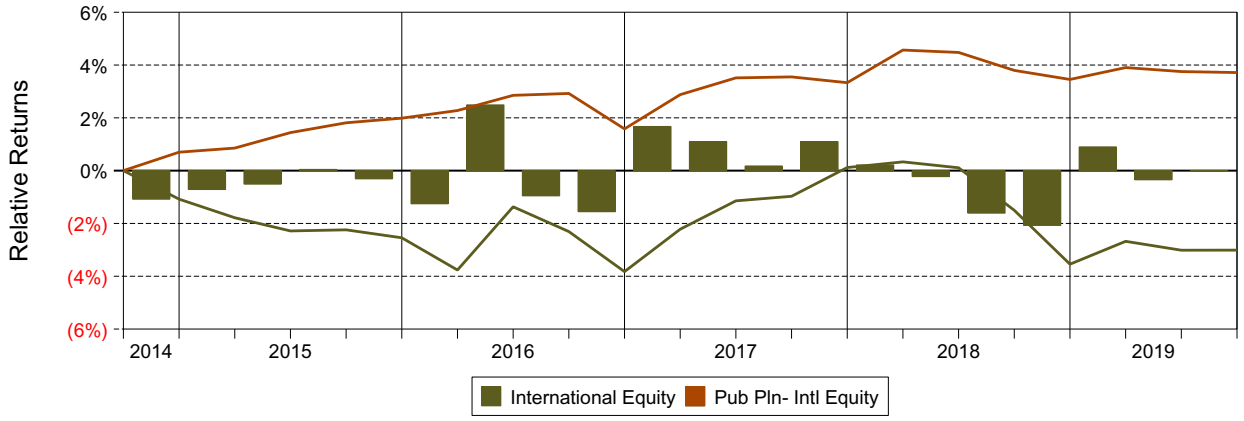
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

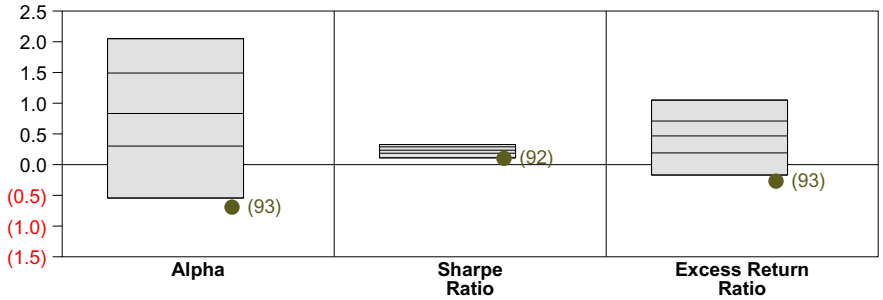


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	14.01	(10.40)	34.17	7.81	(0.26)	0.08	23.34	21.00	(9.81)	16.23
25th Percentile	13.34	(13.05)	31.15	5.65	(1.61)	(1.75)	20.55	20.07	(11.83)	14.28
Median	11.96	(14.09)	29.11	4.10	(3.83)	(3.17)	17.91	18.60	(13.40)	12.11
75th Percentile	10.83	(15.57)	27.49	2.58	(6.46)	(4.32)	14.50	17.09	(15.01)	9.72
90th Percentile	9.60	(17.19)	25.71	0.41	(10.70)	(5.48)	8.51	15.58	(17.58)	8.52
International Equity ●	12.18	(17.33)	32.41	3.12	(7.06)	(3.78)	19.30	22.05	(16.34)	12.02
MSCI ACWI ex US ▲	11.56	(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 September 30, 2019



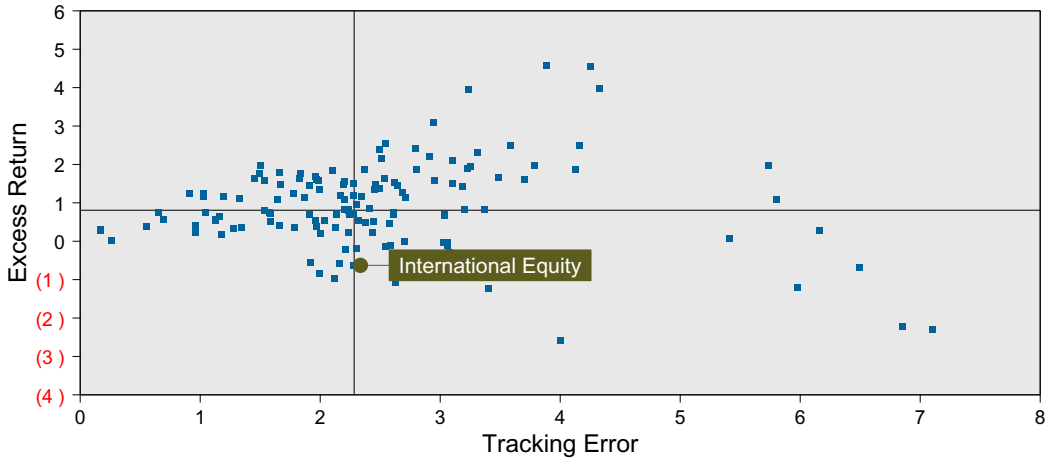
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.05	0.33	1.05
25th Percentile	1.49	0.29	0.71
Median	0.83	0.23	0.47
75th Percentile	0.30	0.19	0.19
90th Percentile	(0.54)	0.11	(0.17)
International Equity ●	(0.69)	0.10	(0.27)

International Equity
Risk Analysis Summary

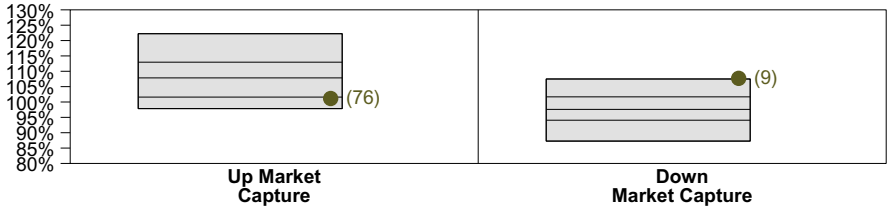
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

Risk Analysis vs Public Fund - International Equity (Gross)
Five Years Ended September 30, 2019

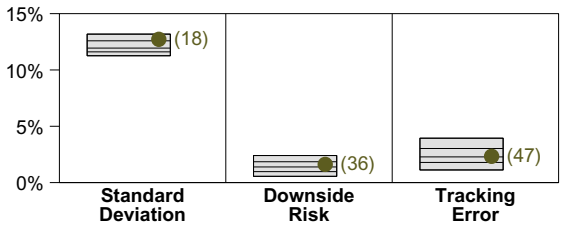


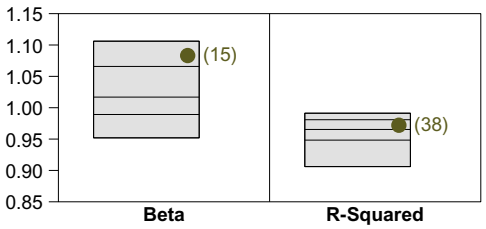
Market Capture vs MSCI ACWI ex US Index (USD Net Div)
Rankings Against Public Fund - International Equity (Gross)
Five Years Ended September 30, 2019



	Up Market Capture	Down Market Capture
10th Percentile	122.23	107.49
25th Percentile	112.96	101.68
Median	107.85	97.60
75th Percentile	101.59	94.07
90th Percentile	97.85	87.28
International Equity ●	101.14	107.70

Risk Statistics Rankings vs MSCI ACWI ex US Index (USD Net Div)
Rankings Against Public Fund - International Equity (Gross)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	13.18	2.40	3.94
25th Percentile	12.59	1.85	3.03
Median	11.94	1.39	2.28
75th Percentile	11.61	0.97	1.79
90th Percentile	11.26	0.56	1.12
International Equity ●	12.72	1.62	2.34

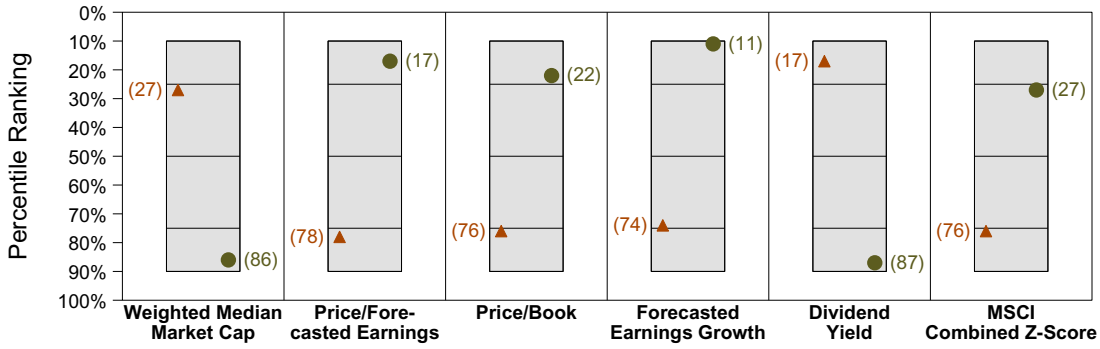
	Beta	R-Squared
10th Percentile	1.11	0.99
25th Percentile	1.07	0.98
Median	1.02	0.97
75th Percentile	0.99	0.95
90th Percentile	0.95	0.91
International Equity ●	1.08	0.97

International Equity
Equity Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings
Rankings Against Public Fund - International Equity
as of September 30, 2019

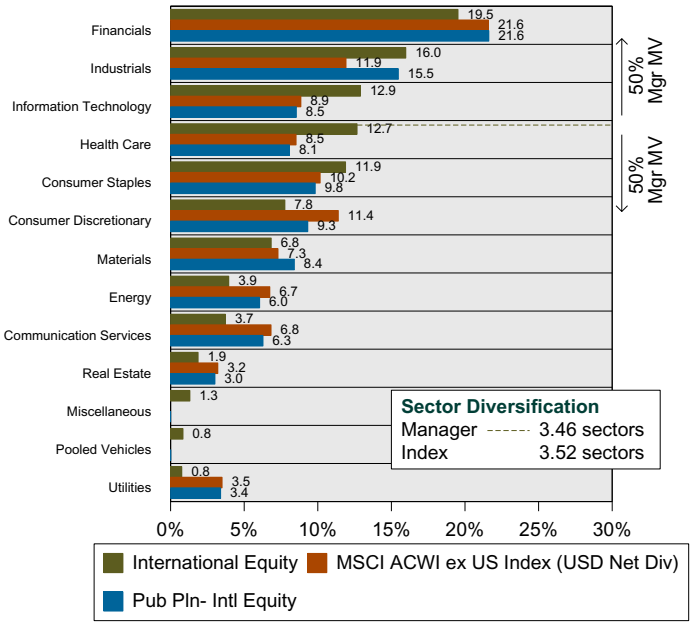


	Weighted Median Market Cap	Price/Forecasted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	36.03	17.19	2.82	12.93	3.21	0.72
25th Percentile	32.35	15.07	2.12	12.14	2.93	0.38
Median	24.94	14.36	1.74	11.05	2.78	0.15
75th Percentile	18.75	13.32	1.61	9.86	2.39	(0.02)
90th Percentile	13.97	12.65	1.45	8.68	1.77	(0.13)
International Equity ●	16.61	16.18	2.16	12.88	2.11	0.35
MSCI ACWI ex US Index (USD Net Div) ▲	31.71	13.23	1.60	9.87	3.19	(0.03)

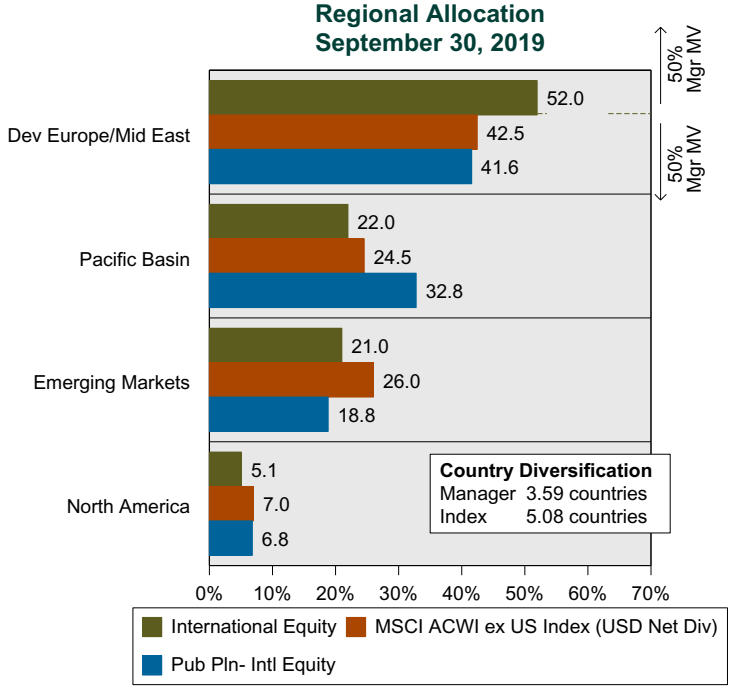
Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. The regional allocation chart compares the manager's geographical region weights with those of the benchmark as well as the median region weights of the peer group.

Sector Allocation
September 30, 2019



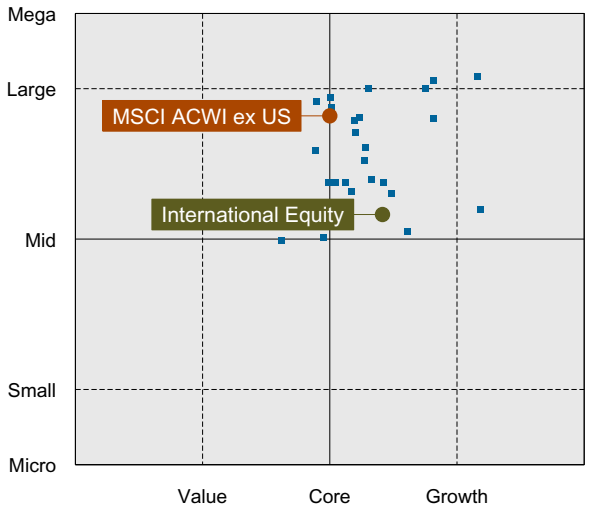
Regional Allocation
September 30, 2019



Current Holdings Based Style Analysis
International Equity
As of September 30, 2019

This page analyzes the current investment style of a portfolio utilizing a detailed holdings-based style analysis to determine actual exposures to various regional and style segments of the international/global equity market. The market is segmented quarterly by region and style. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the current market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the current portfolio and index weights and stock counts (in parentheses) in each region/style segment of the market. The middle chart illustrates the total exposures and stock counts in the three style segments, with a legend showing the total growth, value, and "combined Z" (growth - value) scores. The bottom chart exhibits the sector weights as well as the style weights within each sector.

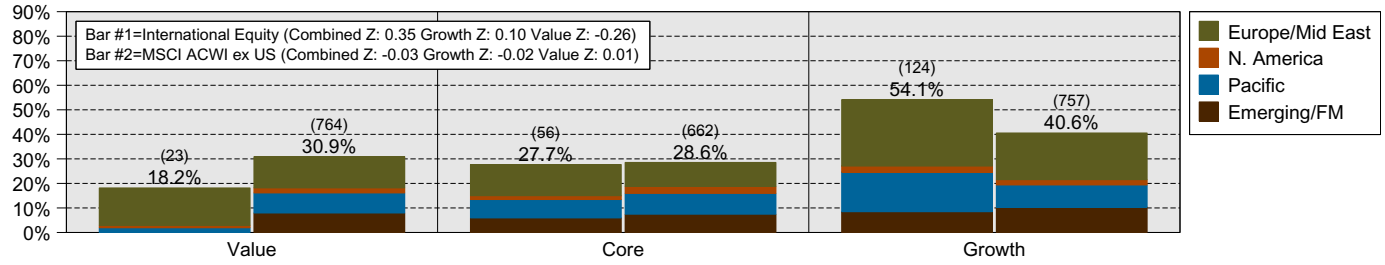
Style Map vs Pub Pln- Intl Equity
Holdings as of September 30, 2019



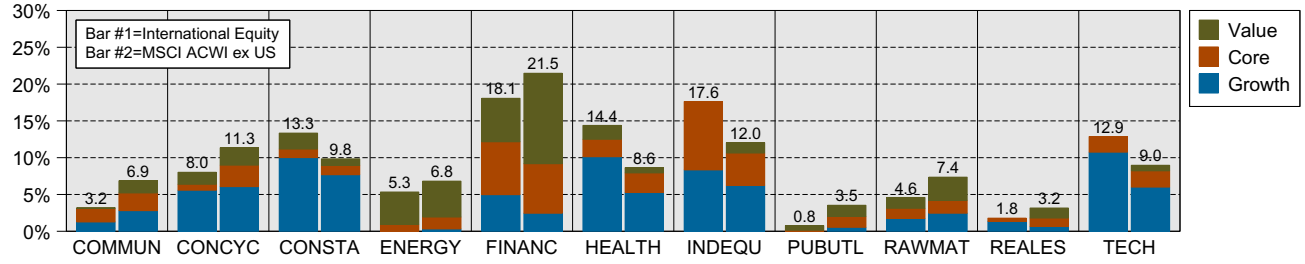
Style Exposure Matrix
Holdings as of September 30, 2019

	Value	Core	Growth	Total
Europe/ Mid East	15.2% (17) 12.7% (144)	12.7% (30) 9.8% (120)	27.1% (58) 19.0% (184)	**55.0% (105)** **41.5% (448)**
N. America	1.0% (4) 2.1% (29)	1.6% (3) 2.8% (27)	2.5% (7) 2.2% (34)	**5.1% (14)** **7.1% (90)**
Pacific	1.9% (2) 8.2% (145)	7.5% (13) 8.5% (157)	16.1% (37) 9.0% (168)	**25.5% (52)** **25.6% (470)**
Emerging/ FM	0.0% (0) 7.9% (446)	5.9% (10) 7.4% (358)	8.5% (22) 10.4% (371)	**14.4% (32)** **25.8% (1175)**
Total	**18.2% (23)** **30.9% (764)**	**27.7% (56)** **28.6% (662)**	**54.1% (124)** **40.6% (757)**	**100.0% (203)** **100.0% (2183)**

Combined Z-Score Style Distribution
Holdings as of September 30, 2019



Sector Weights Distribution
Holdings as of September 30, 2019



International Equity
Top 10 Portfolio Holdings Characteristics
as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Roche Hldgs Ag Basel Div Rts Ctf	Health Care	$3,919,326	2.0%	3.40%	204.64	14.87	2.86%	6.00%
Royal Dutch Shell 'b' Shs	Energy	$3,488,184	1.8%	(8.60)%	110.25	10.35	6.16%	7.37%
British American Tobacco	Consumer Staples	$3,369,863	1.7%	5.93%	85.01	8.79	6.56%	7.47%
Novartis	Health Care	$3,178,472	1.6%	(5.14)%	219.34	15.65	3.29%	6.66%
Aia Group Ltd Com Par Usd 1	Financials	$3,076,268	1.6%	(12.05)%	114.19	16.12	1.59%	47.20%
Treasury Wine Estates Ltd	Consumer Staples	$2,959,755	1.5%	20.26%	9.01	24.23	2.05%	15.34%
Taiwan Semicond Manufac Co L Shs	Information Technology	$2,767,446	1.4%	14.79%	227.34	18.74	3.13%	7.27%
Prudential	Financials	$2,721,002	1.4%	(15.78)%	47.26	8.63	3.40%	5.90%
Rolls Royce Holdings Plc Lon Shs	Industrials	$2,663,954	1.4%	(8.70)%	18.86	27.57	0.00%	55.95%
Volkswagen Vorzug	Consumer Discretionary	$2,656,853	1.3%	0.55%	34.97	5.45	3.12%	4.95%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Varta	Industrials	$366,123	0.2%	58.57%	3.99	53.22	0.00%	-
Hellofresh	Consumer Discretionary	$262,568	0.1%	58.14%	2.49	-	0.00%	-
Lasertec	Information Technology	$481,459	0.2%	58.06%	2.95	25.85	0.70%	4.19%
Bosideng International Hldgs	Consumer Discretionary	$241,548	0.1%	56.80%	4.58	23.67	2.39%	12.36%
Cobham	Industrials	$542,645	0.3%	42.53%	4.62	21.21	5.63%	17.34%
Gsx Techedu Inc	Information Technology	$253,021	0.1%	41.89%	1.91	37.16	0.00%	265.70%
Entertainment One Ltd	Communication Services	$193,604	0.1%	38.53%	3.48	20.03	0.51%	14.78%
Afterpay Touch Group	Information Technology	$279,726	0.1%	37.51%	6.11	310.16	0.00%	-
A Living Services Co Ltd H Common St	Industrials	$433,638	0.2%	36.28%	1.00	15.07	0.97%	-
Avast	Information Technology	$388,574	0.2%	26.20%	4.69	14.57	2.01%	9.60%

10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Ausnutria Dairy Corp Ltd	Consumer Staples	$144,753	0.1%	(34.42)%	2.10	13.75	1.46%	54.43%
Aryzta Ag	Consumer Staples	$152,312	0.1%	(33.58)%	0.76	6.35	0.00%	2.70%
Fila Korea	Consumer Discretionary	$273,898	0.1%	(28.00)%	2.96	12.40	0.09%	39.80%
Abcam Plc, Cambridge Shs	Health Care	$183,746	0.1%	(24.79)%	2.90	35.63	1.06%	14.42%
Thule Group Ab/The	Consumer Discretionary	$44,196	0.0%	(23.33)%	1.96	18.59	3.76%	13.19%
Valmet Corp	Industrials	$314,472	0.2%	(22.22)%	2.91	12.17	3.65%	22.56%
Evotec Ag Shs	Health Care	$238,460	0.1%	(20.38)%	3.36	58.06	0.00%	(15.80)%
Imcd Group	Industrials	$98,583	0.1%	(19.41)%	3.89	22.11	1.18%	16.10%
Argen-X	Health Care	$306,282	0.2%	(19.11)%	4.28	(27.51)	0.00%	-
Transpacific Inds Group Ltd Shs	Industrials	$299,788	0.2%	(18.82)%	2.69	24.36	1.82%	11.36%

Causeway International Opportunities
Period Ended September 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)

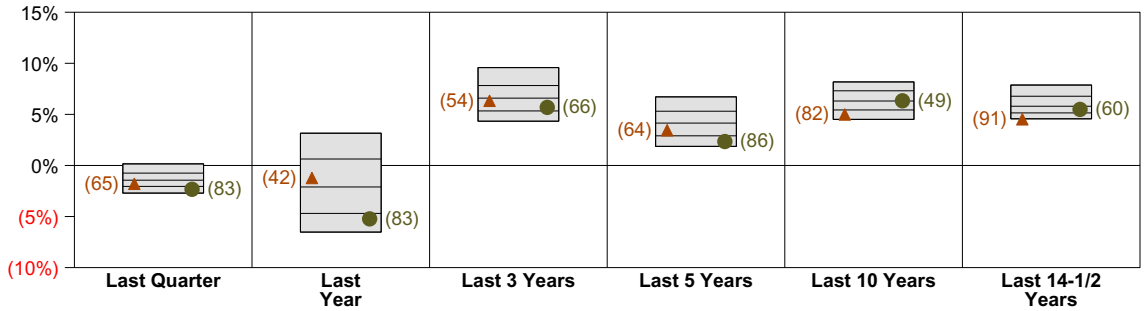
Quarterly Summary and Highlights

- Causeway International Opportunities's portfolio posted a (2.34)% return for the quarter placing it in the 83 percentile of the Callan Non-US Equity group for the quarter and in the 83 percentile for the last year.
- Causeway International Opportunities's portfolio underperformed the Causeway Linked Index by 0.54% for the quarter and underperformed the Causeway Linked Index for the year by 4.00%.

Quarterly Asset Growth

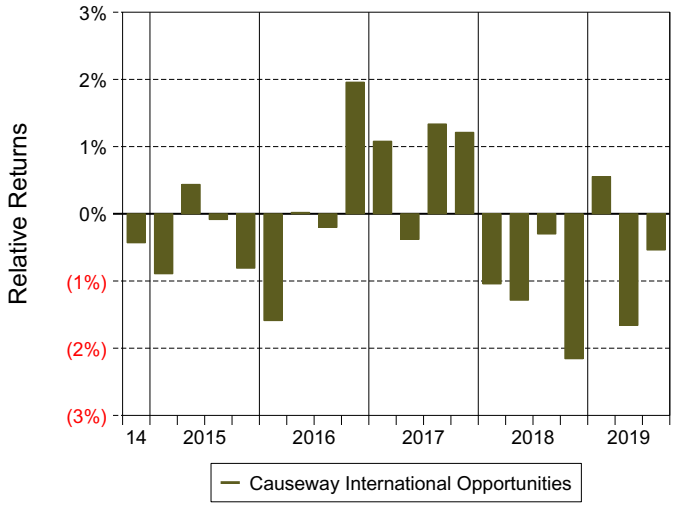
Beginning Market Value	$78,532,446
Net New Investment	$0
Investment Gains/(Losses)	$-1,833,954
Ending Market Value	$76,698,492

Performance vs Callan Non-US Equity (Gross)

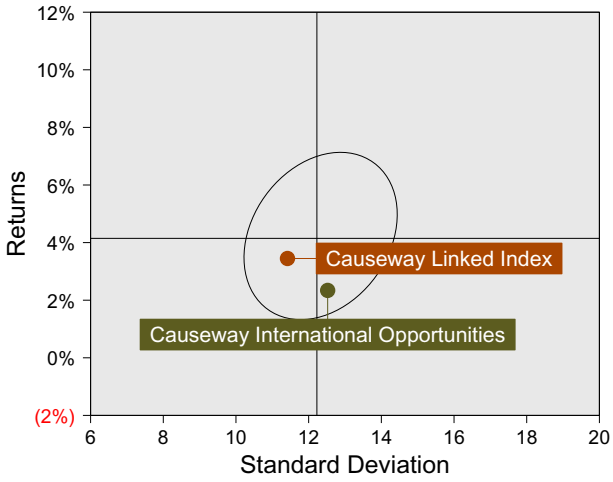


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 14-1/2 Years
10th Percentile	0.15	3.16	9.58	6.72	8.18	7.87
25th Percentile	(0.75)	0.63	7.82	5.31	7.31	6.78
Median	(1.44)	(2.10)	6.59	4.15	6.31	5.80
75th Percentile	(2.05)	(4.70)	5.34	2.90	5.44	5.14
90th Percentile	(2.71)	(6.52)	4.33	1.87	4.51	4.56
Causeway International Opportunities ●	(2.34)	(5.23)	5.69	2.34	6.33	5.48
Causeway Linked Index ▲	(1.80)	(1.23)	6.33	3.45	4.99	4.52

Relative Return vs Causeway Linked Index



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

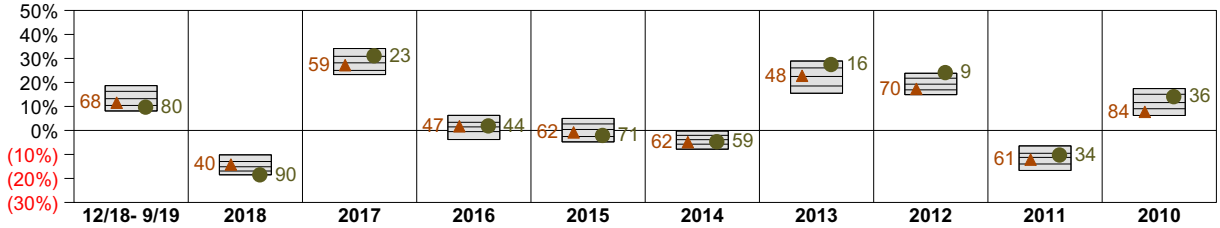


Causeway International Opportunities
Return Analysis Summary

Return Analysis

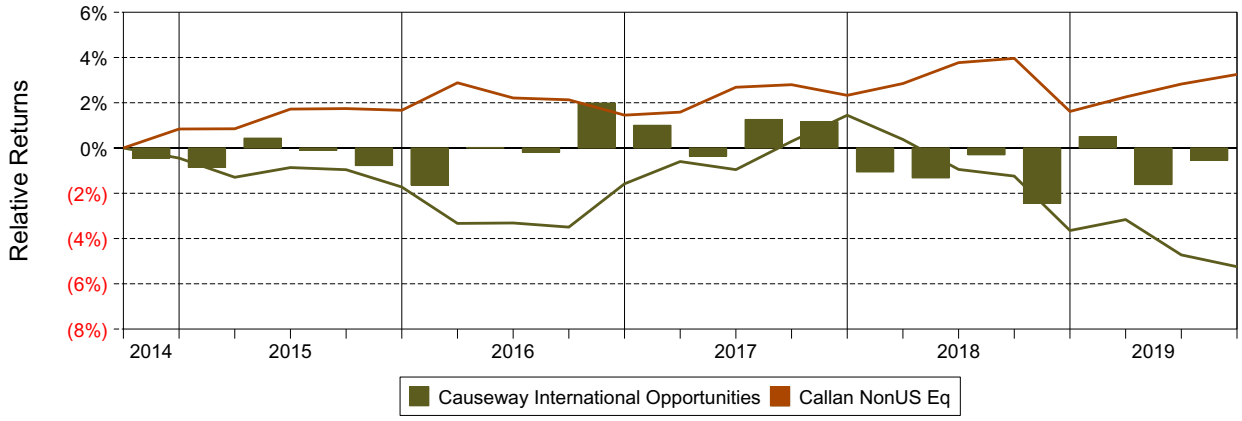
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

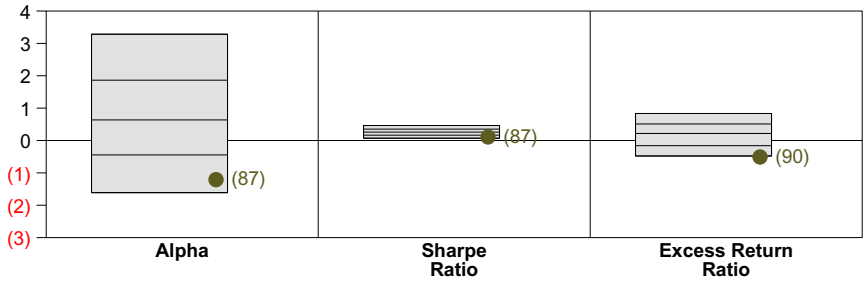


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	18.67	(10.17)	34.14	6.28	5.00	(0.22)	28.92	23.83	(6.44)	17.45
25th Percentile	16.28	(12.94)	30.88	3.39	2.71	(2.04)	26.05	21.76	(9.53)	15.07
Median	13.23	(15.13)	28.16	1.48	0.40	(3.85)	22.49	19.28	(11.24)	11.62
75th Percentile	10.41	(16.91)	25.01	(0.49)	(2.53)	(5.73)	18.53	16.91	(13.97)	9.05
90th Percentile	8.11	(18.49)	23.28	(3.79)	(4.77)	(7.82)	15.49	14.91	(16.68)	6.24
Causeway International Opportunities ●	9.71	(18.50)	31.11	1.88	(2.09)	(4.70)	27.47	24.10	(10.24)	14.06
Causeway Linked Index ▲	11.56	(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 September 30, 2019



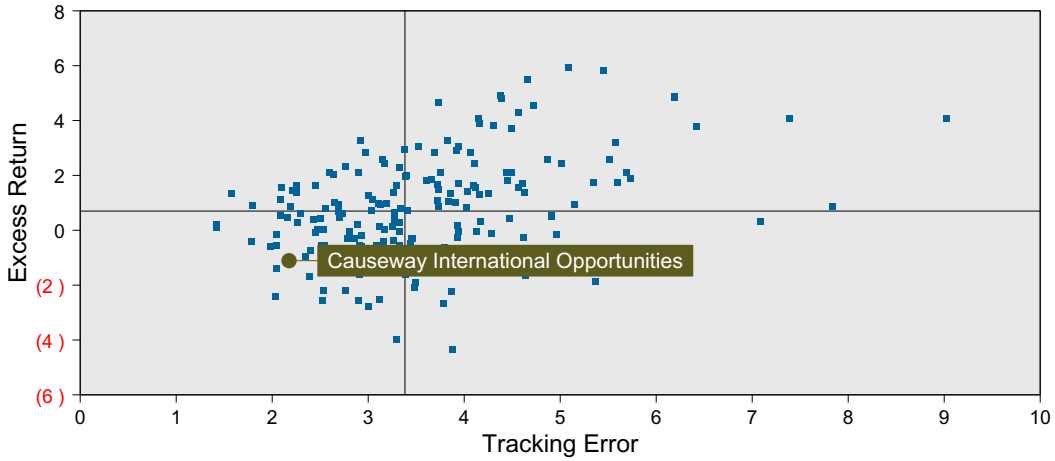
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	3.28	0.46	0.83
25th Percentile	1.86	0.35	0.51
Median	0.64	0.26	0.22
75th Percentile	(0.45)	0.16	(0.16)
90th Percentile	(1.61)	0.07	(0.48)
Causeway International Opportunities ●	(1.21)	0.11	(0.51)

Causeway International Opportunities
Risk Analysis Summary

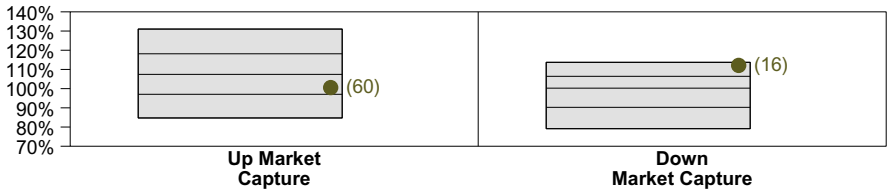
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

Risk Analysis vs Callan Non-US Equity (Gross)
Five Years Ended September 30, 2019

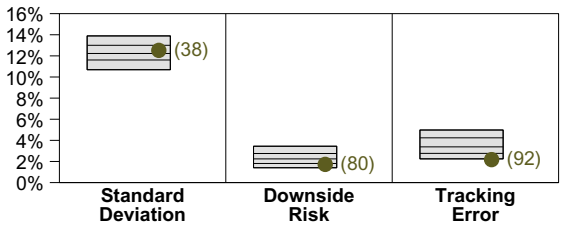


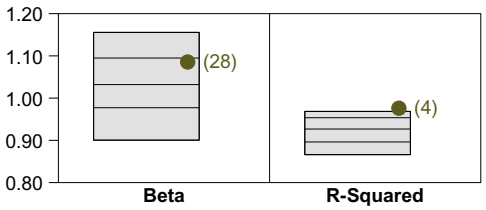
Market Capture vs Causeway Linked Index
Rankings Against Callan Non-US Equity (Gross)
Five Years Ended September 30, 2019



	Up Market Capture	Down Market Capture
10th Percentile	131.03	113.70
25th Percentile	118.16	106.41
Median	107.43	100.25
75th Percentile	97.05	90.26
90th Percentile	84.72	79.14
Causeway International Opportunities ●	100.54	112.10

Risk Statistics Rankings vs Causeway Linked Index
Rankings Against Callan Non-US Equity (Gross)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	13.89	3.44	4.98
25th Percentile	13.00	2.75	4.24
Median	12.23	2.25	3.38
75th Percentile	11.61	1.81	2.77
90th Percentile	10.69	1.41	2.25
Causeway International Opportunities ●	12.52	1.72	2.18

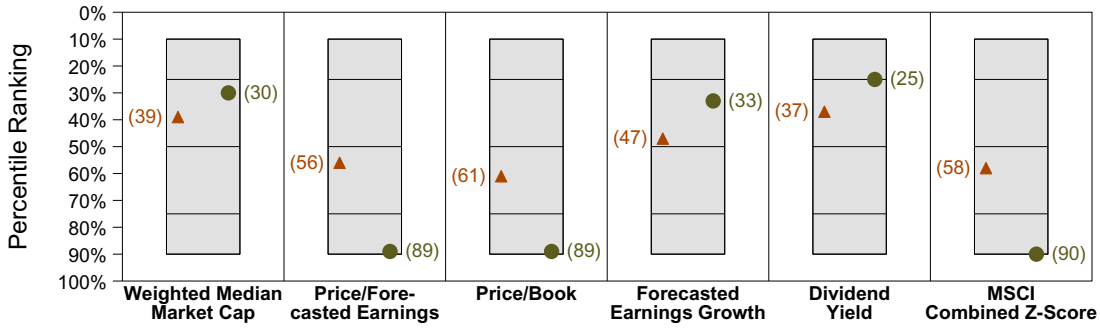
	Beta	R-Squared
10th Percentile	1.16	0.97
25th Percentile	1.09	0.95
Median	1.03	0.93
75th Percentile	0.98	0.90
90th Percentile	0.90	0.87
Causeway International Opportunities ●	1.09	0.98

Causeway International Opportunities
Equity Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings
Rankings Against Callan Non-US Equity
as of September 30, 2019

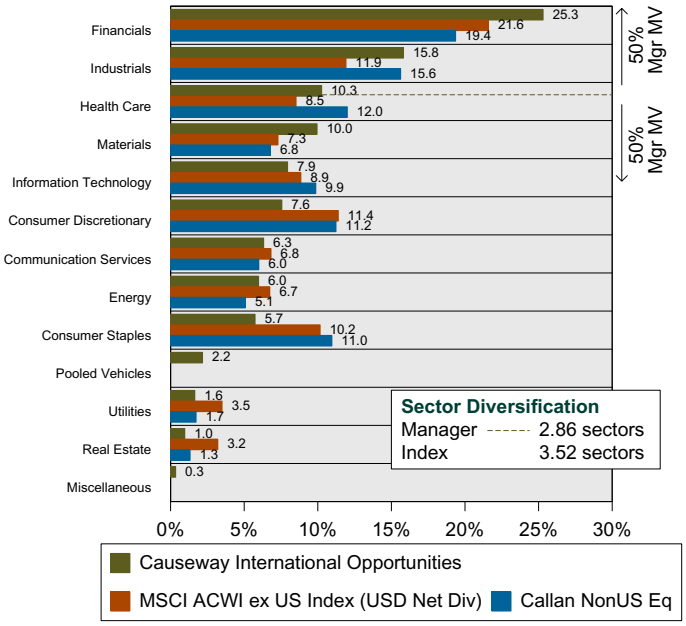


	Weighted Median Market Cap	Price/Forecasted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	49.74	21.08	3.55	13.40	3.71	1.12
25th Percentile	37.77	16.42	2.60	11.97	3.37	0.58
Median	28.50	13.58	1.81	9.60	2.79	0.14
75th Percentile	21.51	11.66	1.45	8.29	2.21	(0.32)
90th Percentile	13.29	10.39	1.22	7.47	1.57	(0.69)
Causeway International Opportunities ●	35.98	10.79	1.24	10.93	3.38	(0.69)
MSCI ACWI ex US Index (USD Net Div) ▲	31.71	13.23	1.60	9.87	3.19	(0.03)

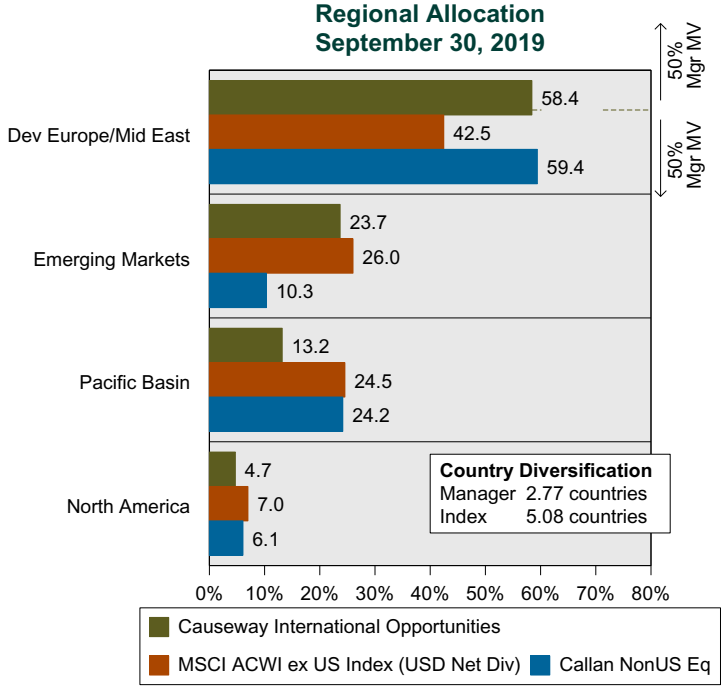
Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. The regional allocation chart compares the manager's geographical region weights with those of the benchmark as well as the median region weights of the peer group.

Sector Allocation
September 30, 2019



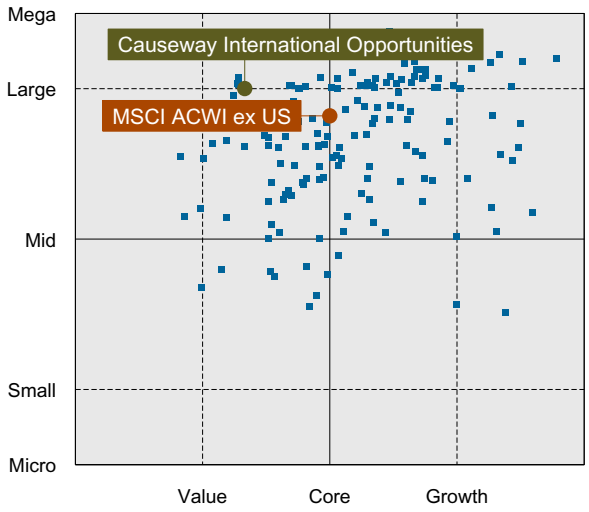
Regional Allocation
September 30, 2019



Current Holdings Based Style Analysis
Causeway International Opportunities
As of September 30, 2019

This page analyzes the current investment style of a portfolio utilizing a detailed holdings-based style analysis to determine actual exposures to various regional and style segments of the international/global equity market. The market is segmented quarterly by region and style. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the current market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the current portfolio and index weights and stock counts (in parentheses) in each region/style segment of the market. The middle chart illustrates the total exposures and stock counts in the three style segments, with a legend showing the total growth, value, and "combined Z" (growth - value) scores. The bottom chart exhibits the sector weights as well as the style weights within each sector.

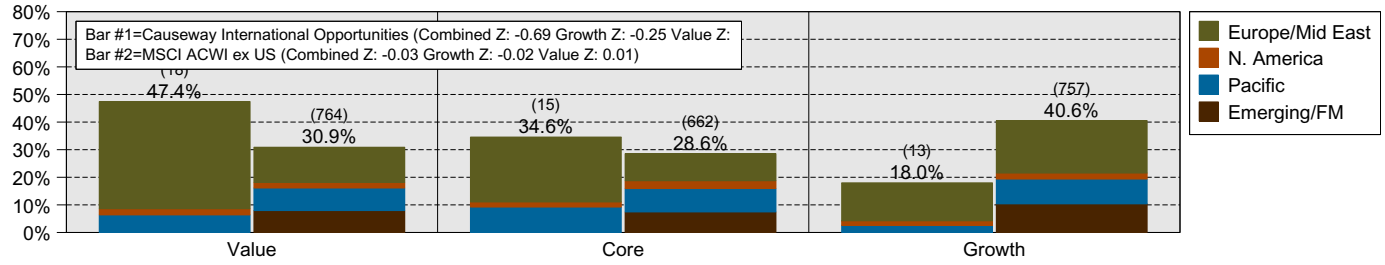
Style Map vs Callan NonUS Eq
Holdings as of September 30, 2019



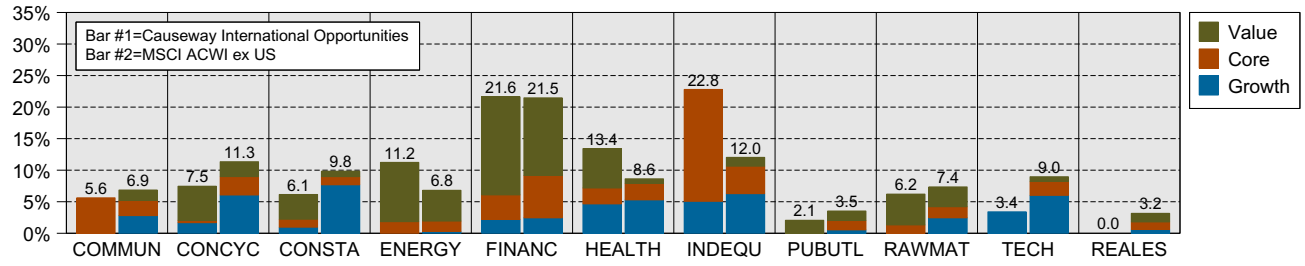
Style Exposure Matrix
Holdings as of September 30, 2019

	Value	Core	Growth	Total
Europe/ Mid East	38.8% (14) 12.7% (144)	23.5% (11) 9.8% (120)	13.8% (10) 19.0% (184)	**76.1% (35)** **41.5% (448)**
N. America	2.2% (2) 2.1% (29)	1.8% (1) 2.8% (27)	1.7% (1) 2.2% (34)	**5.8% (4)** **7.1% (90)**
Pacific	6.4% (2) 8.2% (145)	9.2% (3) 8.5% (157)	2.6% (2) 9.0% (168)	**18.1% (7)** **25.6% (470)**
Emerging/ FM	0.0% (0) 7.9% (446)	0.0% (0) 7.4% (358)	0.0% (0) 10.4% (371)	**0.0% (0)** **25.8% (1175)**
Total	**47.4% (18)** **30.9% (764)**	**34.6% (15)** **28.6% (662)**	**18.0% (13)** **40.6% (757)**	**100.0% (46)** **100.0% (2183)**

Combined Z-Score Style Distribution
Holdings as of September 30, 2019



Sector Weights Distribution
Holdings as of September 30, 2019



Causeway International Opportunities
Top 10 Portfolio Holdings Characteristics
as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Volkswagen Vorzug	Consumer Discretionary	$2,656,853	3.5%	0.55%	34.97	5.45	3.12%	4.95%
B A S F A G Ord New	Materials	$2,401,609	3.2%	(4.09)%	64.15	14.70	5.00%	(4.59)%
Takeda Pharmaceutical Co Ltd Shs	Health Care	$2,352,450	3.1%	(1.47)%	53.82	(76.72)	4.88%	30.30%
Abb Ltd Zuerich Namen Akt	Industrials	$1,970,892	2.6%	(2.12)%	42.64	17.16	4.08%	14.50%
Prudential	Financials	$1,902,690	2.5%	(15.78)%	47.26	8.63	3.40%	5.90%
Barclays Plc Shs	Financials	$1,775,571	2.3%	(0.79)%	32.01	6.63	4.65%	6.81%
British American Tobacco	Consumer Staples	$1,775,390	2.3%	5.93%	85.01	8.79	6.56%	7.47%
Rolls Royce Holdings Plc Lon Shs	Industrials	$1,646,756	2.2%	(8.70)%	18.86	27.57	0.00%	55.95%
Royal Dutch Shell 'b' Shs	Energy	$1,639,190	2.2%	(8.60)%	110.25	10.35	6.16%	7.37%
Kddi	Communication Services	$1,557,900	2.1%	4.80%	61.57	10.74	3.72%	3.04%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Cobham	Industrials	$542,645	0.7%	42.53%	4.62	21.21	5.63%	17.34%
Vodafone Group Plc New Shs New	Communication Services	$1,207,196	1.6%	21.33%	53.44	19.23	4.83%	14.00%
Sse Plc Shs	Utilities	$1,014,906	1.3%	14.27%	15.97	13.18	7.83%	(2.50)%
Astrazeneca Plc Ord	Health Care	$1,341,175	1.8%	10.32%	117.38	21.68	2.96%	15.70%
Ingenico Group Sa Shs	Information Technology	$264,130	0.3%	10.16%	6.22	16.78	1.23%	10.92%
Sompo Hldgs Inc Shs	Financials	$1,090,851	1.4%	10.00%	15.60	9.05	2.88%	26.00%
Air France Klm Shs	Industrials	$56,025	0.1%	8.76%	4.49	6.06	0.00%	25.10%
Cdn Imperial Bk Comm Toronto	Financials	$435,589	0.6%	6.15%	36.73	8.85	5.27%	1.10%
British American Tobacco	Consumer Staples	$1,775,390	2.3%	5.93%	85.01	8.79	6.56%	7.47%
Kddi	Communication Services	$1,557,900	2.1%	4.80%	61.57	10.74	3.72%	3.04%

10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Aryzta Ag	Consumer Staples	$152,312	0.2%	(33.58)%	0.76	6.35	0.00%	2.70%
Prudential	Financials	$1,902,690	2.5%	(15.78)%	47.26	8.63	3.40%	5.90%
Sap Se Shs	Information Technology	$1,320,651	1.7%	(14.09)%	144.78	20.86	1.39%	12.70%
Coca-Cola Bottlers Japan Inc Shs	Consumer Staples	$163,731	0.2%	(11.54)%	4.63	(222.08)	2.06%	1.66%
Balfour Beatty Plc Ord	Industrials	$541,010	0.7%	(11.18)%	1.89	9.01	2.39%	2.40%
Johnson Matthey Plc Shs New	Materials	$652,394	0.9%	(11.09)%	7.29	12.48	2.80%	7.73%
Siemens	Industrials	$1,044,129	1.4%	(10.10)%	91.23	13.16	3.86%	8.75%
Encana Corp	Energy	$906,406	1.2%	(9.97)%	5.98	6.44	1.63%	17.76%
Carrefour Sa Ord	Consumer Staples	$622,729	0.8%	(9.45)%	14.13	12.44	2.86%	9.20%
Rolls Royce Holdings Plc Lon Shs	Industrials	$1,646,756	2.2%	(8.70)%	18.86	27.57	0.00%	55.95%

Causeway International Opportunities vs MSCI ACWI ex US
Attribution for Quarter Ended September 30, 2019

International Attribution

The first chart below illustrates the return for each country in the index sorted from high to low. The total return for the index is highlighted with a dotted line. The second chart (countries presented in the same order) illustrates the manager's country allocation decisions relative to the index. To the extent that the manager over-weighted a country that had a higher return than the total return for the index (above the dotted line) it contributes positively to the manager's country (or currency) selection effect. The last chart details the manager return, the index return, and the attribution factors for the quarter.

Index Returns by Country

	Local Return	Dollar Return	Currency Return
Turkey	9.0		2.4
Egypt	4.7		2.6
Taiwan	5.7		0.1
Belgium	8.1		(4.3)
Japan	3.6		(0.3)
Netherlands	6.6		(3.9)
Portugal	6.4		(4.3)
United States	1.6		0.0
Pakistan	(0.9)		2.2
Canada	2.0		(1.3)
Switzerland	2.6		(2.2)
Italy	4.6		(4.3)
United Arab Emirates	(0.2)		(0.0)
Qatar	(0.2)		0.0
Ireland	4.0		(4.3)
Denmark	3.6		(4.3)
Russia	1.5		(2.4)
Australia	2.6		(3.9)
France	2.7		(4.3)
Mexico	1.1		(2.7)
Finland	2.7		(4.3)
Total	0.7		(2.5)
United Kingdom	0.7		(3.2)
New Zealand	4.1		(6.6)
Austria	1.3		(4.3)
Greece	1.3		(4.3)
Norway	3.0		(6.2)
Israel	(5.1)		1.5
Spain	0.5		(4.3)
Hungary	4.2		(7.8)
Germany	0.2		(4.3)
South Korea	(1.0)		(3.5)
Brazil	3.8		(8.0)
Philippines	(3.5)		(1.1)
China	(4.2)		(0.4)
Sweden	0.9		(5.6)
India	(2.6)		(2.6)
Indonesia	(4.7)		(0.5)
Singapore	(3.7)		(2.2)
Thailand	(6.1)		0.3
Colombia	1.9		(7.8)
Malaysia	(5.1)		(1.3)
Chile	(0.6)		(6.8)
Peru	(9.3)		0.0
Saudi Arabia	(9.4)		(0.0)
Czech Republic	(4.1)		(5.6)
Poland	(5.1)		(7.0)
Hong Kong	(11.7)		(0.3)
South Africa	(5.8)		(7.0)
Argentina	(46.8)		0.0

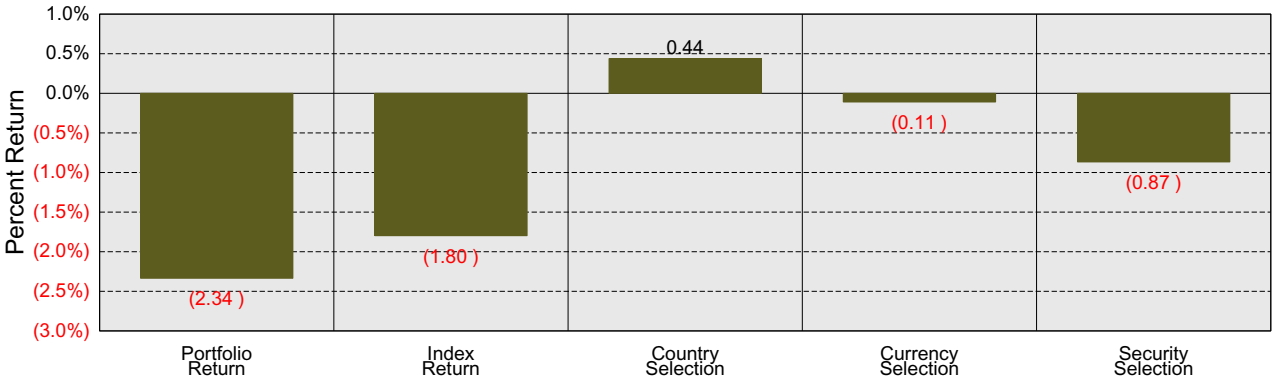
(60%) (40%) (20%) 0% 20% 40%

Beginning Relative Weights (Portfolio - Index)

	Index Weight	Portfolio Weight
Turkey	0.1	0.3
Egypt	0.0	0.0
Taiwan	2.9	3.4
Belgium	0.7	0.0
Japan	15.8	12.9
Netherlands	2.4	2.8
Portugal	0.1	0.0
United States	0.0	0.2
Pakistan	0.0	0.0
Canada	6.8	5.2
Switzerland	6.2	7.1
Italy	1.5	3.0
United Arab Emirates	0.2	0.1
Qatar	0.3	0.1
Ireland	0.4	0.9
Denmark	1.1	0.0
Russia	1.1	1.1
Australia	4.7	0.0
France	7.6	3.4
Mexico	0.7	0.3
Finland	0.7	0.0
Total		
United Kingdom	11.2	28.8
New Zealand	0.2	0.0
Austria	0.2	0.0
Greece	0.1	0.0
Norway	0.4	0.0
Israel	0.4	0.0
Spain	2.0	0.7
Hungary	0.1	0.0
Germany	5.9	11.0
South Korea	3.3	3.7
Brazil	2.0	2.5
Philippines	0.3	0.1
China	8.3	7.7
Sweden	1.8	0.0
India	2.4	2.6
Indonesia	0.6	0.3
Singapore	0.9	0.0
Thailand	0.8	0.5
Colombia	0.1	0.0
Malaysia	0.6	0.2
Chile	0.2	0.0
Peru	0.1	0.2
Saudi Arabia	0.4	0.0
Czech Republic	0.0	0.0
Poland	0.3	0.1
Hong Kong	2.7	0.0
South Africa	1.6	0.6
Argentina	0.1	0.0

(10%) (5%) 0% 5% 10% 15% 20% 25%

Attribution Factors for Quarter Ended September 30, 2019

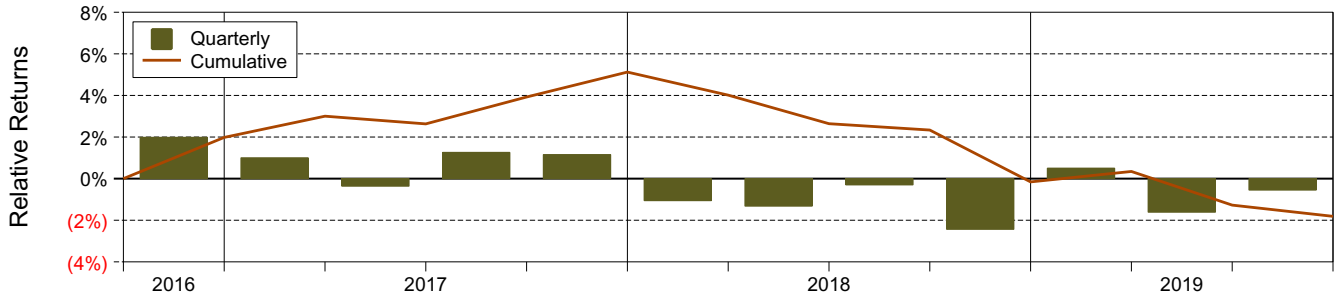


Causeway International Opportunities vs MSCI ACWI ex US
Attribution for Three years Ended September 30, 2019

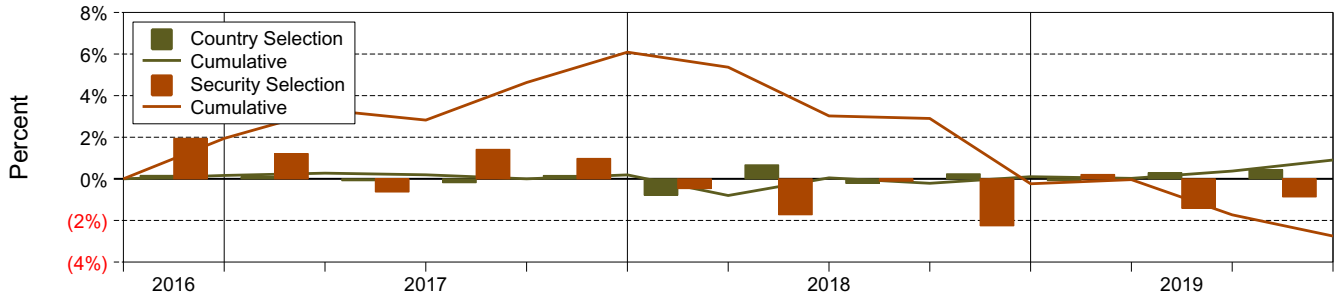
Cumulative International Attribution

The first chart below illustrates the quarterly and cumulative return of the portfolio relative to the index. The second chart shows the cumulative and quarterly impact of the manager's country selection and security selection decisions. The third chart shows the cumulative and quarterly impact of the managers currency selection decisions. The last chart shows the annualized cumulative returns for the manager and the index, as well as the attribution factors that explain the difference in return.

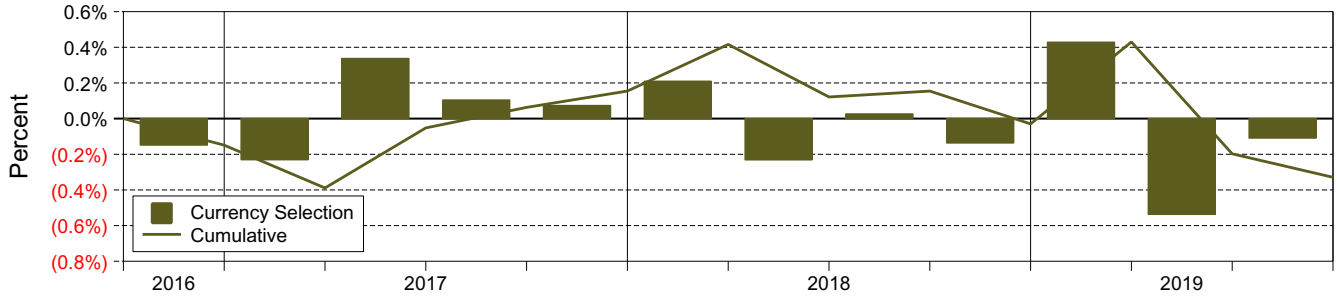
Cumulative and Quarterly Return vs MSCI ACWI ex US



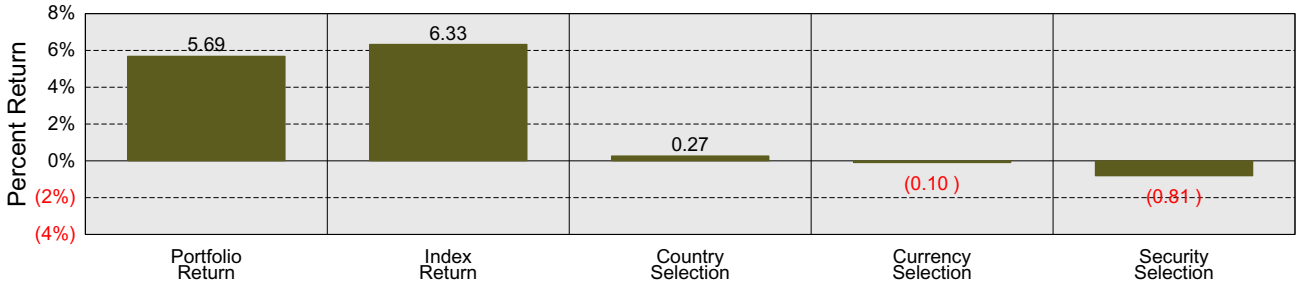
Cumulative and Quarterly Country Selection and Security Selection Factors



Cumulative and Quarterly Currency Selection Factors



Attribution Factors for Three Years Ended September 30, 2019



Aberdeen EAFE Plus
Period Ended September 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. The product was funded during the second quarter of 2012. Performance prior is that of the composite.

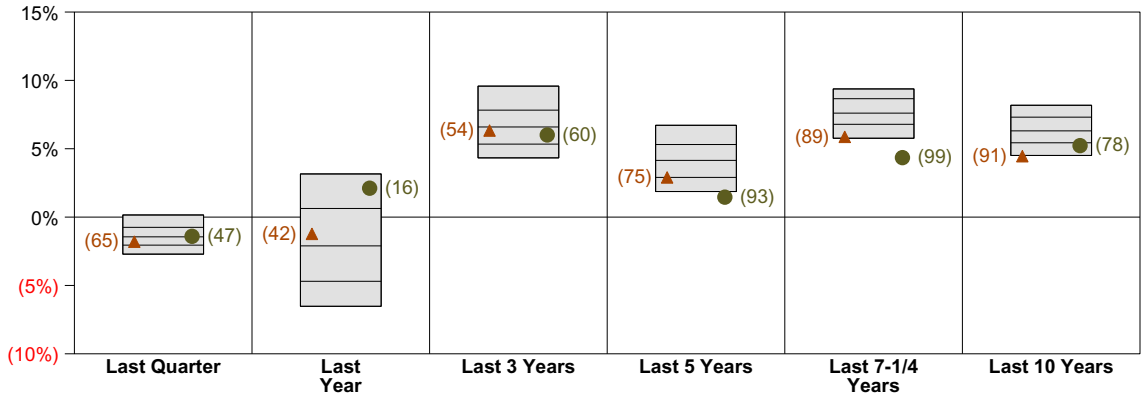
Quarterly Summary and Highlights

- Aberdeen EAFE Plus's portfolio posted a (1.41)% return for the quarter placing it in the 47 percentile of the Callan Non-US Equity group for the quarter and in the 16 percentile for the last year.
- Aberdeen EAFE Plus's portfolio outperformed the MSCI ACWI ex US by 0.39% for the quarter and outperformed the MSCI ACWI ex US for the year by 3.34%.

Quarterly Asset Growth

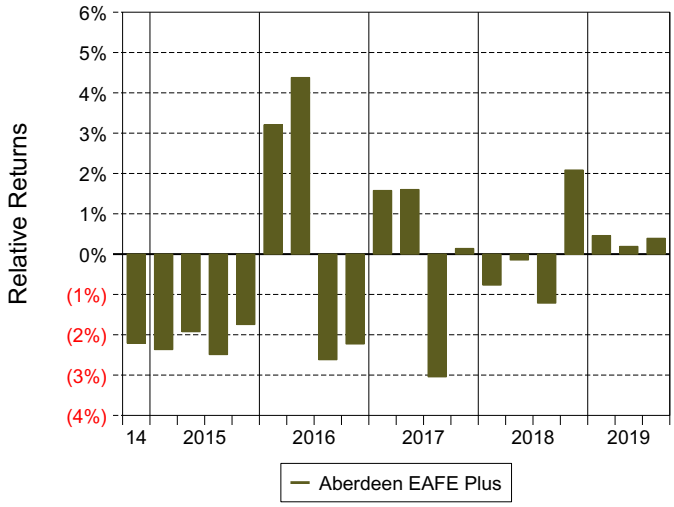
Beginning Market Value	$83,449,553
Net New Investment	$-137,084
Investment Gains/(Losses)	$-1,173,178
Ending Market Value	$82,139,291

Performance vs Callan Non-US Equity (Gross)

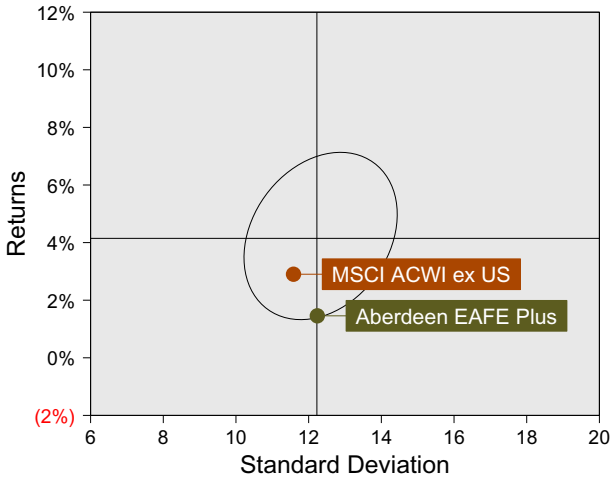


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7-1/4 Years	Last 10 Years
10th Percentile	0.15	3.16	9.58	6.72	9.38	8.18
25th Percentile	(0.75)	0.63	7.82	5.31	8.66	7.31
Median	(1.44)	(2.10)	6.59	4.15	7.61	6.31
75th Percentile	(2.05)	(4.70)	5.34	2.90	6.79	5.44
90th Percentile	(2.71)	(6.52)	4.33	1.87	5.77	4.51
Aberdeen EAFE Plus ●	(1.41)	2.11	6.01	1.46	4.35	5.23
MSCI ACWI ex US ▲	(1.80)	(1.23)	6.33	2.90	5.87	4.46

Relative Return vs MSCI ACWI ex US



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

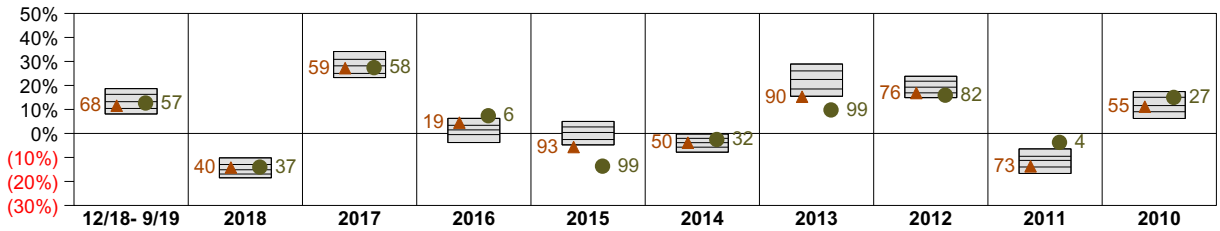


Aberdeen EAFE Plus
Return Analysis Summary

Return Analysis

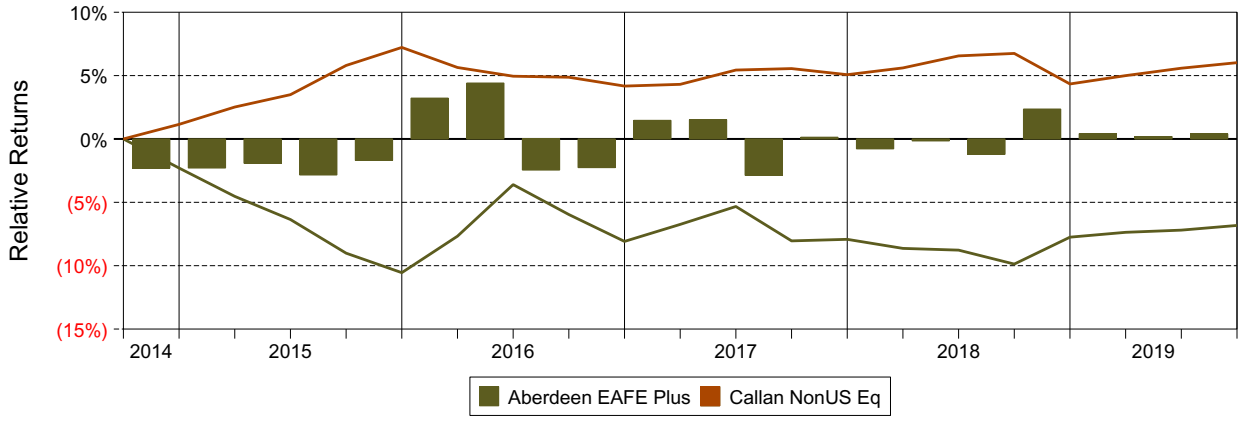
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

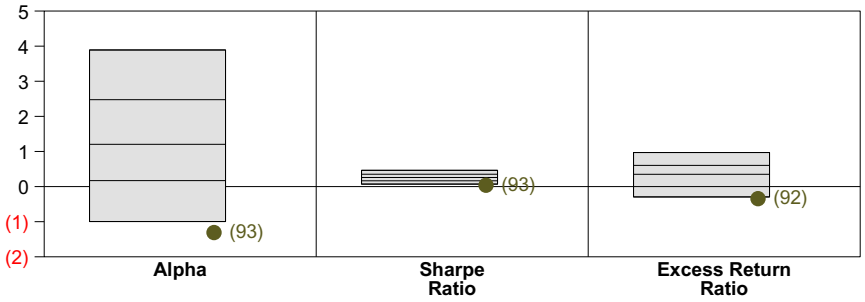


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	18.67	(10.17)	34.14	6.28	5.00	(0.22)	28.92	23.83	(6.44)	17.45
25th Percentile	16.28	(12.94)	30.88	3.39	2.71	(2.04)	26.05	21.76	(9.53)	15.07
Median	13.23	(15.13)	28.16	1.48	0.40	(3.85)	22.49	19.28	(11.24)	11.62
75th Percentile	10.41	(16.91)	25.01	(0.49)	(2.53)	(5.73)	18.53	16.91	(13.97)	9.05
90th Percentile	8.11	(18.49)	23.28	(3.79)	(4.77)	(7.82)	15.49	14.91	(16.68)	6.24
Aberdeen EAFE Plus ●	12.68	(14.04)	27.42	7.37	(13.63)	(2.53)	9.79	15.94	(3.72)	15.02
MSCI ACWI ex US ▲	11.56	(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 September 30, 2019



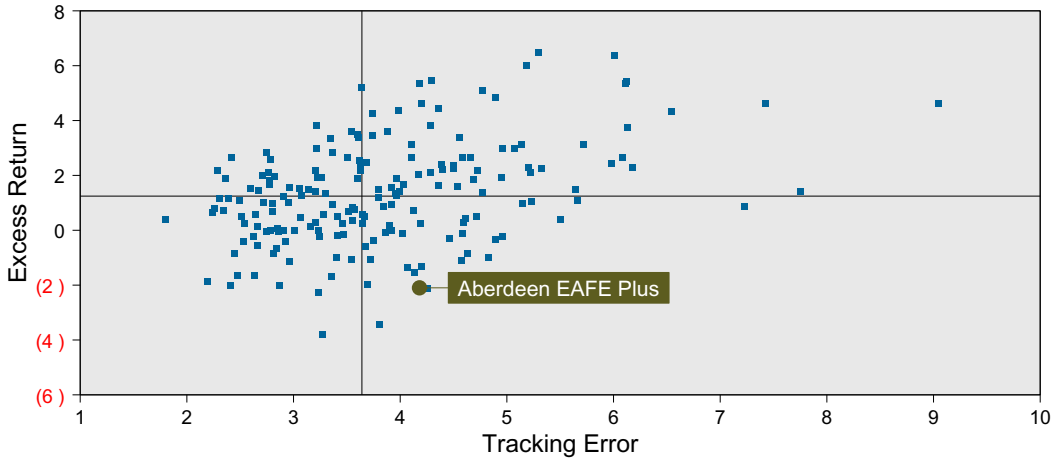
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	3.89	0.46	0.97
25th Percentile	2.48	0.35	0.60
Median	1.20	0.26	0.35
75th Percentile	0.17	0.16	0.00
90th Percentile	(1.00)	0.07	(0.30)
Aberdeen EAFE Plus ●	(1.31)	0.04	(0.34)

Aberdeen EAFE Plus
Risk Analysis Summary

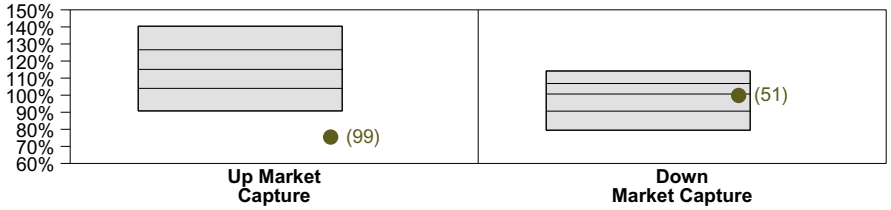
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

Risk Analysis vs Callan Non-US Equity (Gross)
Five Years Ended September 30, 2019

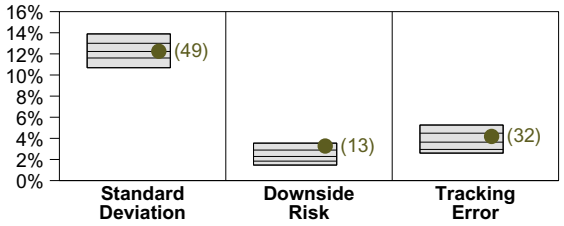


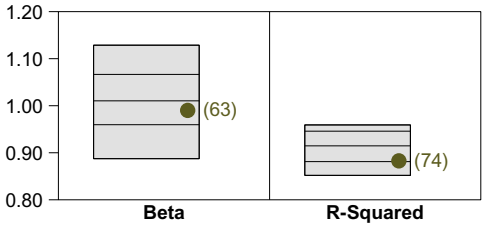
Market Capture vs MSCI ACWI ex US Index (USD Net Div)
Rankings Against Callan Non-US Equity (Gross)
Five Years Ended September 30, 2019



	Up Market Capture	Down Market Capture
10th Percentile	140.40	114.17
25th Percentile	126.61	106.85
Median	115.11	100.67
75th Percentile	103.99	90.64
90th Percentile	90.77	79.47
Aberdeen EAFE Plus ●	75.46	99.83

Risk Statistics Rankings vs MSCI ACWI ex US Index (USD Net Div)
Rankings Against Callan Non-US Equity (Gross)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	13.89	3.55	5.26
25th Percentile	13.00	2.89	4.49
Median	12.23	2.29	3.64
75th Percentile	11.61	1.84	2.95
90th Percentile	10.69	1.47	2.60
Aberdeen EAFE Plus ●	12.25	3.27	4.18

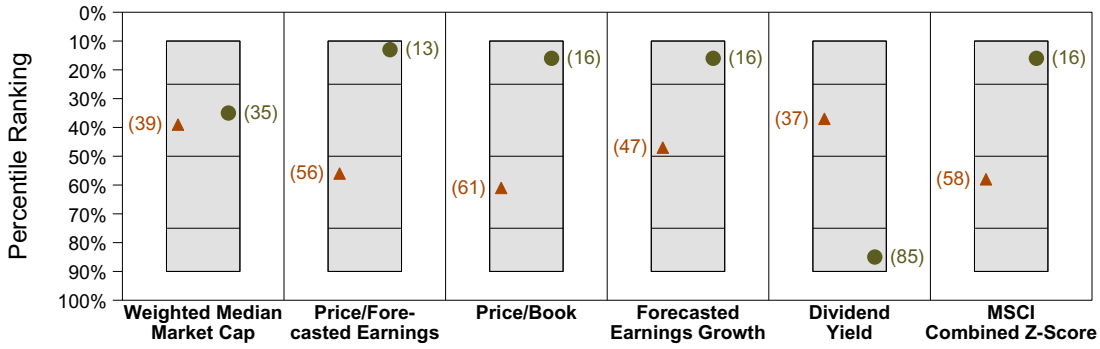
	Beta	R-Squared
10th Percentile	1.13	0.96
25th Percentile	1.07	0.95
Median	1.01	0.91
75th Percentile	0.96	0.88
90th Percentile	0.89	0.85
Aberdeen EAFE Plus ●	0.99	0.88

Aberdeen EAFE Plus
Equity Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings
Rankings Against Callan Non-US Equity
as of September 30, 2019

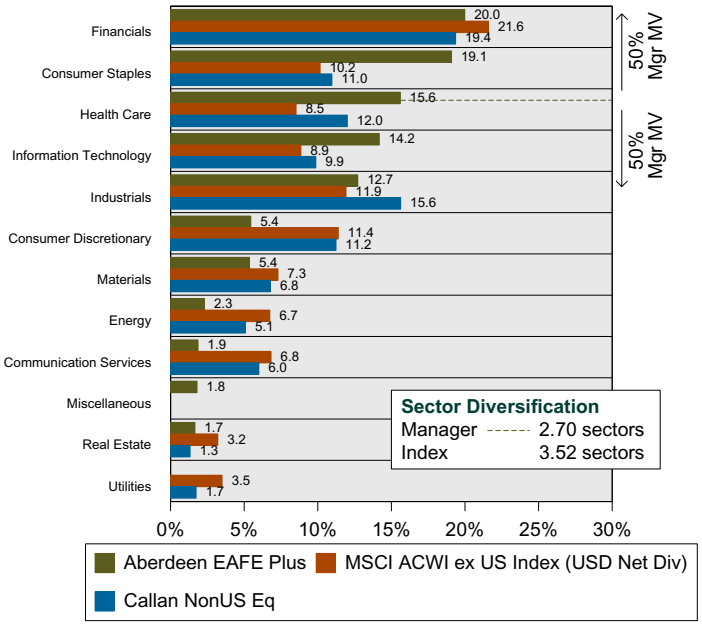


	Weighted Median Market Cap	Price/Forecasted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	49.74	21.08	3.55	13.40	3.71	1.12
25th Percentile	37.77	16.42	2.60	11.97	3.37	0.58
Median	28.50	13.58	1.81	9.60	2.79	0.14
75th Percentile	21.51	11.66	1.45	8.29	2.21	(0.32)
90th Percentile	13.29	10.39	1.22	7.47	1.57	(0.69)
Aberdeen EAFE Plus ●	33.25	19.68	3.02	12.37	1.95	0.77
MSCI ACWI ex US Index (USD Net Div) ▲	31.71	13.23	1.60	9.87	3.19	(0.03)

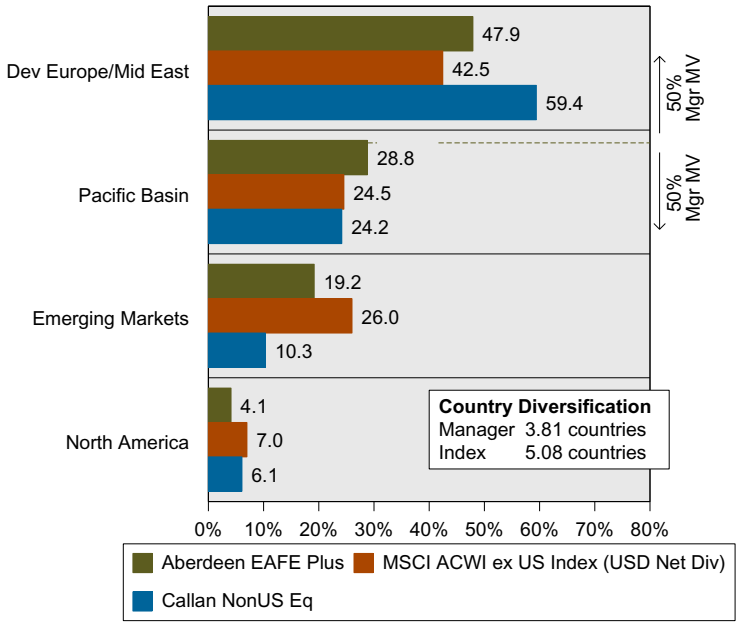
Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. The regional allocation chart compares the manager's geographical region weights with those of the benchmark as well as the median region weights of the peer group.

Sector Allocation
September 30, 2019



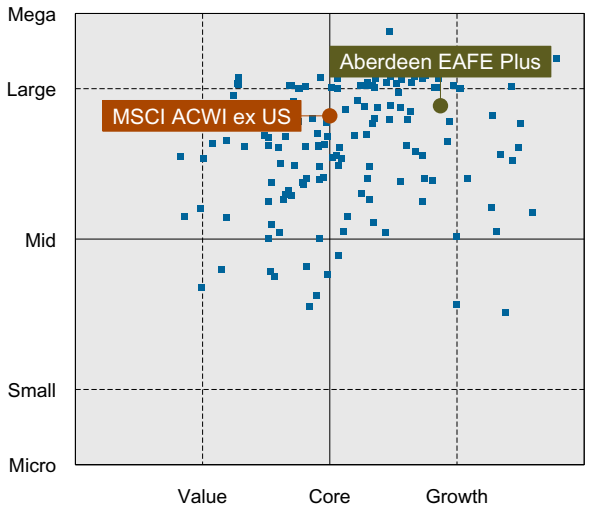
Regional Allocation
September 30, 2019



Current Holdings Based Style Analysis
Aberdeen EAFE Plus
As of September 30, 2019

This page analyzes the current investment style of a portfolio utilizing a detailed holdings-based style analysis to determine actual exposures to various regional and style segments of the international/global equity market. The market is segmented quarterly by region and style. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the current market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the current portfolio and index weights and stock counts (in parentheses) in each region/style segment of the market. The middle chart illustrates the total exposures and stock counts in the three style segments, with a legend showing the total growth, value, and "combined Z" (growth - value) scores. The bottom chart exhibits the sector weights as well as the style weights within each sector.

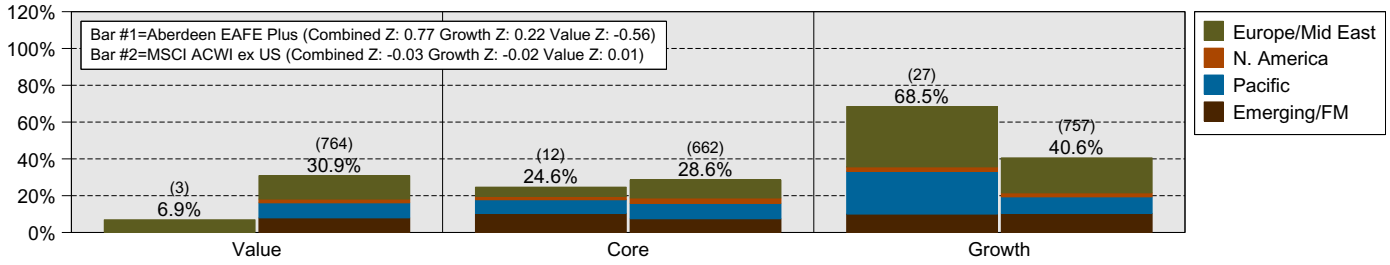
Style Map vs Callan NonUS Eq
Holdings as of September 30, 2019



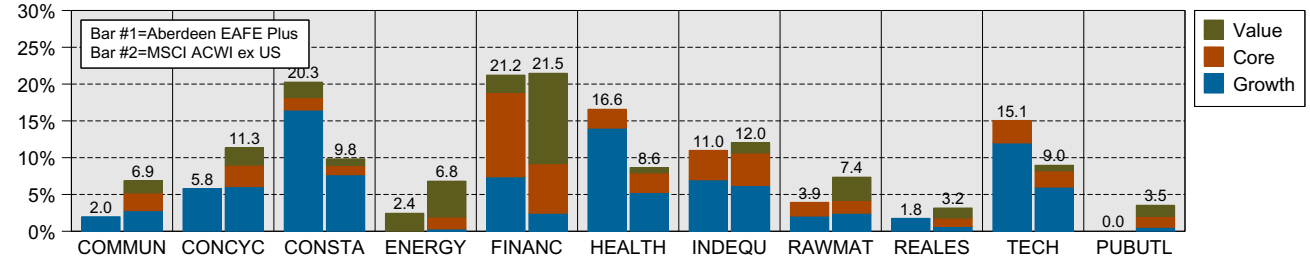
Style Exposure Matrix
Holdings as of September 30, 2019

	Value	Core	Growth	Total
Europe/ Mid East	6.9% (3) 12.7% (144)	5.0% (3) 9.8% (120)	32.8% (13) 19.0% (184)	**44.7% (19)** **41.5% (448)**
N. America	0.0% (0) 2.1% (29)	1.9% (1) 2.8% (27)	2.5% (1) 2.2% (34)	**4.4% (2)** **7.1% (90)**
Pacific	0.0% (0) 8.2% (145)	7.4% (4) 8.5% (157)	23.2% (9) 9.0% (168)	**30.6% (13)** **25.6% (470)**
Emerging/ FM	0.0% (0) 7.9% (446)	10.3% (4) 7.4% (358)	10.0% (4) 10.4% (371)	**20.4% (8)** **25.8% (1175)**
Total	**6.9% (3)** **30.9% (764)**	**24.6% (12)** **28.6% (662)**	**68.5% (27)** **40.6% (757)**	**100.0% (42)** **100.0% (2183)**

Combined Z-Score Style Distribution
Holdings as of September 30, 2019



Sector Weights Distribution
Holdings as of September 30, 2019



Aberdeen EAFE Plus
Top 10 Portfolio Holdings Characteristics
as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Aia Group Ltd Com Par Usd 1	Financials	$3,076,268	3.7%	(12.05)%	114.19	16.12	1.59%	47.20%
Roche Hldgs Ag Basel Div Rts Ctf	Health Care	$2,970,044	3.6%	3.40%	204.64	14.87	2.86%	6.00%
Treasury Wine Estates Ltd	Consumer Staples	$2,959,755	3.6%	20.26%	9.01	24.23	2.05%	15.34%
Taiwan Semicond Manufac Co L Shs	Information Technology	$2,767,446	3.4%	14.79%	227.34	18.74	3.13%	7.27%
Loreal	Consumer Staples	$2,571,529	3.1%	(1.82)%	157.28	31.39	1.50%	8.32%
Deutsche Boerse Ag Frank Mai Namen A	Financials	$2,520,127	3.1%	(4.28)%	29.71	22.64	1.88%	9.20%
Csl Ltd Shs	Health Care	$2,504,420	3.0%	4.76%	71.53	33.19	1.14%	11.54%
Lvmh Moet Hennessy Lou Vuitt Ord	Consumer Discretionary	$2,364,048	2.9%	(6.74)%	200.93	23.43	1.65%	10.08%
Pvtpl Gdr Samsung Electrs Ltd 144a	Information Technology	$2,310,048	2.8%	0.52%	27.29	-	3.66%	-
Housing Dev Finance Corp	Financials	$2,218,599	2.7%	(11.49)%	48.17	28.94	1.06%	17.00%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Ritchie Bros Auctioneers	Industrials	$1,881,071	2.3%	20.73%	4.30	27.79	2.01%	26.80%
Treasury Wine Estates Ltd	Consumer Staples	$2,959,755	3.6%	20.26%	9.01	24.23	2.05%	15.34%
Shin Etsu Chemical Co Ltd Shs	Materials	$1,560,507	1.9%	15.91%	45.74	14.72	1.73%	14.74%
Taiwan Semicond Manufac Co L Shs	Information Technology	$2,767,446	3.4%	14.79%	227.34	18.74	3.13%	7.27%
British American Tobacco	Consumer Staples	$1,594,473	1.9%	5.93%	85.01	8.79	6.56%	7.47%
Experian Group Ord Gbp0	Industrials	$2,002,602	2.4%	5.56%	29.14	28.91	1.40%	9.32%
Nice Sys Ltd Sponsored Adr	Information Technology	$1,990,757	2.4%	4.96%	9.13	26.09	0.00%	13.46%
Nestle S A Shs Nom New	Consumer Staples	$2,056,047	2.5%	4.76%	323.16	23.06	2.26%	8.73%
Csl Ltd Shs	Health Care	$2,504,420	3.0%	4.76%	71.53	33.19	1.14%	11.54%
Fisher & Paykel Healthcare C Ord	Health Care	$1,243,349	1.5%	4.47%	6.23	37.29	0.00%	16.52%

10 Worst Performers

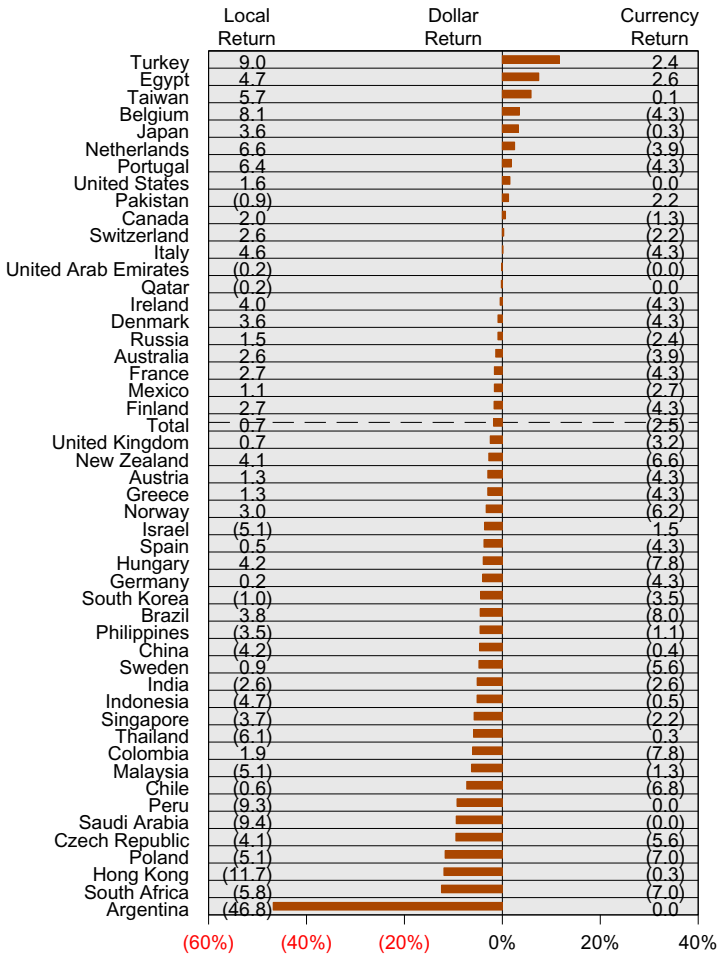
Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Banco Bradesco S A Sp Adr Pfd New	Financials	$2,022,448	2.5%	(16.54)%	32.83	9.78	2.89%	13.87%
Prudential	Financials	$818,312	1.0%	(15.78)%	47.26	8.63	3.40%	5.90%
Auckland Intl Airport Limite Shs New	Industrials	$1,108,395	1.3%	(13.27)%	6.95	39.86	2.43%	12.17%
Aia Group Ltd Com Par Usd 1	Financials	$3,076,268	3.7%	(12.05)%	114.19	16.12	1.59%	47.20%
Housing Dev Finance Corp	Financials	$2,218,599	2.7%	(11.49)%	48.17	28.94	1.06%	17.00%
Dormakaba Hldg Ltd Namen Akt	Industrials	$1,404,768	1.7%	(11.07)%	2.71	18.25	2.49%	7.72%
Aveva Group Plc Shs New	Information Technology	$1,188,681	1.4%	(10.73)%	7.36	33.12	1.16%	12.45%
Rolls Royce Holdings Plc Lon Shs	Industrials	$1,017,198	1.2%	(8.70)%	18.86	27.57	0.00%	55.95%
Royal Dutch Shell 'b' Shs	Energy	$1,848,995	2.3%	(8.60)%	110.25	10.35	6.16%	7.37%
Itc Ltd Shs Dematerial	Consumer Staples	$1,275,063	1.6%	(7.58)%	45.05	21.21	2.21%	15.03%

Aberdeen EAFE Plus vs MSCI ACWI ex US
Attribution for Quarter Ended September 30, 2019

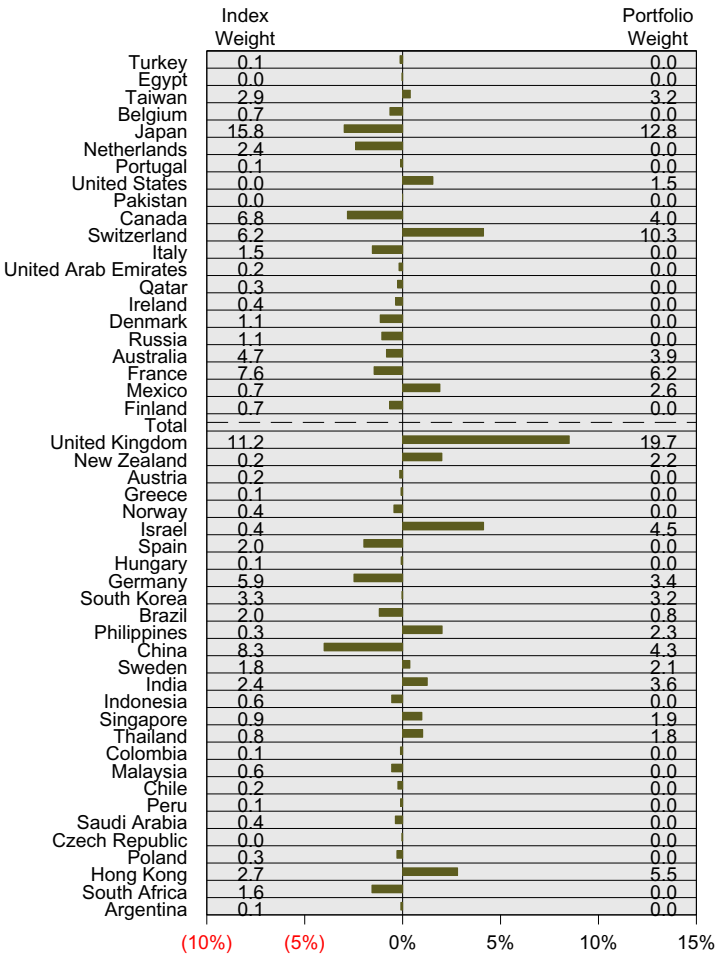
International Attribution

The first chart below illustrates the return for each country in the index sorted from high to low. The total return for the index is highlighted with a dotted line. The second chart (countries presented in the same order) illustrates the manager's country allocation decisions relative to the index. To the extent that the manager over-weighted a country that had a higher return than the total return for the index (above the dotted line) it contributes positively to the manager's country (or currency) selection effect. The last chart details the manager return, the index return, and the attribution factors for the quarter.

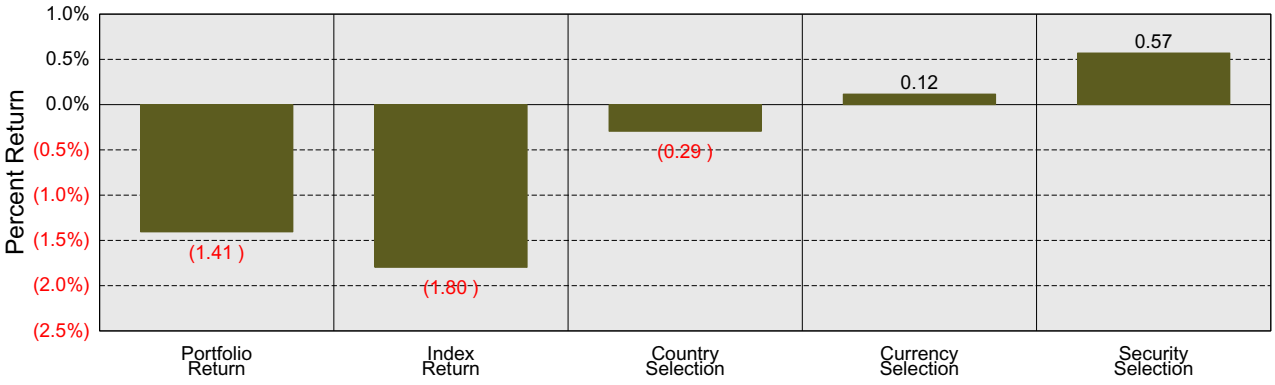
Index Returns by Country



Beginning Relative Weights (Portfolio - Index)



Attribution Factors for Quarter Ended September 30, 2019

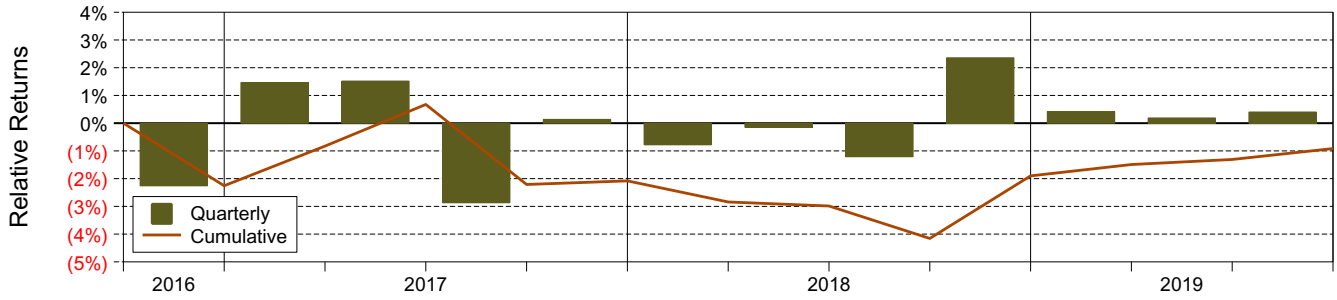


Aberdeen EAFE Plus vs MSCI ACWI ex US
Attribution for Three years Ended September 30, 2019

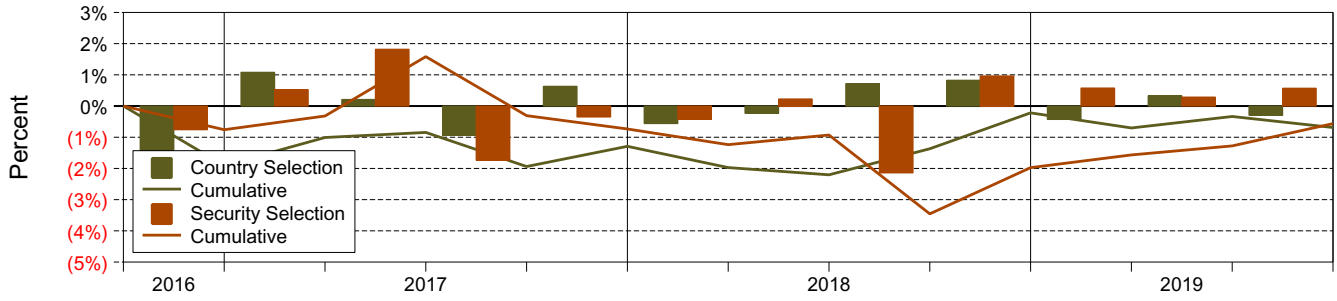
Cumulative International Attribution

The first chart below illustrates the quarterly and cumulative return of the portfolio relative to the index. The second chart shows the cumulative and quarterly impact of the manager's country selection and security selection decisions. The third chart shows the cumulative and quarterly impact of the managers currency selection decisions. The last chart shows the annualized cumulative returns for the manager and the index, as well as the attribution factors that explain the difference in return.

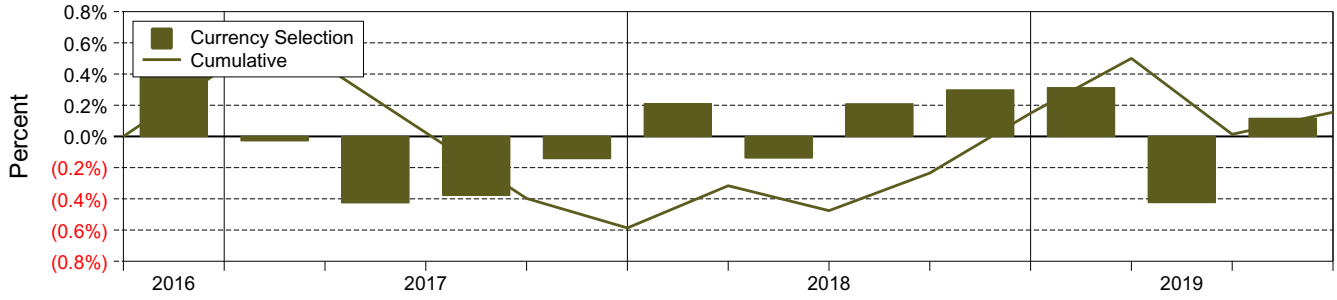
Cumulative and Quarterly Return vs MSCI ACWI ex US



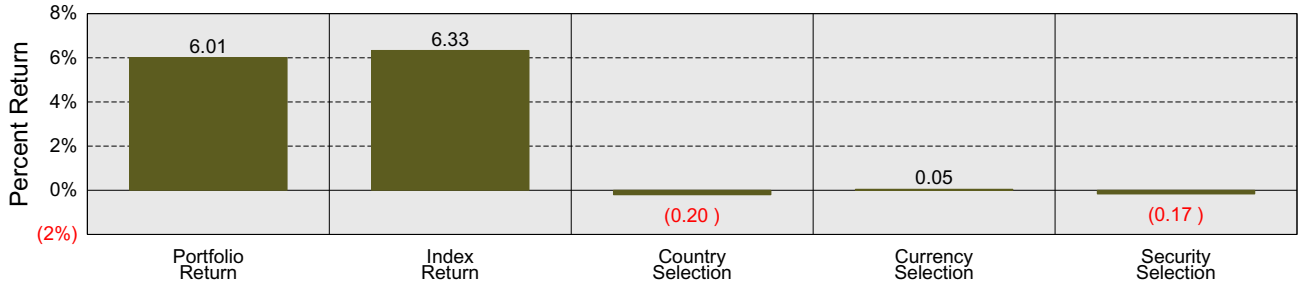
Cumulative and Quarterly Country Selection and Security Selection Factors



Cumulative and Quarterly Currency Selection Factors



Attribution Factors for Three Years Ended September 30, 2019



American Century Non-US SC
Period Ended September 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 history represents the institutional mutual fund. Performance is shown net-of-fees, as fees are accrued on a daily basis as part of the NAV.

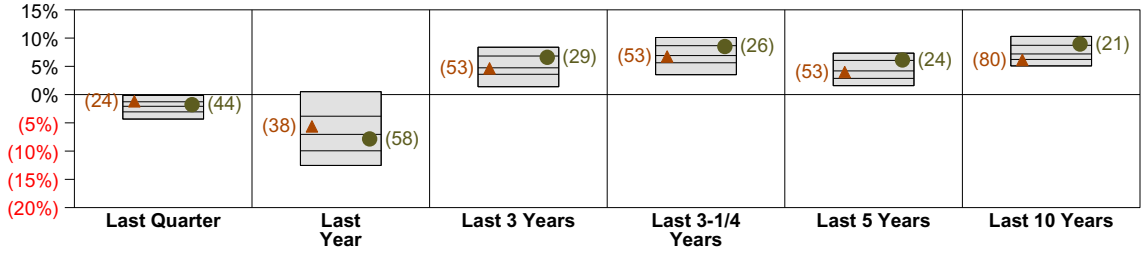
Quarterly Summary and Highlights

- American Century Non-US SC's portfolio posted a (1.78)% return for the quarter placing it in the 44 percentile of the Callan International Small Cap Mut Funds group for the quarter and in the 58 percentile for the last year.
- American Century Non-US SC's portfolio underperformed the MSCI ACWI ex US Small Cap by 0.60% for the quarter and underperformed the MSCI ACWI ex US Small Cap for the year by 2.22%.

Quarterly Asset Growth

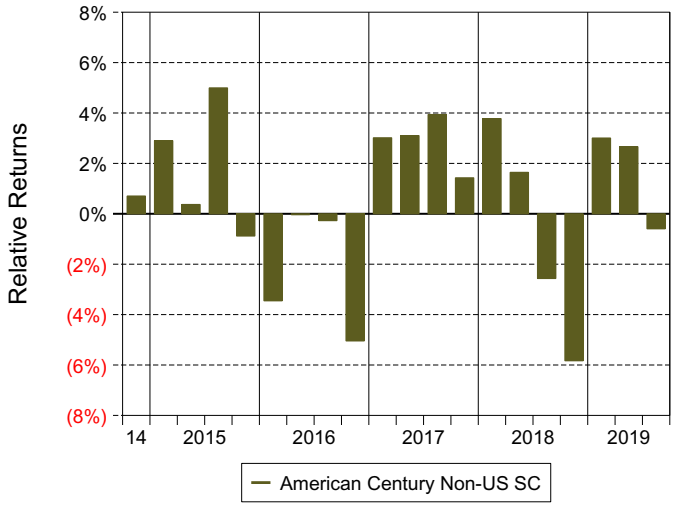
Beginning Market Value	$39,656,482
Net New Investment	$0
Investment Gains/(Losses)	$-706,609
Ending Market Value	$38,949,873

Performance vs Callan International Small Cap Mut Funds (Institutional Net)

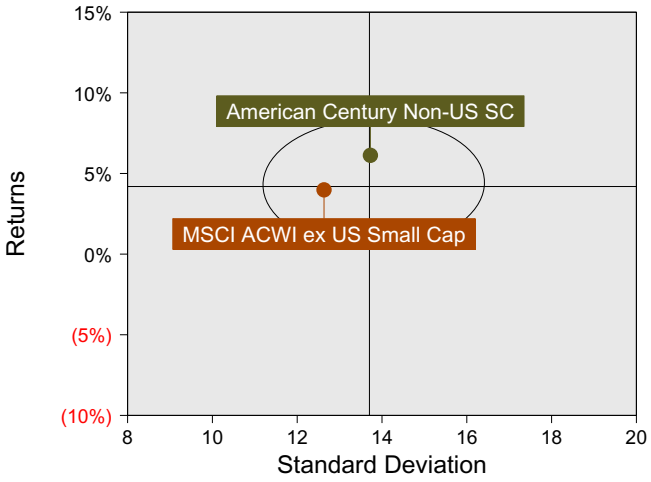


	Last Quarter	Last Year	Last 3 Years	Last 3-1/4 Years	Last 5 Years	Last 10 Years
10th Percentile	(0.13)	0.52	8.38	10.11	7.34	10.30
25th Percentile	(1.27)	(3.82)	6.83	8.66	6.05	8.72
Median	(2.07)	(7.04)	4.74	6.91	4.19	7.19
75th Percentile	(3.06)	(9.95)	3.59	5.63	2.87	6.22
90th Percentile	(4.33)	(12.54)	1.40	3.52	1.58	5.07
American Century Non-US SC ●	(1.78)	(7.85)	6.60	8.51	6.13	8.94
MSCI ACWI ex US Small Cap ▲	(1.19)	(5.63)	4.64	6.75	3.98	6.13

Relative Returns vs MSCI ACWI ex US Small Cap



Callan International Small Cap Mut Funds (Institutional Net) Annualized Five Year Risk vs Return

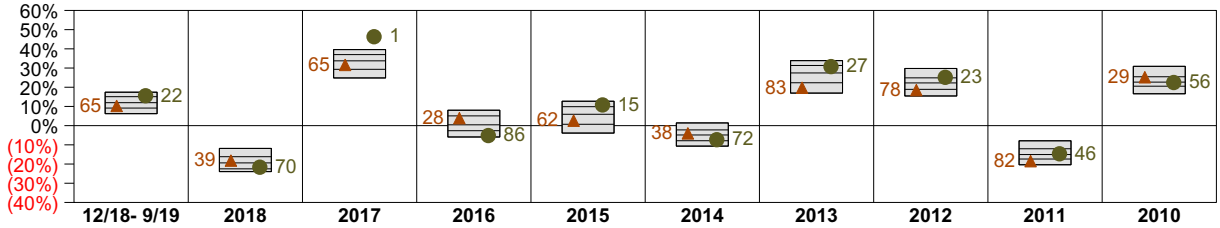


American Century Non-US SC
Return Analysis Summary

Return Analysis

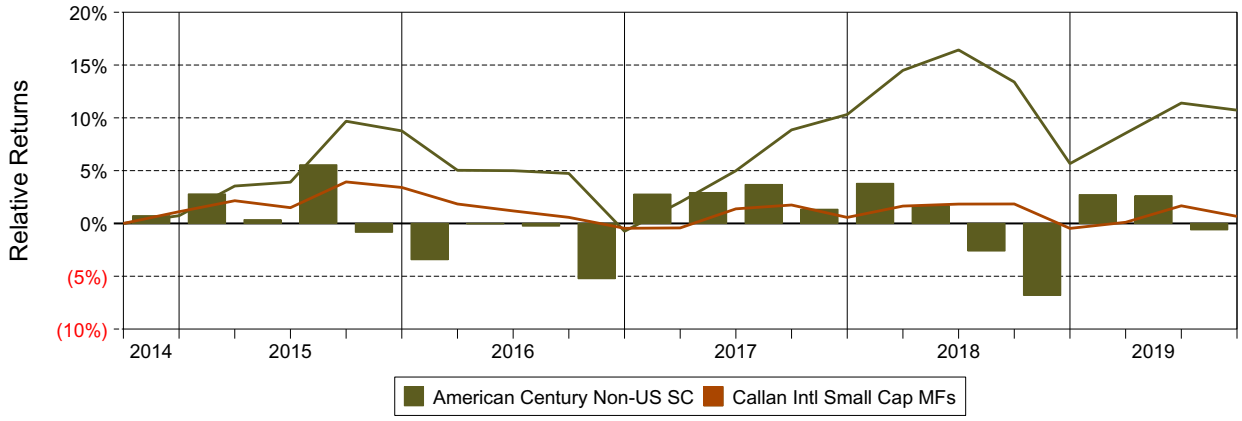
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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 Mut Funds (Institutional Net)

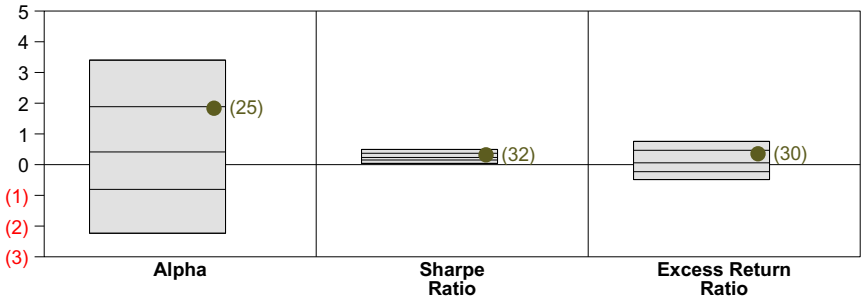


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	17.41	(11.86)	39.61	8.03	12.71	1.41	33.86	29.78	(7.89)	30.89
25th Percentile	15.09	(16.18)	37.01	5.09	9.88	(2.22)	31.33	24.89	(12.04)	25.46
Median	11.97	(19.40)	33.75	0.43	5.91	(4.87)	27.44	22.24	(15.05)	22.67
75th Percentile	9.16	(22.51)	29.34	(2.64)	0.71	(7.85)	22.33	18.90	(17.39)	20.54
90th Percentile	6.23	(23.94)	24.83	(5.92)	(3.87)	(10.67)	16.94	15.44	(20.37)	16.59
American Century Non-US SC ●	15.56	(21.65)	46.31	(5.17)	10.78	(7.33)	30.75	25.17	(14.67)	22.45
MSCI ACWI ex US Small Cap ▲	10.28	(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 Mut Funds (Institutional Net)
Five Years Ended September 30, 2019



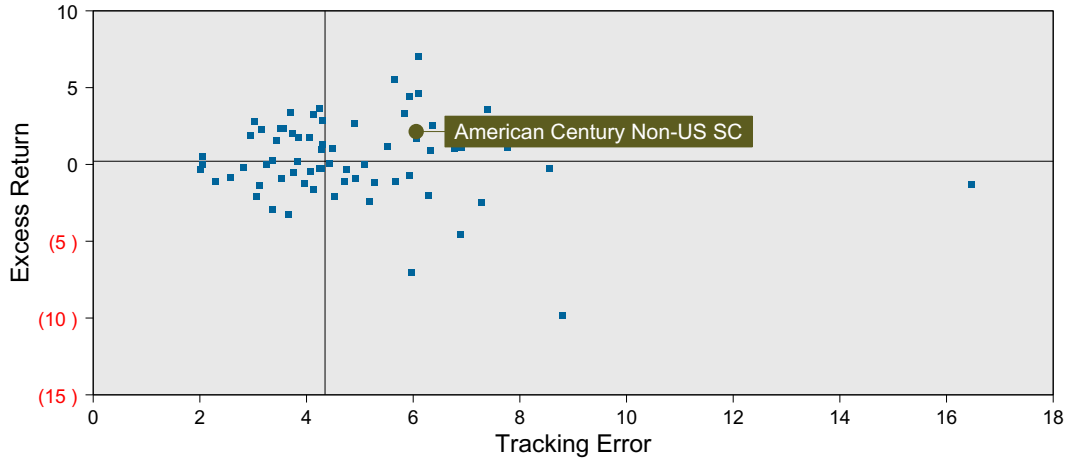
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	3.40	0.49	0.76
25th Percentile	1.89	0.37	0.47
Median	0.41	0.23	0.06
75th Percentile	(0.81)	0.15	(0.23)
90th Percentile	(2.23)	0.04	(0.49)
American Century Non-US SC ●	1.84	0.32	0.35

American Century Non-US SC
Risk Analysis Summary

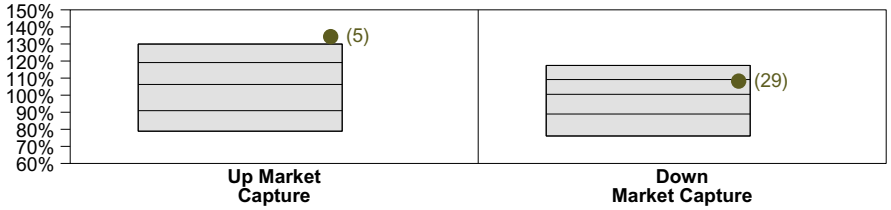
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

Risk Analysis vs Callan International Small Cap Mut Funds (Institutional Net)
Five Years Ended September 30, 2019

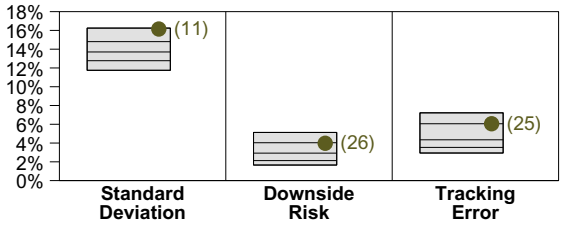


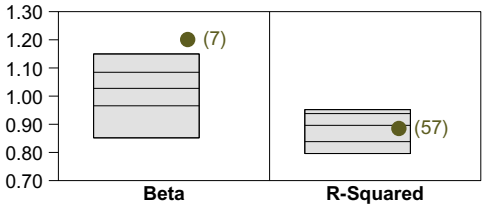
Market Capture vs MSCI ACWI ex US Sm Cap (USD Net Div)
Rankings Against Callan International Small Cap Mut Funds (Institutional Net)
Five Years Ended September 30, 2019



	Up Market Capture	Down Market Capture
10th Percentile	129.96	117.42
25th Percentile	119.11	109.15
Median	106.28	100.50
75th Percentile	90.92	88.95
90th Percentile	78.89	76.08
American Century Non-US SC ●	134.30	108.24

Risk Statistics Rankings vs MSCI ACWI ex US Sm Cap (USD Net Div)
Rankings Against Callan International Small Cap Mut Funds (Institutional Net)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	16.25	5.13	7.22
25th Percentile	14.80	4.04	6.06
Median	13.70	2.93	4.35
75th Percentile	12.77	2.13	3.54
90th Percentile	11.75	1.66	2.94
American Century Non-US SC ●	16.15	3.98	6.06

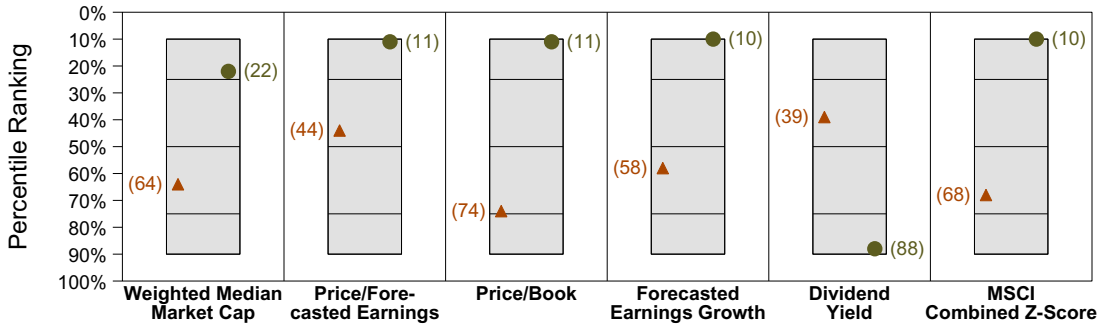
	Beta	R-Squared
10th Percentile	1.15	0.95
25th Percentile	1.08	0.94
Median	1.03	0.90
75th Percentile	0.97	0.84
90th Percentile	0.85	0.80
American Century Non-US SC ●	1.20	0.89

American Century Non-US SC
Equity Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Portfolio Characteristics Percentile Rankings
Rankings Against Callan International Small Cap
as of September 30, 2019

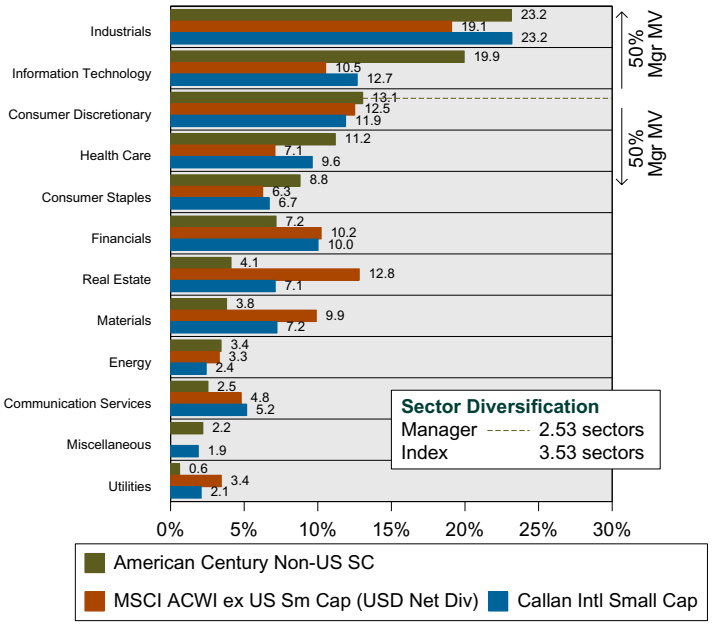


	Weighted Median Market Cap	Price/Forecasted Earnings	Price/Book	Forecasted Earnings Growth	Dividend Yield	MSCI Combined Z-Score
10th Percentile	3.56	20.49	3.42	18.37	3.16	0.97
25th Percentile	3.05	17.19	2.38	14.76	2.88	0.48
Median	2.32	13.74	1.69	12.46	2.45	0.19
75th Percentile	1.50	12.38	1.33	10.10	2.04	(0.17)
90th Percentile	1.10	10.39	1.05	7.98	1.30	(0.59)
American Century Non-US SC ●	3.37	20.32	3.32	18.18	1.37	0.98
MSCI ACWI ex US Sm Cap (USD Net Div) ▲	1.82	14.57	1.38	11.67	2.67	(0.02)

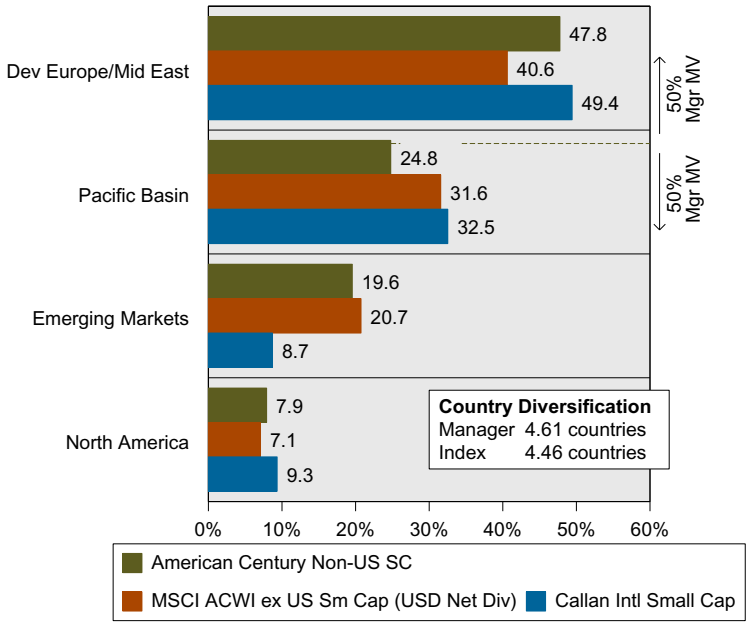
Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. The regional allocation chart compares the manager's geographical region weights with those of the benchmark as well as the median region weights of the peer group.

Sector Allocation
September 30, 2019



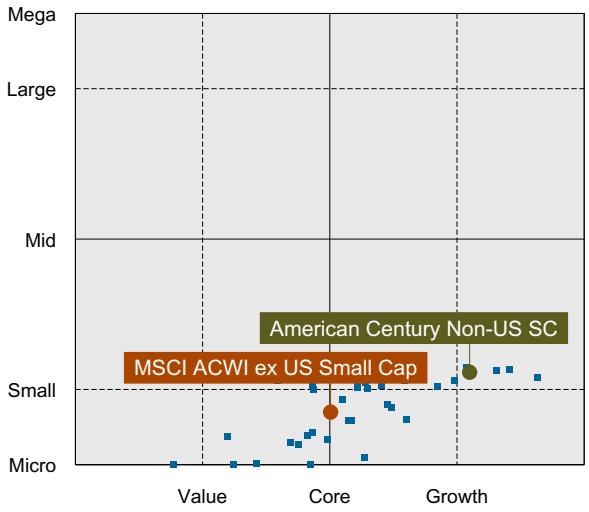
Regional Allocation
September 30, 2019



Current Holdings Based Style Analysis
American Century Non-US SC
As of September 30, 2019

This page analyzes the current investment style of a portfolio utilizing a detailed holdings-based style analysis to determine actual exposures to various regional and style segments of the international/global equity market. The market is segmented quarterly by region and style. The style segments are determined using the "Combined Z Score", based on the eight fundamental factors used in the MSCI stock style scoring system. The upper-left style map illustrates the current market capitalization and style score of the portfolio relative to indices and/or peers. The upper-right style exposure matrix displays the current portfolio and index weights and stock counts (in parentheses) in each region/style segment of the market. The middle chart illustrates the total exposures and stock counts in the three style segments, with a legend showing the total growth, value, and "combined Z" (growth - value) scores. The bottom chart exhibits the sector weights as well as the style weights within each sector.

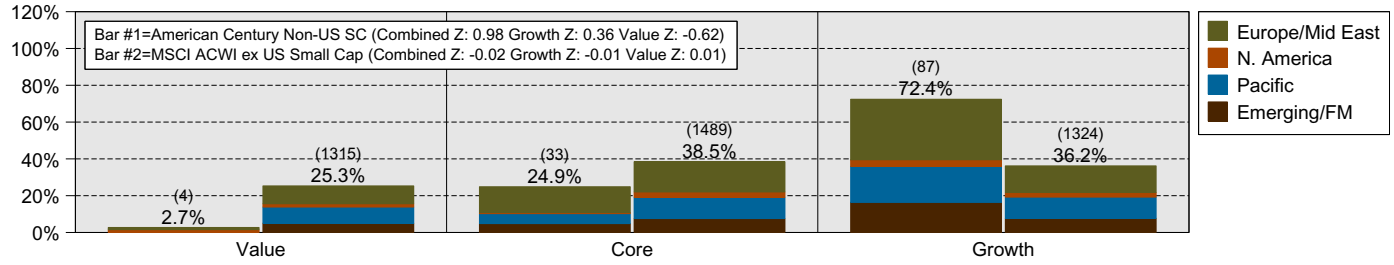
Style Map vs Callan Intl Small Cap
Holdings as of September 30, 2019



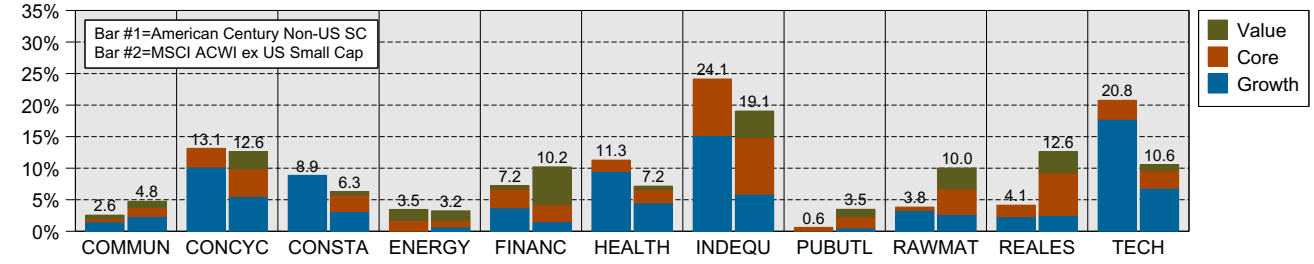
Style Exposure Matrix
Holdings as of September 30, 2019

	Value	Core	Growth	Total
Europe/ Mid East	1.2% (2) 9.7% (316)	14.0% (19) 16.4% (395)	32.9% (38) 14.5% (327)	**48.1% (59)** **40.6% (1038)**
N. America	1.5% (2) 1.8% (74)	0.6% (1) 2.9% (77)	3.6% (5) 2.5% (59)	**5.8% (8)** **7.1% (210)**
Pacific	0.0% (0) 8.7% (438)	5.4% (7) 11.6% (433)	19.5% (26) 11.5% (413)	**25.0% (33)** **31.9% (1284)**
Emerging/ FM	0.0% (0) 5.1% (487)	4.8% (6) 7.6% (584)	16.3% (18) 7.7% (525)	**21.2% (24)** **20.3% (1596)**
Total	**2.7% (4)** **25.3% (1315)**	**24.9% (33)** **38.5% (1489)**	**72.4% (87)** **36.2% (1324)**	**100.0% (124)** **100.0% (4128)**

Combined Z-Score Style Distribution
Holdings as of September 30, 2019



Sector Weights Distribution
Holdings as of September 30, 2019



American Century Non-US SC
Top 10 Portfolio Holdings Characteristics
as of September 30, 2019

10 Largest Holdings

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Intermediate Capital Group P Ord	Financials	$712,310	1.8%	2.01%	5.21	15.76	3.09%	3.80%
Li Ning Company Limited Shs	Consumer Discretionary	$636,737	1.6%	21.73%	6.64	31.54	0.46%	44.66%
Wns Holdings Ltd Spon Adr	Information Technology	$585,875	1.5%	(0.76)%	2.92	19.46	0.00%	10.71%
Gds Hldgs Ltd Sponsored Adr	Information Technology	$566,592	1.5%	6.68%	5.50	(513.85)	0.00%	-
Seven Group Holdings	Industrials	$535,295	1.4%	(8.38)%	3.99	12.21	2.41%	12.01%
Interxion Holding N.V Shs	Information Technology	$524,999	1.3%	7.06%	6.18	115.87	0.00%	10.00%
Zhongsheng Group Holdings Lt Shs	Consumer Discretionary	$511,726	1.3%	13.40%	7.17	10.56	1.49%	18.80%
Merida Industry Co.	Consumer Discretionary	$482,993	1.2%	(1.93)%	1.70	19.49	1.98%	(21.32)%
Enlight B	Real Estate	$482,769	1.2%	13.00%	6.40	19.57	0.00%	28.26%
Lasertec	Information Technology	$481,459	1.2%	58.06%	2.95	25.85	0.70%	4.19%

10 Best Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Varta	Industrials	$366,123	0.9%	58.57%	3.99	53.22	0.00%	-
Hellofresh	Consumer Discretionary	$262,568	0.7%	58.14%	2.49	-	0.00%	-
Lasertec	Information Technology	$481,459	1.2%	58.06%	2.95	25.85	0.70%	4.19%
Bosideng International Hldgs	Consumer Discretionary	$241,548	0.6%	56.80%	4.58	23.67	2.39%	12.36%
Gsx Techedu Inc	Information Technology	$253,021	0.6%	41.89%	1.91	37.16	0.00%	265.70%
Entertainment One Ltd	Communication Services	$193,604	0.5%	38.53%	3.48	20.03	0.51%	14.78%
Afterpay Touch Group	Information Technology	$279,726	0.7%	37.51%	6.11	310.16	0.00%	-
A Living Services Co Ltd H Common St	Industrials	$433,638	1.1%	36.28%	1.00	15.07	0.97%	-
Avast	Information Technology	$388,574	1.0%	26.20%	4.69	14.57	2.01%	9.60%
Hikma Pharmaceuticals	Health Care	$384,107	1.0%	24.40%	6.57	18.51	1.51%	16.60%

10 Worst Performers

Stock	Sector	Ending Market Value	Percent of Portfolio	Qtrly Return	Market Capital	Price/ Forecasted Earnings Ratio	Dividend Yield	Forecasted Growth in Earnings
Ausnutria Dairy Corp Ltd	Consumer Staples	$144,753	0.4%	(34.42)%	2.10	13.75	1.46%	54.43%
Fila Korea	Consumer Discretionary	$273,898	0.7%	(28.00)%	2.96	12.40	0.09%	39.80%
Abcam Plc, Cambridge Shs	Health Care	$183,746	0.5%	(24.79)%	2.90	35.63	1.06%	14.42%
Thule Group Ab/The	Consumer Discretionary	$44,196	0.1%	(23.33)%	1.96	18.59	3.76%	13.19%
Valmet Corp	Industrials	$314,472	0.8%	(22.22)%	2.91	12.17	3.65%	22.56%
Evotec Ag Shs	Health Care	$238,460	0.6%	(20.38)%	3.36	58.06	0.00%	(15.80)%
Imcd Group	Industrials	$98,583	0.3%	(19.41)%	3.89	22.11	1.18%	16.10%
Argen-X	Health Care	$306,282	0.8%	(19.11)%	4.28	(27.51)	0.00%	-
Transpacific Inds Group Ltd Shs	Industrials	$299,788	0.8%	(18.82)%	2.69	24.36	1.82%	11.36%
Nos Sgps S A Shs	Communication Services	$185,751	0.5%	(17.02)%	2.81	14.41	6.99%	13.90%

American Century Non-US SC vs MSCI ACWI ex US Small Cap
Attribution for Quarter Ended September 30, 2019

International Attribution

The first chart below illustrates the return for each country in the index sorted from high to low. The total return for the index is highlighted with a dotted line. The second chart (countries presented in the same order) illustrates the manager's country allocation decisions relative to the index. To the extent that the manager over-weighted a country that had a higher return than the total return for the index (above the dotted line) it contributes positively to the manager's country (or currency) selection effect. The last chart details the manager return, the index return, and the attribution factors for the quarter.

Index Returns by Country

	Local Return	Currency Return
Turkey	6.8	2.4
Israel	6.5	2.4
Saudi Arabia	7.6	(0.0)
United Arab Emirates	7.6	0.0
Taiwan	4.7	0.1
Belgium	8.8	(4.3)
Japan	4.4	(0.3)
Canada	3.0	(1.3)
Brazil	10.2	(8.0)
Czech Republic	6.7	(5.6)
Egypt	(2.9)	2.6
Australia	3.4	(3.9)
Mexico	2.1	(2.7)
Greece	3.4	(4.3)
United Kingdom	2.2	(3.2)
United States	(1.2)	0.0
Total	1.3	(2.5)
Italy	3.0	(4.3)
Switzerland	0.8	(2.2)
New Zealand	5.3	(6.6)
Qatar	(1.8)	0.0
Colombia	6.5	(7.8)
Pakistan	(4.0)	2.2
Singapore	0.0	(2.1)
Malaysia	(0.8)	(1.3)
Netherlands	1.4	(3.8)
France	1.7	(4.3)
Russia	(0.6)	(2.2)
Austria	1.3	(4.3)
Sweden	1.7	(5.6)
South Africa	3.1	(7.0)
Germany	(0.1)	(4.3)
Finland	(1.4)	(4.3)
Indonesia	(5.8)	(0.5)
Spain	(2.2)	(4.3)
Norway	(0.6)	(6.2)
Denmark	(3.0)	(4.3)
Thailand	(7.6)	0.3
Hong Kong	(7.3)	(0.3)
Ireland	(3.6)	(4.3)
China	(7.6)	(0.3)
Hungary	(0.6)	(7.8)
Philippines	(7.6)	(1.1)
Chile	(2.9)	(6.8)
India	(7.6)	(2.6)
South Korea	(6.9)	(3.5)
Portugal	(11.2)	(4.3)
Poland	(11.4)	(7.0)
Argentina	(39.1)	0.0

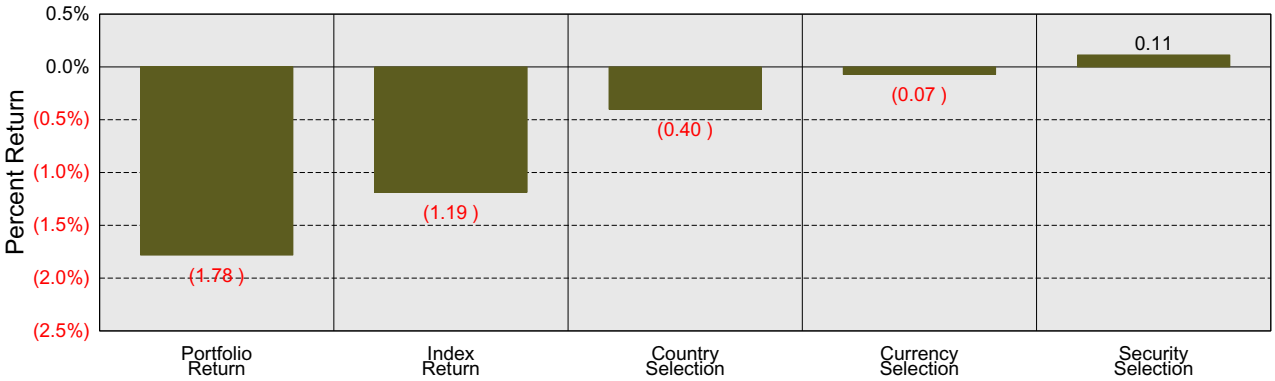
(50%) (40%) (30%) (20%) (10%) 0% 10% 20%

Beginning Relative Weights (Portfolio - Index)

	Index Weight	Portfolio Weight
Turkey	0.3	0.5
Israel	1.2	1.1
Saudi Arabia	0.2	0.0
United Arab Emirates	0.1	0.6
Taiwan	4.0	3.7
Belgium	1.5	2.1
Japan	21.5	17.1
Canada	6.8	5.3
Brazil	1.7	1.2
Czech Republic	0.0	0.0
Egypt	0.1	0.0
Australia	5.6	6.4
Mexico	0.6	0.0
Greece	0.2	0.0
United Kingdom	12.9	15.3
United States	0.0	2.3
Total		
Italy	2.5	2.1
Switzerland	3.5	2.4
New Zealand	0.7	0.0
Qatar	0.2	0.0
Colombia	0.1	0.0
Pakistan	0.1	0.0
Singapore	1.3	0.0
Malaysia	0.7	0.0
Netherlands	2.0	3.9
France	2.5	5.4
Russia	0.2	0.0
Austria	0.6	0.0
Sweden	4.2	5.3
South Africa	1.2	0.0
Germany	4.3	5.3
Finland	1.0	2.1
Indonesia	0.5	1.1
Spain	1.6	0.0
Norway	1.6	2.0
Denmark	1.3	0.0
Thailand	1.1	0.0
Hong Kong	1.4	1.2
Ireland	0.4	0.3
China	2.4	6.2
Hungary	0.0	0.0
Philippines	0.2	0.0
Chile	0.3	0.0
India	3.2	3.2
South Korea	3.4	1.2
Portugal	0.3	0.8
Poland	0.2	0.7
Argentina	0.2	1.1

(6%) (4%) (2%) 0% 2% 4% 6%

Attribution Factors for Quarter Ended September 30, 2019

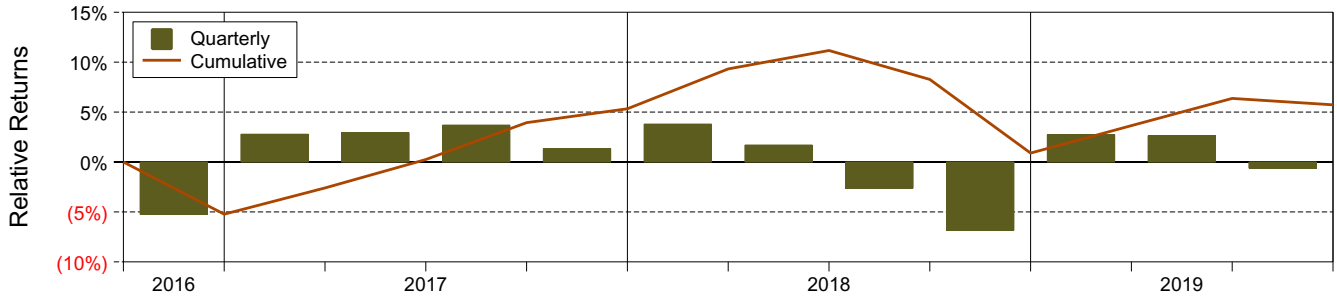


American Century Non-US SC vs MSCI ACWI ex US Small Cap
Attribution for Three years Ended September 30, 2019

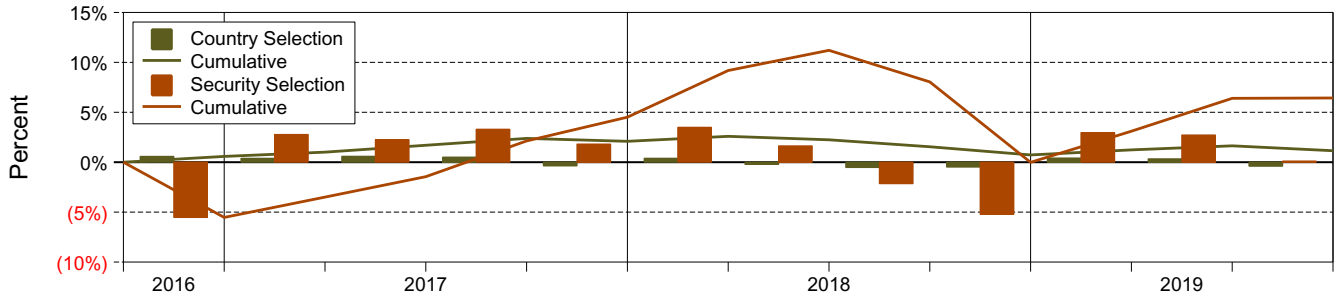
Cumulative International Attribution

The first chart below illustrates the quarterly and cumulative return of the portfolio relative to the index. The second chart shows the cumulative and quarterly impact of the manager's country selection and security selection decisions. The third chart shows the cumulative and quarterly impact of the managers currency selection decisions. The last chart shows the annualized cumulative returns for the manager and the index, as well as the attribution factors that explain the difference in return.

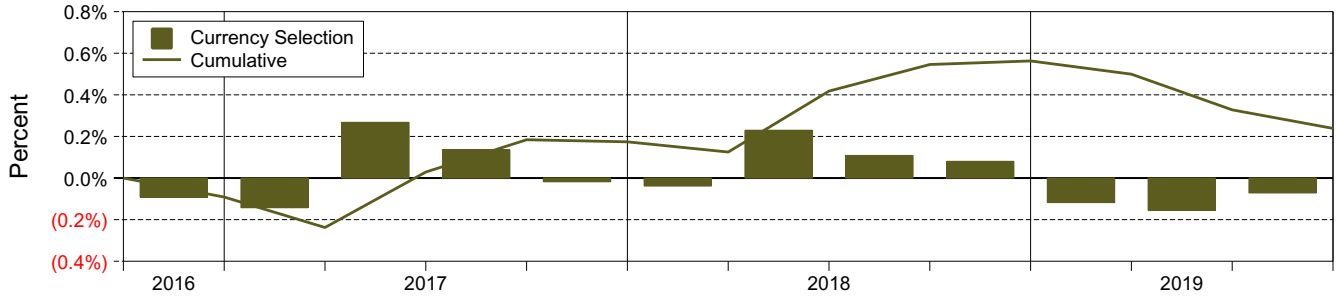
Cumulative and Quarterly Return vs MSCI ACWI ex US Small Cap



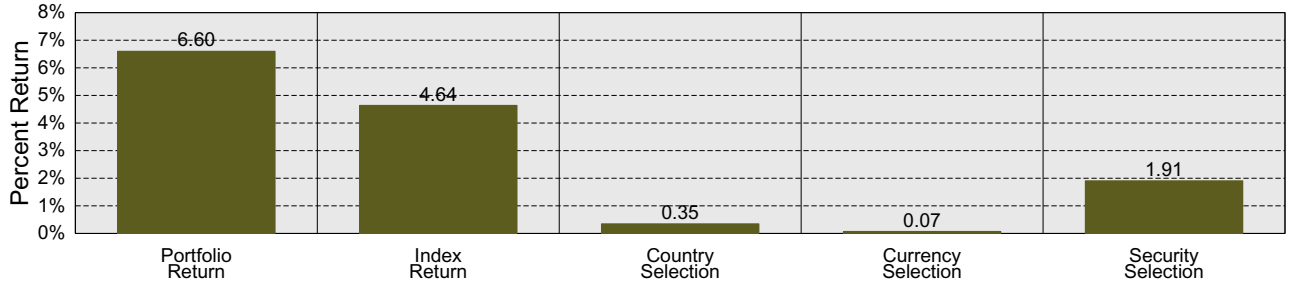
Cumulative and Quarterly Country Selection and Security Selection Factors



Cumulative and Quarterly Currency Selection Factors



Attribution Factors for Three Years Ended September 30, 2019



Fixed Income

Fixed Income
Period Ended September 30, 2019

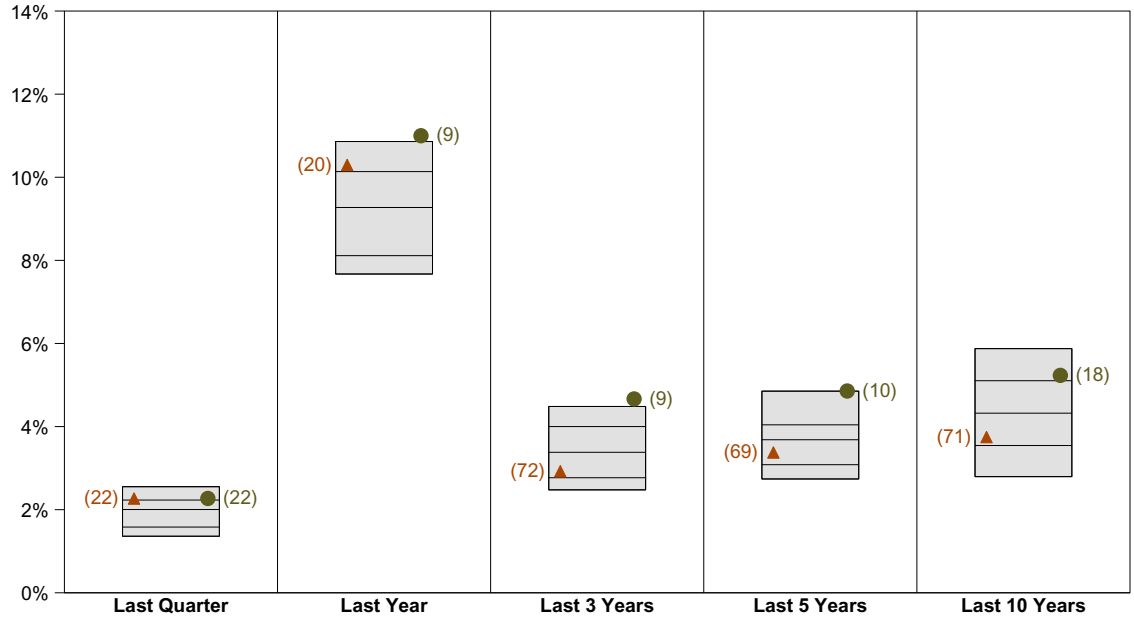
Quarterly Summary and Highlights

- Fixed Income's portfolio posted a 2.27% return for the quarter placing it in the 22 percentile of the Public Fund - Domestic Fixed group for the quarter and in the 9 percentile for the last year.
- Fixed Income's portfolio outperformed the Blmbg Aggregate Index by 0.00% for the quarter and outperformed the Blmbg Aggregate Index for the year by 0.70%.

Quarterly Asset Growth

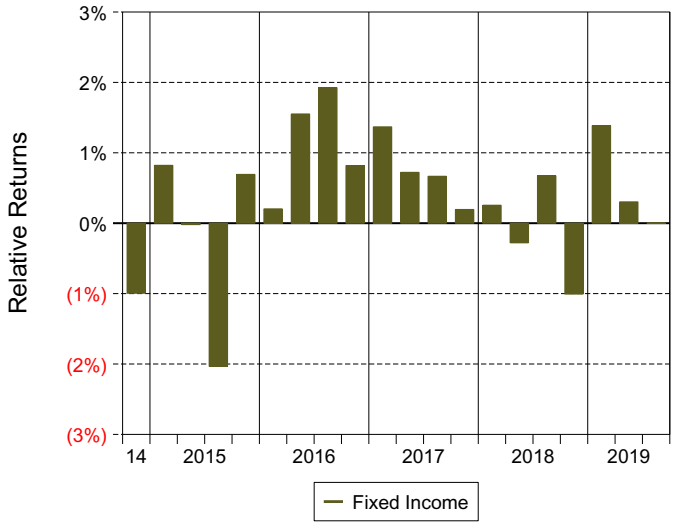
Beginning Market Value	$226,316,271
Net New Investment	$0
Investment Gains/(Losses)	$5,138,343
Ending Market Value	$231,454,613

Performance vs Public Fund - Domestic Fixed (Gross)

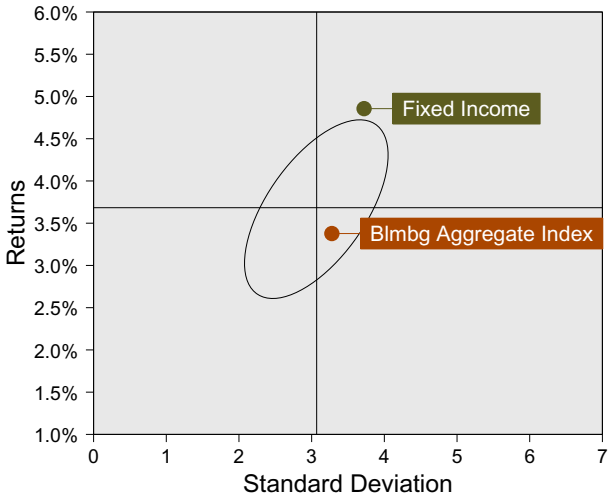


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	2.55	10.86	4.48	4.85	5.88
25th Percentile	2.23	10.14	4.00	4.04	5.10
Median	2.00	9.27	3.38	3.68	4.32
75th Percentile	1.58	8.11	2.77	3.08	3.54
90th Percentile	1.36	7.67	2.48	2.74	2.80
Fixed Income ●	2.27	11.00	4.67	4.86	5.23
Blmbg Aggregate Index ▲	2.27	10.30	2.92	3.38	3.75

Relative Return vs Blmbg Aggregate Index



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

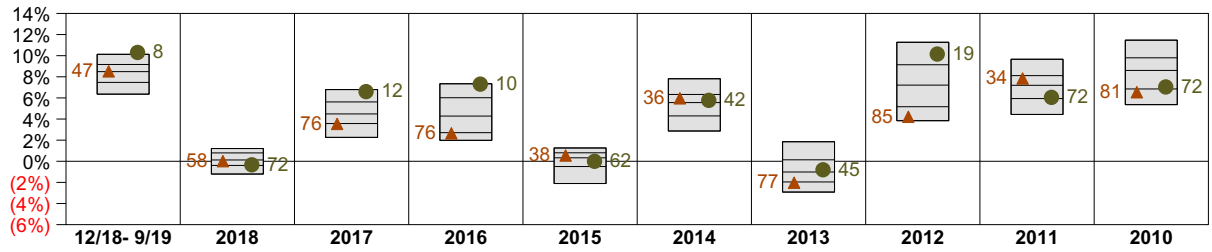


Fixed Income
Return Analysis Summary

Return Analysis

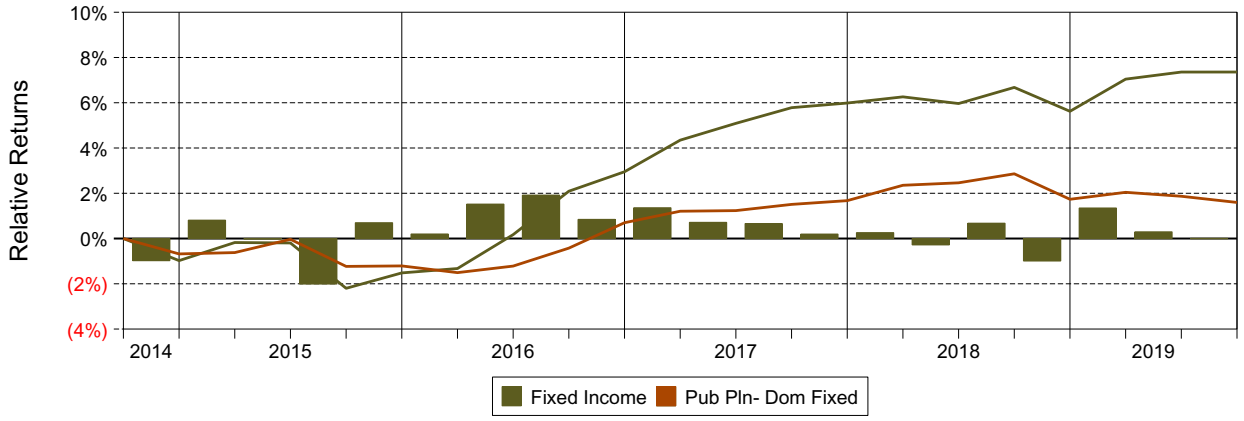
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

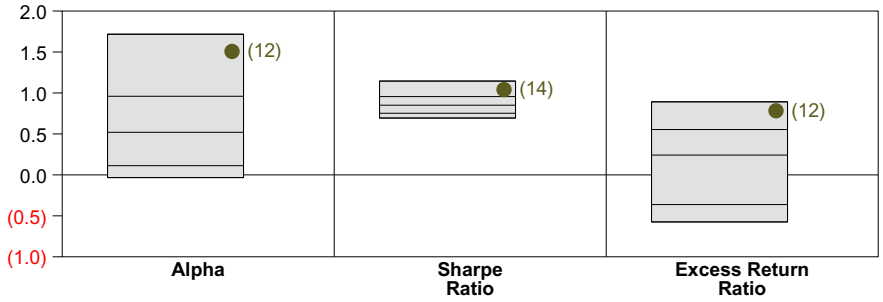


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	10.13	1.21	6.79	7.34	1.26	7.82	1.85	11.27	9.66	11.47
25th Percentile	9.17	0.79	5.62	6.02	0.80	6.33	0.14	9.14	8.11	9.80
Median	8.49	0.12	4.49	4.28	0.33	5.56	(1.02)	7.21	7.19	8.60
75th Percentile	7.47	(0.40)	3.57	2.71	(0.50)	4.30	(1.96)	5.17	5.94	6.85
90th Percentile	6.36	(1.21)	2.26	1.98	(2.11)	2.87	(2.92)	3.84	4.44	5.36
Fixed Income ●	10.30	(0.33)	6.60	7.31	(0.00)	5.77	(0.81)	10.15	6.05	7.04
Blmbg Aggregate Index ▲	8.52	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 September 30, 2019



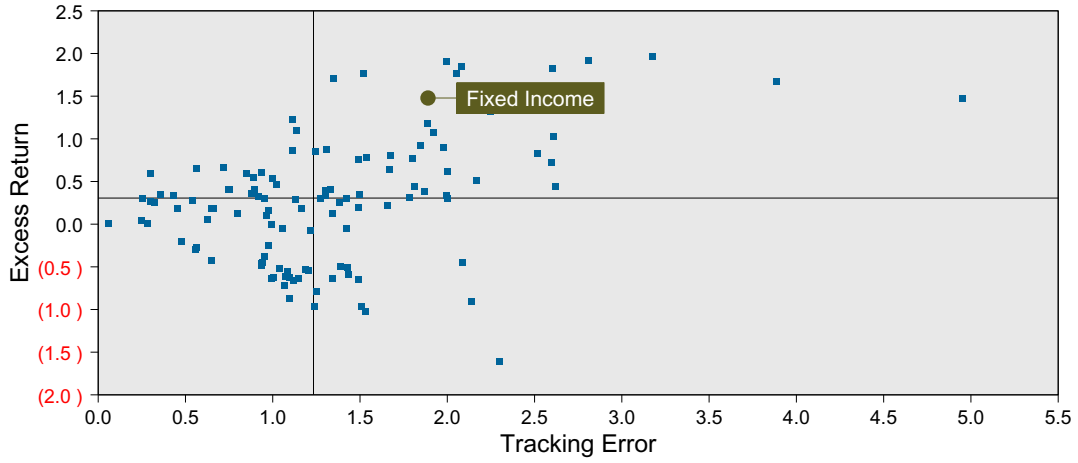
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.72	1.15	0.89
25th Percentile	0.96	0.96	0.55
Median	0.52	0.85	0.24
75th Percentile	0.11	0.75	(0.36)
90th Percentile	(0.03)	0.69	(0.57)
Fixed Income ●	1.51	1.04	0.78

Fixed Income
Risk Analysis Summary

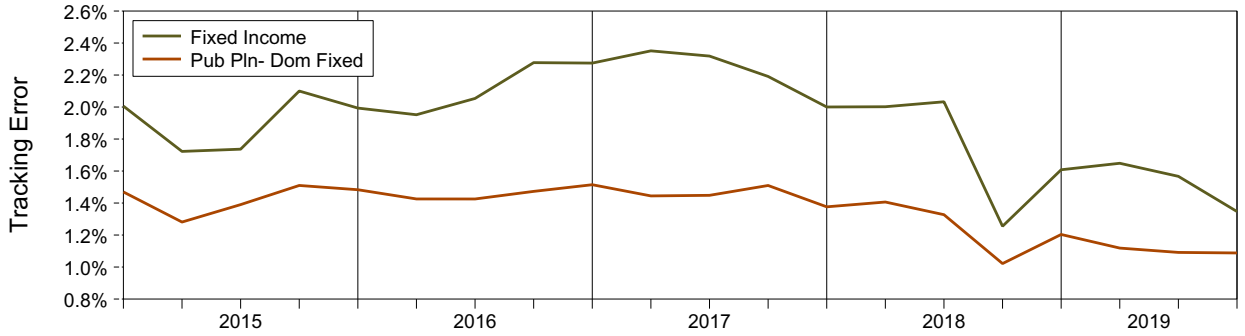
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows tracking error patterns versus the benchmark over time. The last two charts show the ranking of the manager's risk statistics versus the peer group.

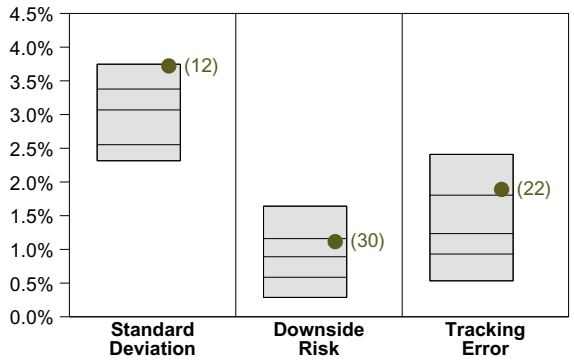
Risk Analysis vs Public Fund - Domestic Fixed (Gross)
Five Years Ended September 30, 2019

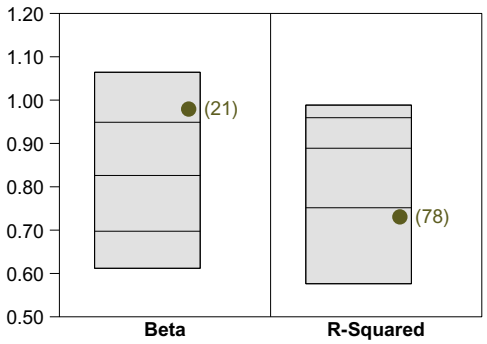


Rolling 12 Quarter Tracking Error vs Blmbg Aggregate Index



Risk Statistics Rankings vs Blmbg Aggregate Index
Rankings Against Public Fund - Domestic Fixed (Gross)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	3.75	1.64	2.41
25th Percentile	3.38	1.16	1.80
Median	3.07	0.89	1.23
75th Percentile	2.55	0.59	0.93
90th Percentile	2.31	0.29	0.53
Fixed Income ●	3.72	1.11	1.89

	Beta	R-Squared
10th Percentile	1.06	0.99
25th Percentile	0.95	0.96
Median	0.83	0.89
75th Percentile	0.70	0.75
90th Percentile	0.61	0.58
Fixed Income ●	0.98	0.73

BlackRock U.S. Debt Fund
Period Ended September 30, 2019

Investment Philosophy

Core Bond peer group includes managers that are typically benchmarked versus a domestic, investment grade fixed income index and generally will not make meaningful investments in securities outside of the benchmark. The product was funded during the fourth quarter of 2011. Performance prior is that of the composite.

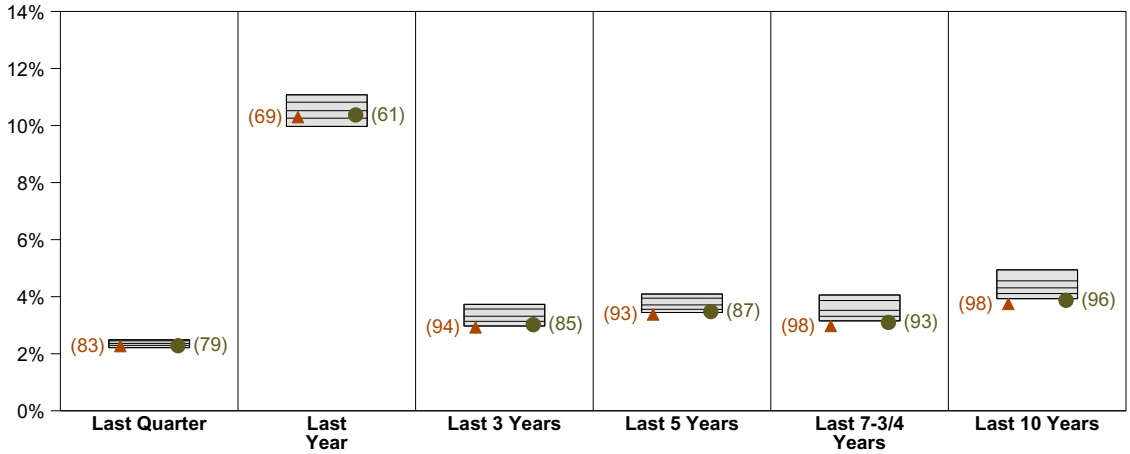
Quarterly Summary and Highlights

- BlackRock U.S. Debt Fund's portfolio posted a 2.28% return for the quarter placing it in the 79 percentile of the Callan Core Bond Fixed Income group for the quarter and in the 61 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 0.08%.

Quarterly Asset Growth

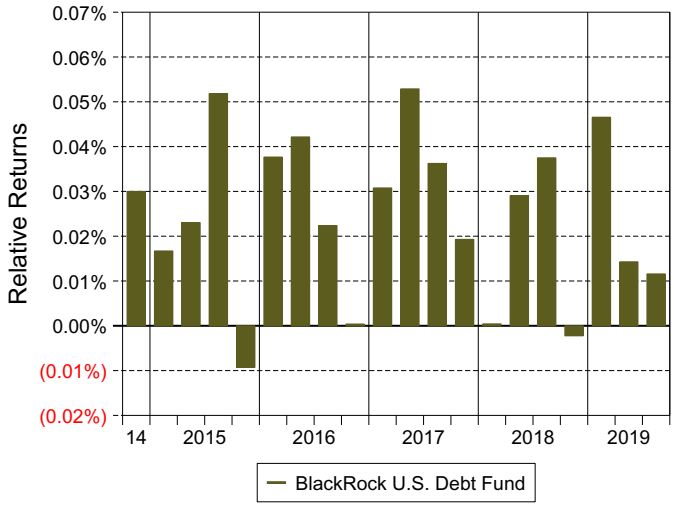
Beginning Market Value	$111,703,222
Net New Investment	$0
Investment Gains/(Losses)	$2,547,713
Ending Market Value	$114,250,935

Performance vs Callan Core Bond Fixed Income (Gross)

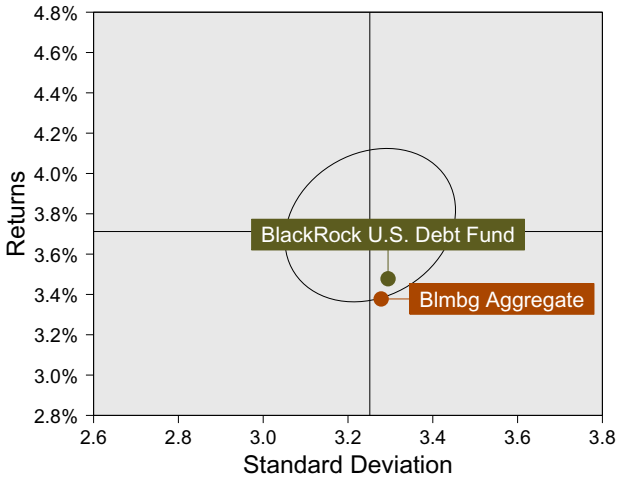


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7-3/4 Years	Last 10 Years
10th Percentile	2.49	11.08	3.73	4.09	4.06	4.94
25th Percentile	2.45	10.82	3.57	3.95	3.87	4.56
Median	2.36	10.52	3.32	3.71	3.52	4.31
75th Percentile	2.29	10.26	3.14	3.56	3.31	4.11
90th Percentile	2.21	9.97	2.97	3.45	3.15	3.93
BlackRock U.S. Debt Fund ●	2.28	10.37	3.02	3.48	3.10	3.87
Blmbg Aggregate ▲	2.27	10.30	2.92	3.38	3.97	3.75

Relative Return vs Blmbg Aggregate



Callan Core Bond Fixed Income (Gross) Annualized Five Year Risk vs Return

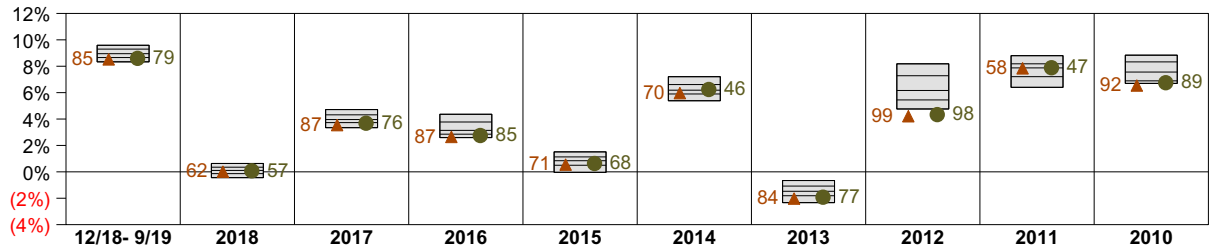


BlackRock U.S. Debt Fund
Return Analysis Summary

Return Analysis

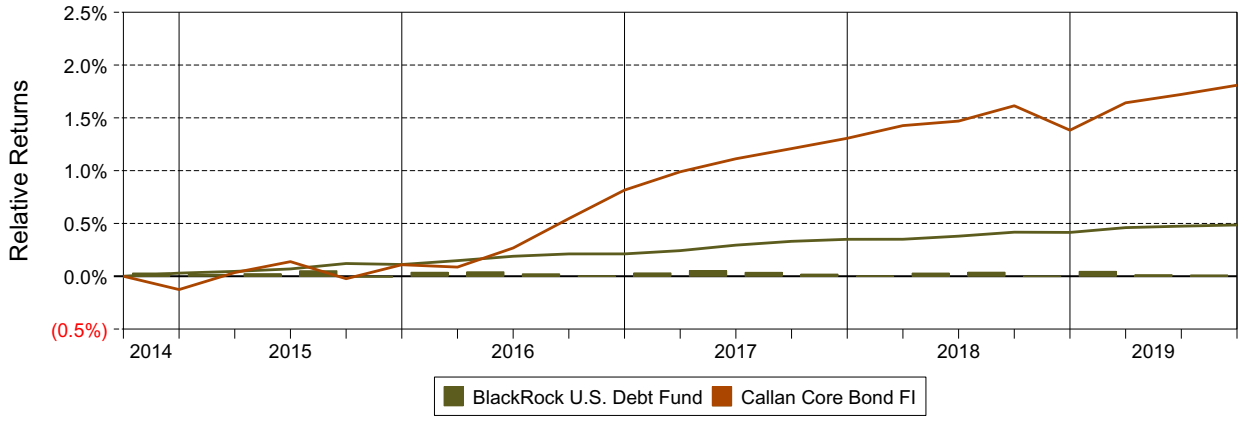
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

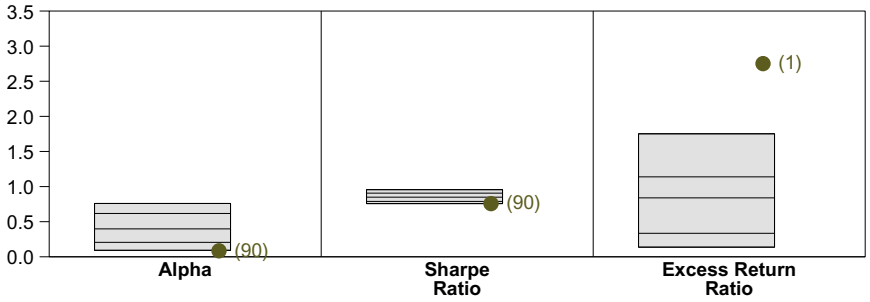


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	9.59	0.64	4.72	4.36	1.51	7.21	(0.66)	8.18	8.80	8.84
25th Percentile	9.30	0.35	4.32	3.78	1.13	6.61	(1.08)	7.28	8.18	8.33
Median	8.95	0.11	3.96	3.14	0.84	6.19	(1.47)	6.16	7.87	7.56
75th Percentile	8.66	(0.14)	3.73	2.85	0.50	5.90	(1.81)	5.45	7.21	6.89
90th Percentile	8.33	(0.44)	3.34	2.59	(0.04)	5.39	(2.33)	4.76	6.40	6.70
BlackRock U.S. Debt Fund ●	8.60	0.08	3.68	2.75	0.63	6.24	(1.92)	4.34	7.89	6.75
Blmbg Aggregate ▲	8.52	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 September 30, 2019



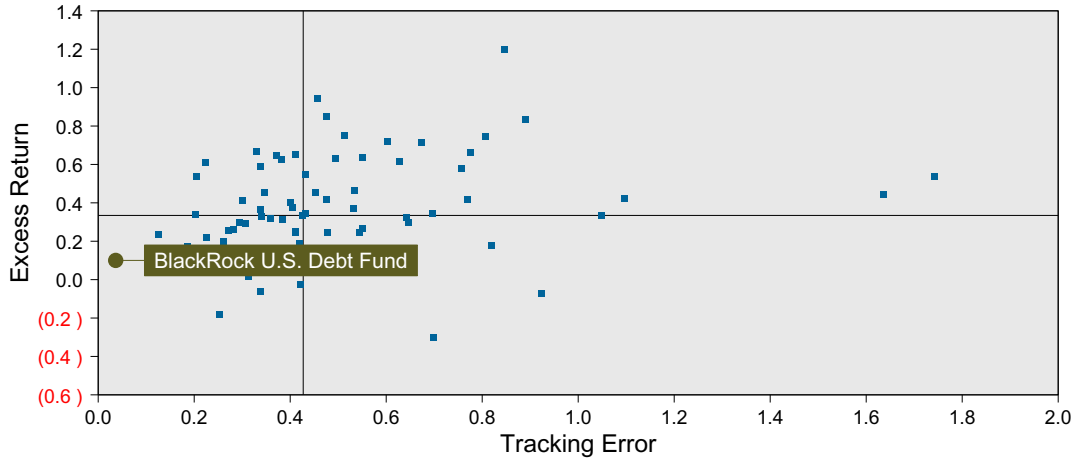
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.76	0.96	1.75
25th Percentile	0.62	0.91	1.14
Median	0.40	0.85	0.84
75th Percentile	0.21	0.79	0.33
90th Percentile	0.09	0.76	0.14
BlackRock U.S. Debt Fund ●	0.09	0.76	2.75

BlackRock U.S. Debt Fund
Risk Analysis Summary

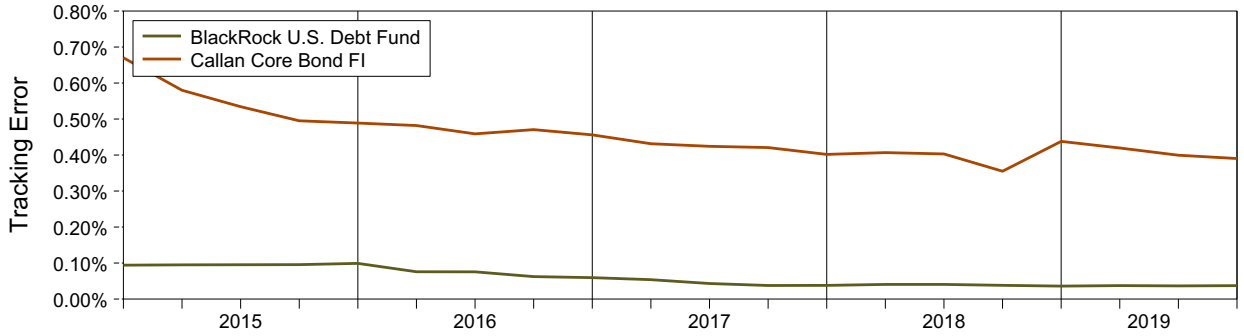
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows tracking error patterns versus the benchmark over time. The last two charts show the ranking of the manager's risk statistics versus the peer group.

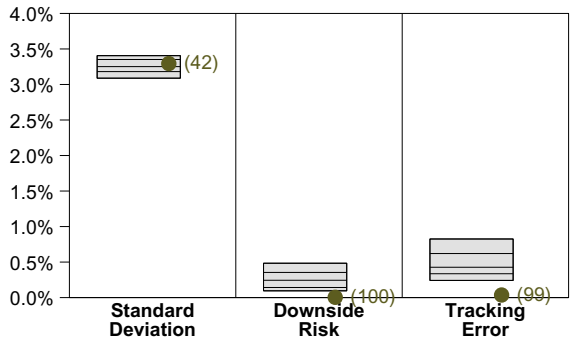
Risk Analysis vs Callan Core Bond Fixed Income (Gross)
Five Years Ended September 30, 2019

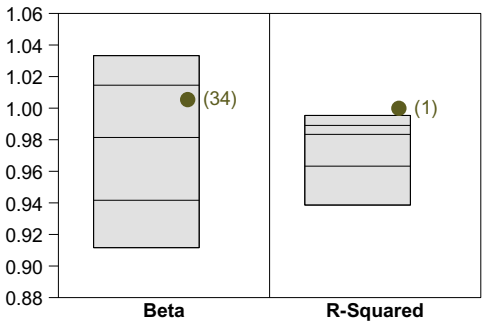


Rolling 12 Quarter Tracking Error vs Bloomberg Barclays Aggregate



Risk Statistics Rankings vs Bloomberg Barclays Aggregate
Rankings Against Callan Core Bond Fixed Income (Gross)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	3.41	0.48	0.83
25th Percentile	3.35	0.35	0.62
Median	3.25	0.24	0.43
75th Percentile	3.18	0.14	0.34
90th Percentile	3.09	0.10	0.24
BlackRock U.S. Debt Fund ●	3.29	0.00	0.04

	Beta	R-Squared
10th Percentile	1.03	1.00
25th Percentile	1.01	0.99
Median	0.98	0.98
75th Percentile	0.94	0.96
90th Percentile	0.91	0.94
BlackRock U.S. Debt Fund ●	1.01	1.00

PIMCO Fixed Income
Period Ended September 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.

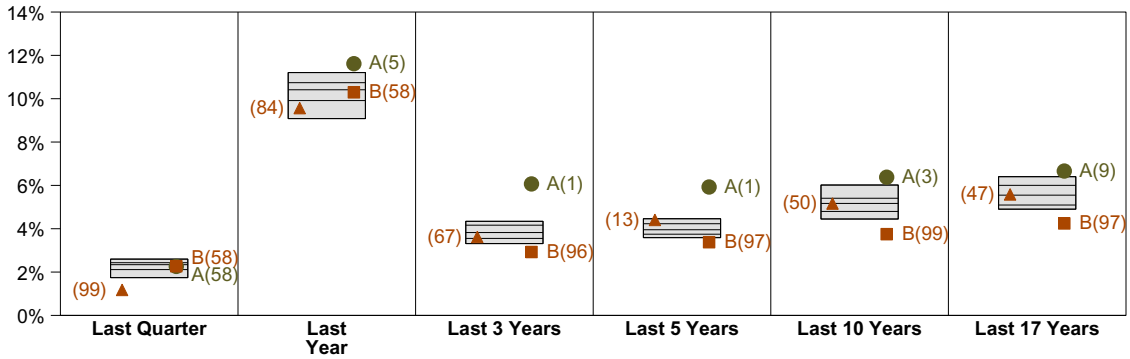
Quarterly Summary and Highlights

- PIMCO Fixed Income's portfolio posted a 2.26% return for the quarter placing it in the 58 percentile of the Callan Core Plus Fixed Income group for the quarter and in the 5 percentile for the last year.
- PIMCO Fixed Income's portfolio outperformed the Custom Index by 1.08% for the quarter and outperformed the Custom Index for the year by 2.05%.

Quarterly Asset Growth

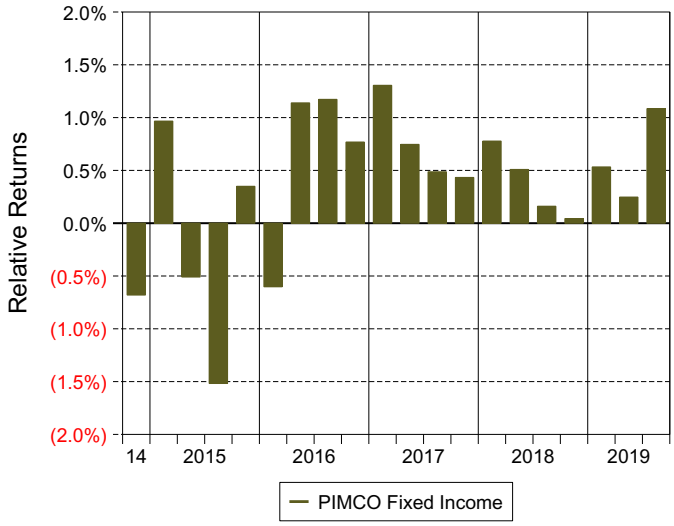
Beginning Market Value	$114,613,049
Net New Investment	$0
Investment Gains/(Losses)	$2,590,629
Ending Market Value	$117,203,678

Performance vs Callan Core Plus Fixed Income (Gross)

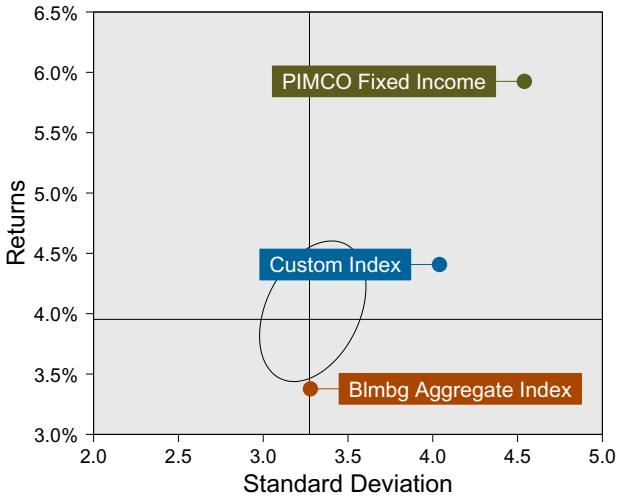


		Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 17 Years
10th Percentile		2.60	11.21	4.34	4.46	6.02	6.40
25th Percentile		2.43	10.74	4.16	4.23	5.41	6.00
Median		2.34	10.41	3.82	3.95	5.17	5.55
75th Percentile		2.11	9.91	3.55	3.75	4.80	5.09
90th Percentile		1.74	9.08	3.31	3.59	4.45	4.90
PIMCO Fixed Income	● A	2.26	11.62	6.07	5.93	6.38	6.66
Blmbg Aggregate Index	■ B	2.27	10.30	2.92	3.38	3.75	4.24
Custom Index	▲	1.18	9.57	3.62	4.41	5.16	5.58

Relative Return vs Custom Index



Callan Core Plus Fixed Income (Gross) Annualized Five Year Risk vs Return

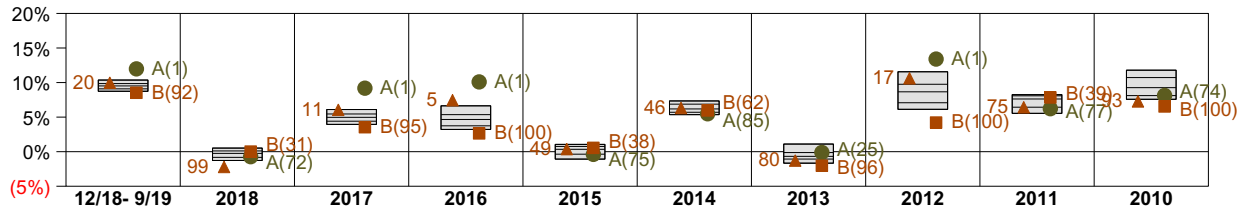


PIMCO Fixed Income
Return Analysis Summary

Return Analysis

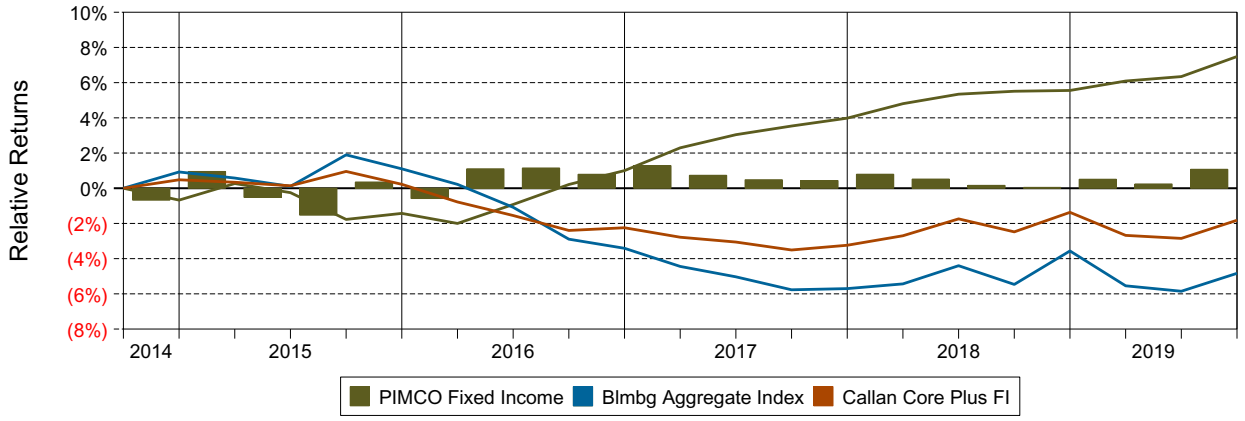
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

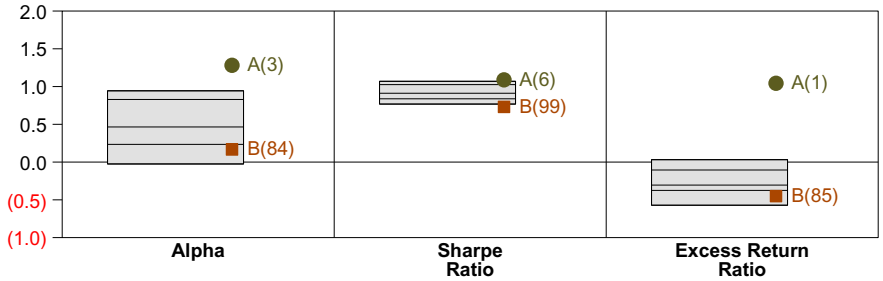


		12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile		10.36	0.52	6.10	6.64	1.05	7.34	1.10	11.56	8.25	11.79
25th Percentile		9.86	0.11	5.45	5.36	0.76	6.88	(0.13)	9.75	8.08	10.72
Median		9.51	(0.25)	4.97	4.66	0.34	6.18	(0.67)	8.66	7.62	9.26
75th Percentile		9.09	(0.82)	4.41	3.74	(0.36)	5.70	(1.07)	7.08	6.44	8.11
90th Percentile		8.74	(1.27)	3.94	3.22	(1.08)	5.36	(1.66)	6.13	5.54	7.58
PIMCO Fixed Income	● A	11.98	(0.73)	9.19	10.09	(0.39)	5.48	(0.12)	13.40	6.22	8.14
Blmbg Aggregate Index	■ B	8.52	0.01	3.54	2.65	0.55	5.97	(2.02)	4.21	7.84	6.54
Custom Index	▲	9.97	(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 September 30, 2019



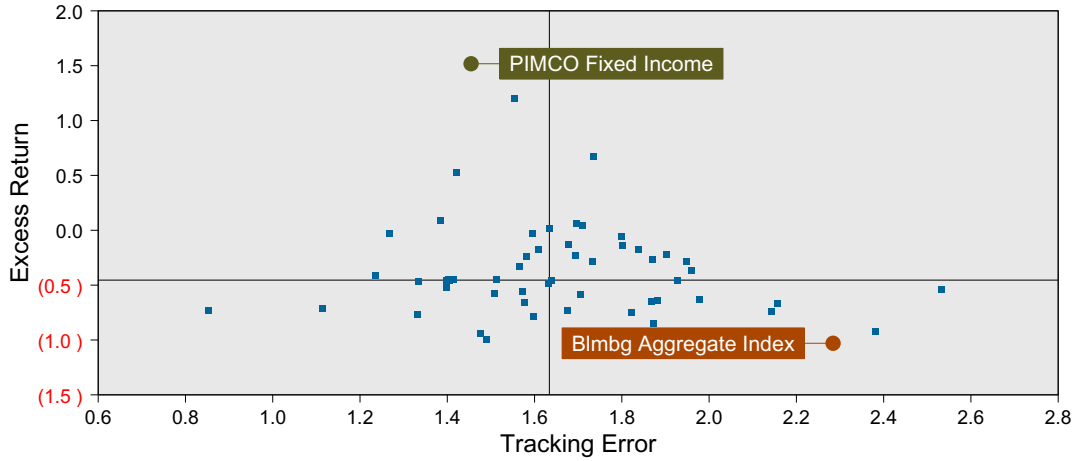
		Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile		0.94	1.07	0.03
25th Percentile		0.83	1.03	(0.10)
Median		0.47	0.91	(0.30)
75th Percentile		0.23	0.84	(0.37)
90th Percentile		(0.03)	0.77	(0.57)
PIMCO Fixed Income	● A	1.28	1.09	1.04
Blmbg Aggregate Index	■ B	0.17	0.73	(0.45)

PIMCO Fixed Income
Risk Analysis Summary

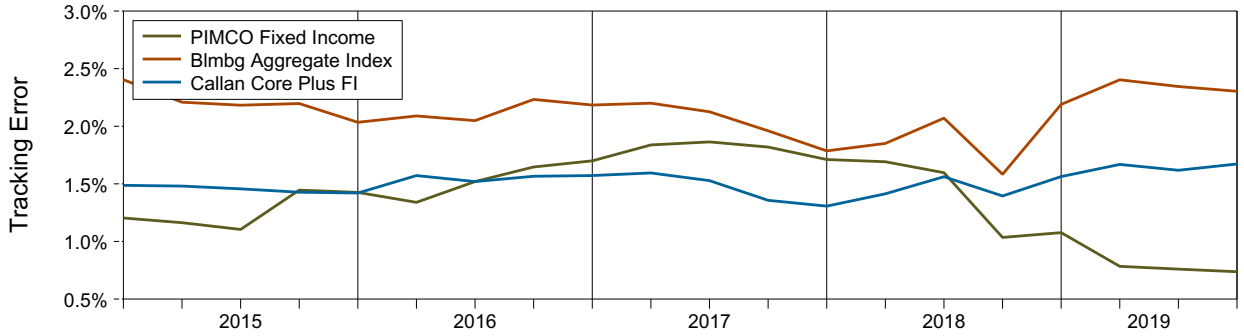
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows tracking error patterns versus the benchmark over time. The last two charts show the ranking of the manager's risk statistics versus the peer group.

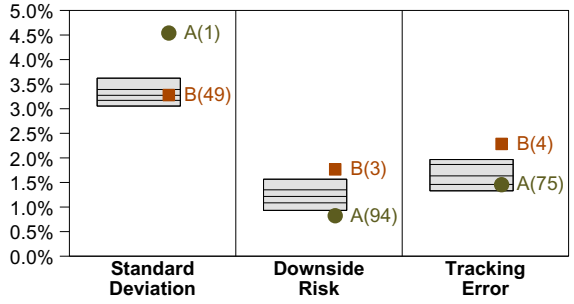
Risk Analysis vs Callan Core Plus Fixed Income (Gross)
Five Years Ended September 30, 2019

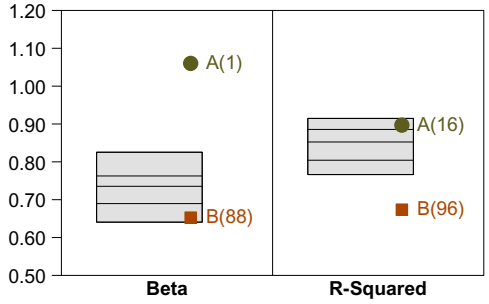


Rolling 12 Quarter Tracking Error vs Custom Index



Risk Statistics Rankings vs Custom Index
Rankings Against Callan Core Plus Fixed Income (Gross)
Five Years Ended September 30, 2019





		Standard Deviation	Downside Risk	Tracking Error
10th Percentile		3.62	1.57	1.97
25th Percentile		3.39	1.35	1.87
Median		3.27	1.22	1.63
75th Percentile		3.17	1.09	1.46
90th Percentile		3.05	0.93	1.33
PIMCO Fixed Income	● A	4.54	0.82	1.45
Blmbg Aggregate Index	■ B	3.28	1.77	2.28

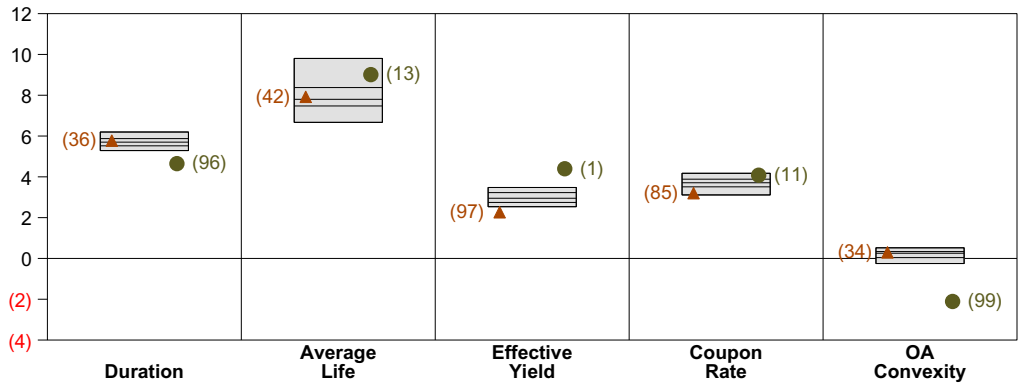
		Beta	R-Squared
10th Percentile		0.83	0.91
25th Percentile		0.76	0.89
Median		0.74	0.85
75th Percentile		0.69	0.80
90th Percentile		0.64	0.77
PIMCO Fixed Income	● A	1.06	0.90
Blmbg Aggregate Index	■ B	0.65	0.67

PIMCO Fixed Income
Bond Characteristics Analysis Summary

Portfolio Characteristics

This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

Fixed Income Portfolio Characteristics
Rankings Against Callan Core Plus Fixed Income
as of September 30, 2019

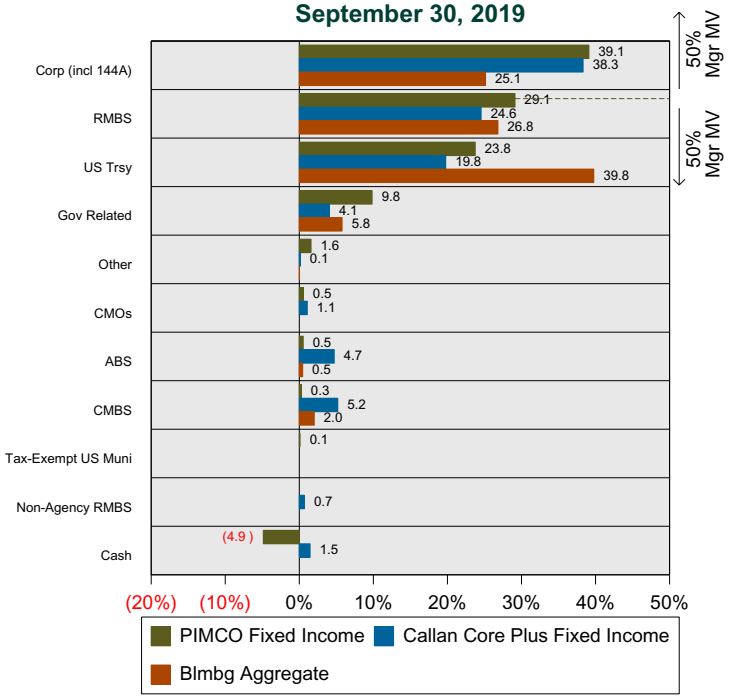


	Duration	Average Life	Effective Yield	Coupon Rate	OA Convexity
10th Percentile	6.20	9.80	3.48	4.17	0.52
25th Percentile	5.88	8.38	3.23	3.88	0.34
Median	5.70	7.80	2.95	3.71	0.25
75th Percentile	5.52	7.47	2.75	3.51	0.04
90th Percentile	5.29	6.67	2.54	3.11	(0.25)
PIMCO Fixed Income ●	4.65	9.01	4.40	4.08	(2.11)
Blmbg Aggregate ▲	5.78	7.92	2.26	3.20	0.30

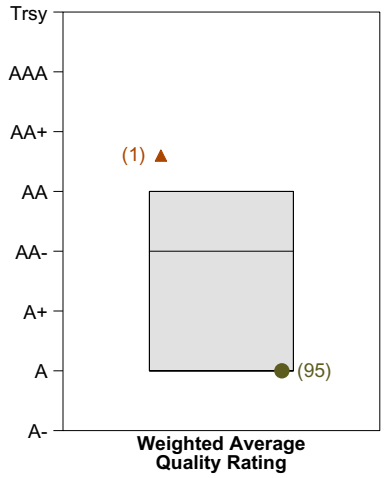
Sector Allocation and Quality Ratings

The first graph compares the manager's sector allocation with the average allocation across all the members of the manager's style. The second graph compares the manager's weighted average quality rating with the range of quality ratings for the style.

Sector Allocation
September 30, 2019



Quality Ratings
vs Callan Core Plus Fixed Income



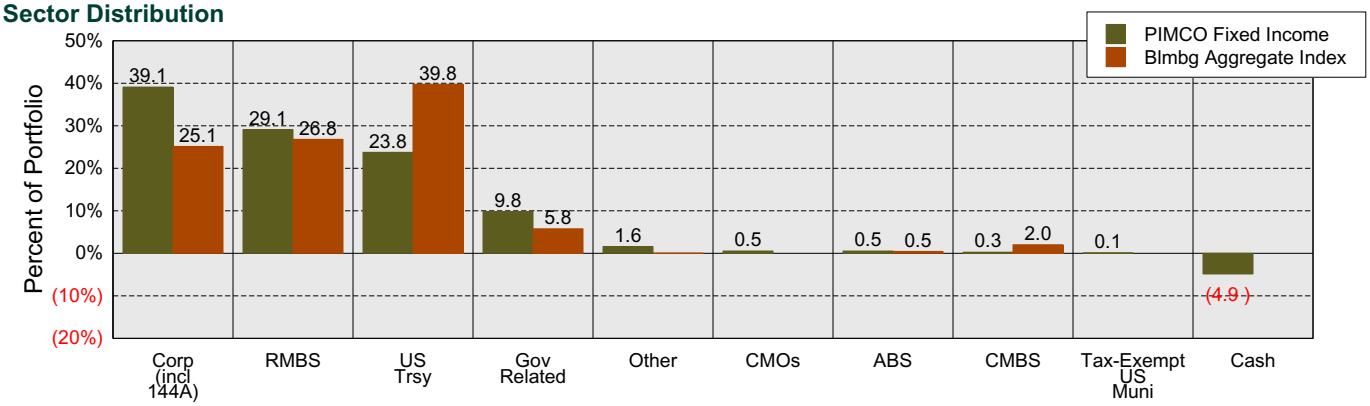
10th Percentile	AA
25th Percentile	AA-
Median	A
75th Percentile	A
90th Percentile	A
PIMCO Fixed Income ●	A
Blmbg Aggregate ▲	AA+

PIMCO Fixed Income
Portfolio Characteristics Summary
As of September 30, 2019

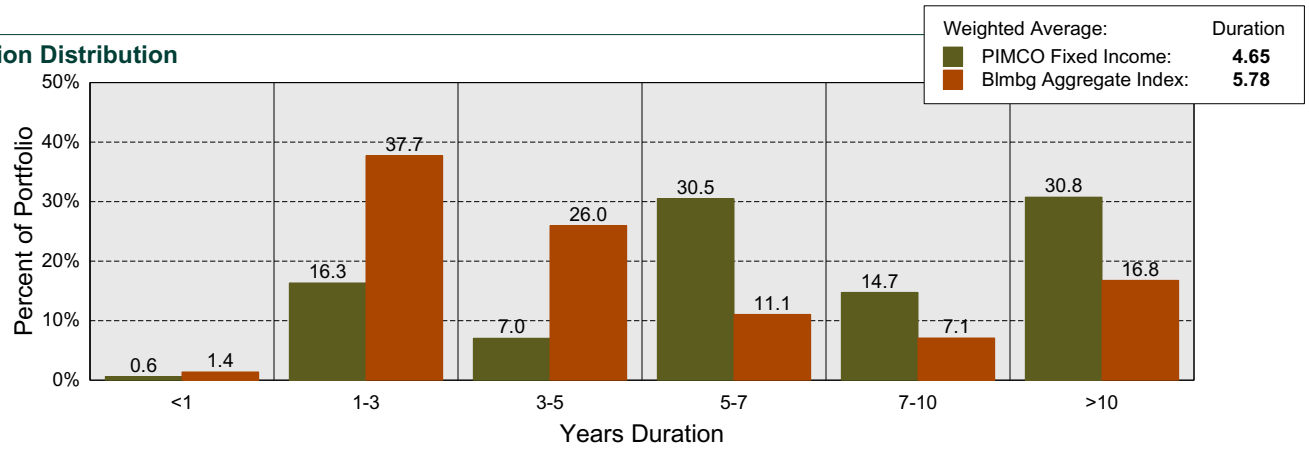
Portfolio Structure Comparison

The charts below compare the structure of the portfolio to that of the index from the three perspectives that have the greatest influence on return. The first chart compares the two portfolios across sectors. The second chart compares the duration distribution. The last chart compares the distribution across quality ratings.

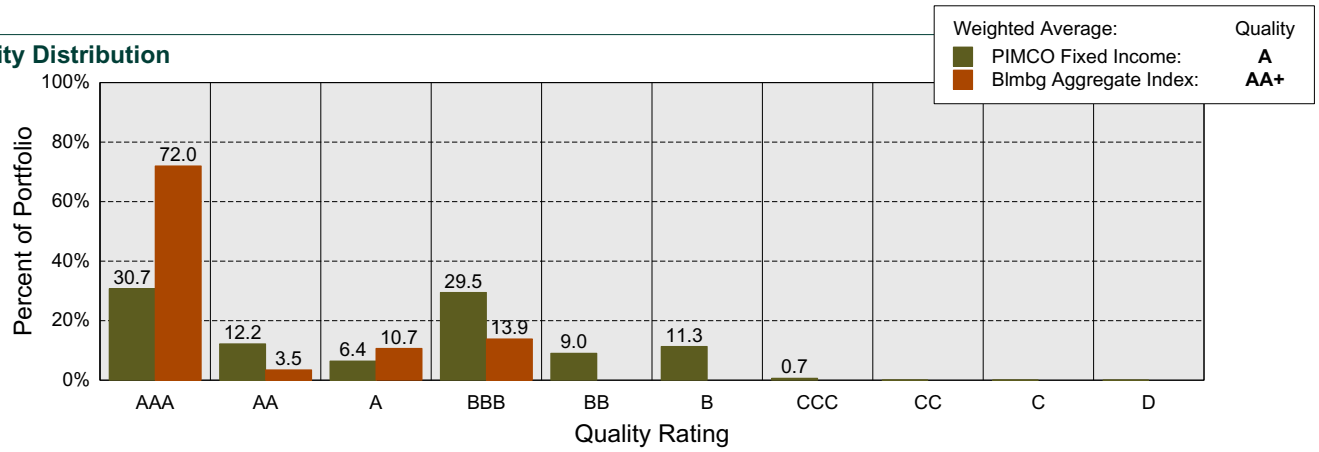
Sector Distribution



Duration Distribution



Quality Distribution



Real Estate

Real Estate
Period Ended September 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.

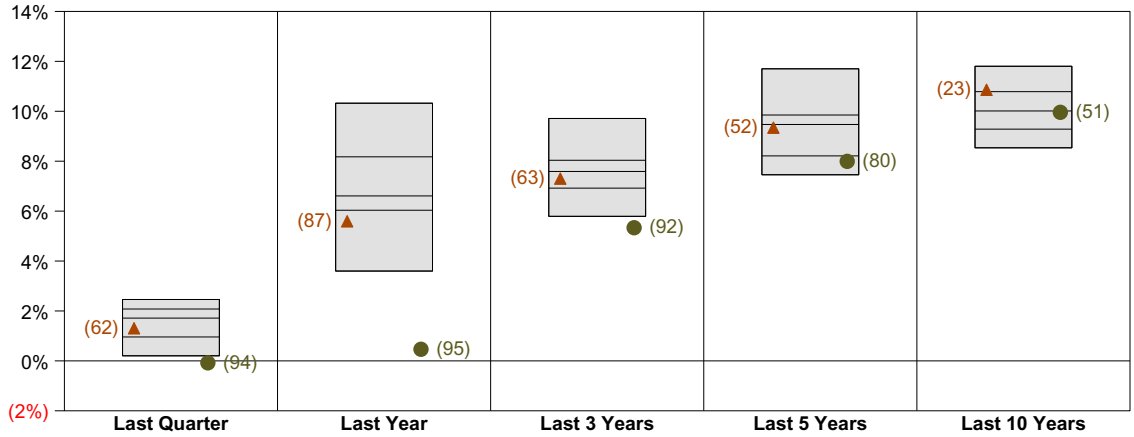
Quarterly Summary and Highlights

- Real Estate's portfolio posted a (0.08)% return for the quarter placing it in the 94 percentile of the Public Fund - Real Estate group for the quarter and in the 95 percentile for the last year.
- Real Estate's portfolio underperformed the NFI-ODCE Value Weight Gr by 1.39% for the quarter and underperformed the NFI-ODCE Value Weight Gr for the year by 5.13%.

Quarterly Asset Growth

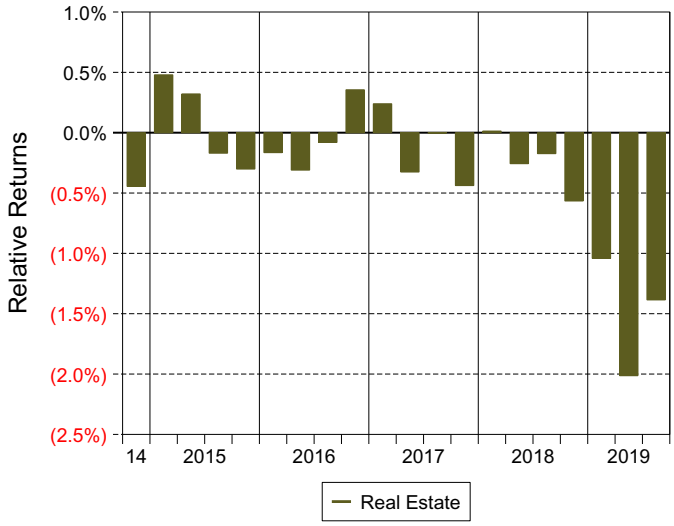
Beginning Market Value	$77,498,617
Net New Investment	$-307,309
Investment Gains/(Losses)	$-61,460
Ending Market Value	$77,129,848

Performance vs Public Fund - Real Estate (Gross)

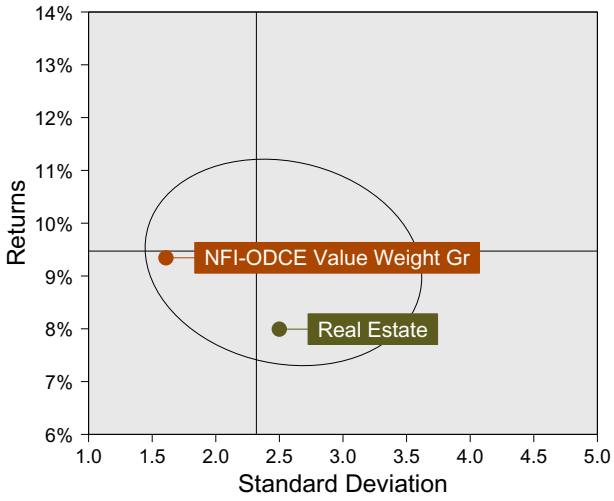


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	2.46	10.32	9.71	11.70	11.80
25th Percentile	2.08	8.17	8.04	9.85	10.79
Median	1.71	6.61	7.59	9.47	10.01
75th Percentile	0.96	6.04	6.92	8.21	9.28
90th Percentile	0.20	3.60	5.79	7.46	8.54
Real Estate ●	(0.08)	0.46	5.33	7.99	9.96
NFI-ODCE Value Weight Gr ▲	1.31	5.59	7.30	9.34	10.86

Relative Return vs NFI-ODCE Value Weight Gr



Public Fund - Real Estate (Gross) Annualized Five Year Risk vs Return

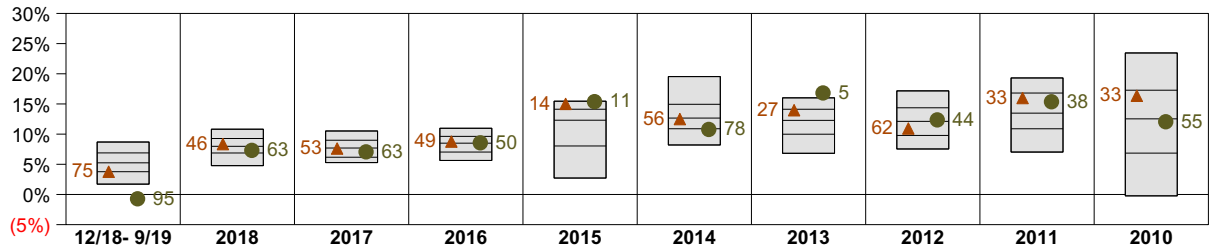


Real Estate
Return Analysis Summary

Return Analysis

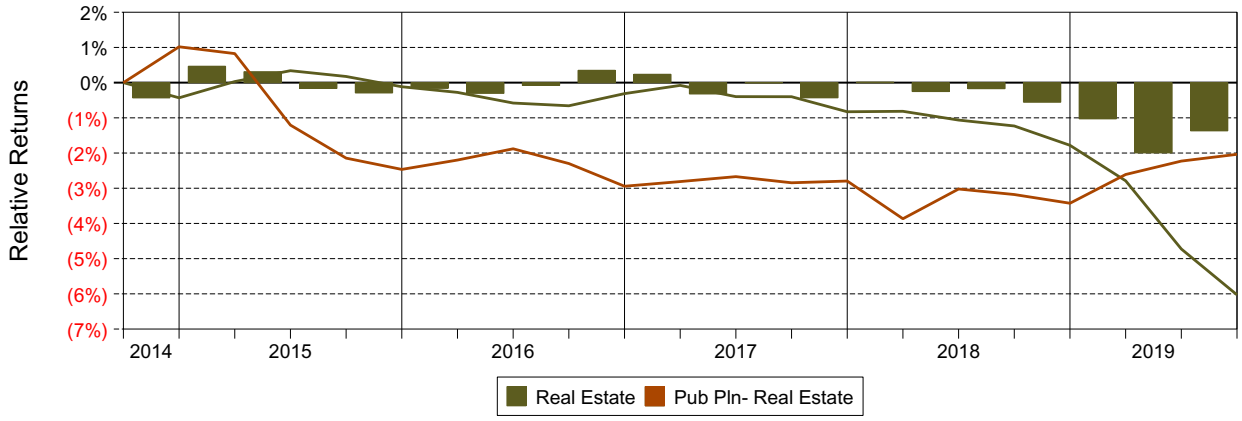
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

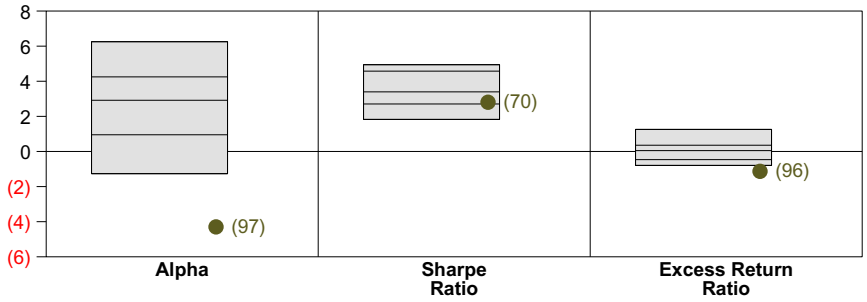


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	8.69	10.81	10.52	10.97	15.46	19.54	16.01	17.17	19.31	23.45
25th Percentile	6.89	9.28	8.99	9.63	14.13	14.94	14.12	14.36	16.81	17.28
Median	5.24	7.98	7.70	8.50	12.31	12.66	12.28	12.11	13.48	12.53
75th Percentile	3.77	6.87	6.17	7.03	8.04	10.89	9.99	9.78	10.89	6.85
90th Percentile	1.71	4.78	5.29	5.64	2.72	8.20	6.82	7.54	7.03	(0.23)
Real Estate ●	(0.72)	7.31	7.06	8.56	15.38	10.78	16.82	12.36	15.36	12.05
NCREIF NFI-ODCE Val Wt Gr ▲	3.77	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 September 30, 2019



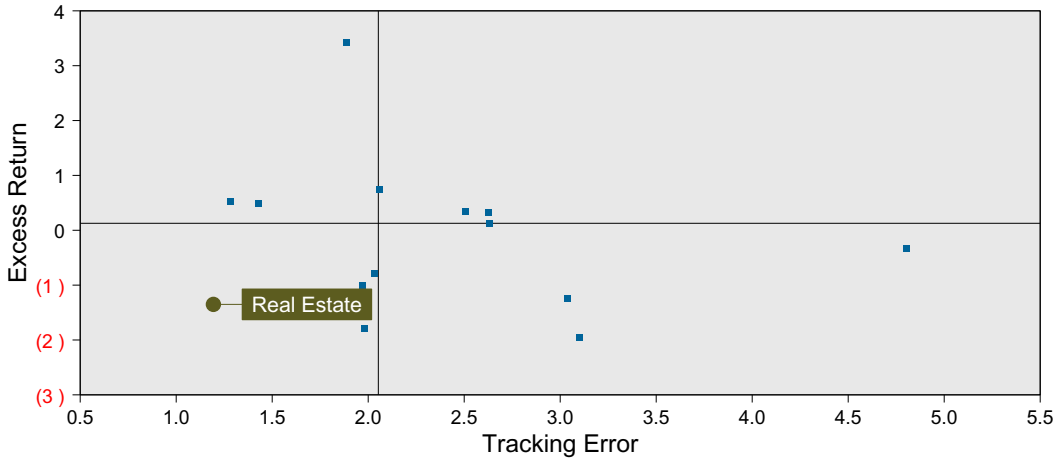
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	6.25	4.94	1.26
25th Percentile	4.25	4.58	0.36
Median	2.92	3.39	0.05
75th Percentile	0.95	2.71	(0.46)
90th Percentile	(1.26)	1.83	(0.79)
Real Estate ●	(4.30)	2.81	(1.13)

Real Estate
Risk Analysis Summary

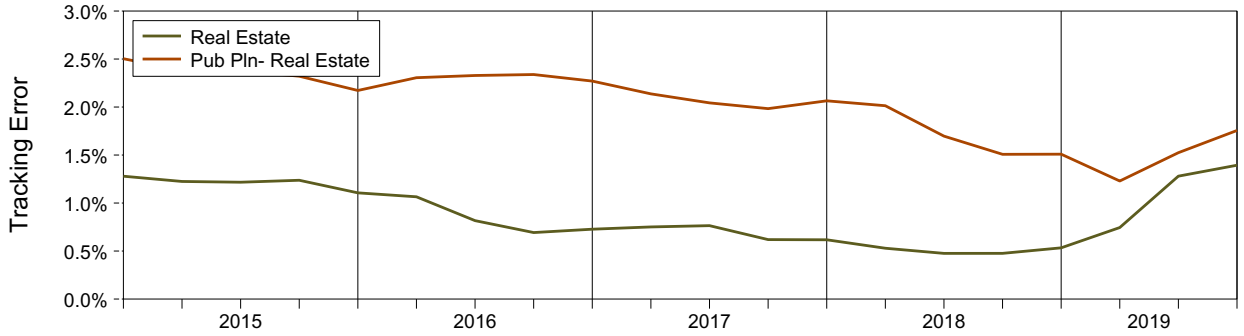
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows tracking error patterns versus the benchmark over time. The last two charts show the ranking of the manager's risk statistics versus the peer group.

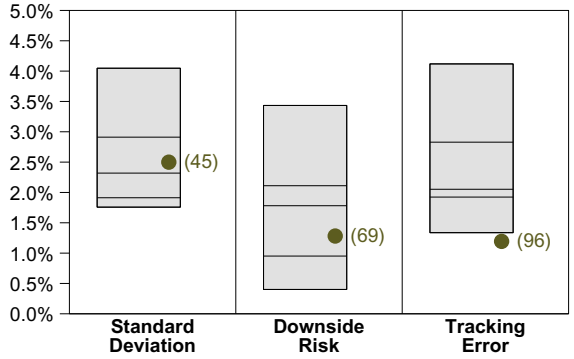
Risk Analysis vs Public Fund - Real Estate (Gross)
Five Years Ended September 30, 2019

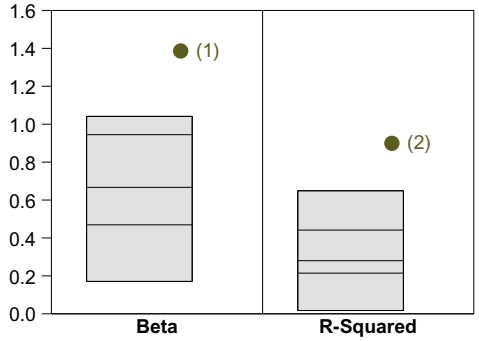


Rolling 12 Quarter Tracking Error vs NCREIF NFI-ODCE Value Weight Gross



Risk Statistics Rankings vs NCREIF NFI-ODCE Value Weight Gross
Rankings Against Public Fund - Real Estate (Gross)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	4.05	3.43	4.12
25th Percentile	2.91	2.11	2.83
Median	2.32	1.78	2.05
75th Percentile	1.91	0.95	1.92
90th Percentile	1.76	0.40	1.34
Real Estate ●	2.50	1.28	1.19

	Beta	R-Squared
10th Percentile	1.04	0.65
25th Percentile	0.94	0.44
Median	0.67	0.28
75th Percentile	0.47	0.21
90th Percentile	0.17	0.02
Real Estate ●	1.39	0.90

JP Morgan Strategic Property Fund
Period Ended September 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 2000.

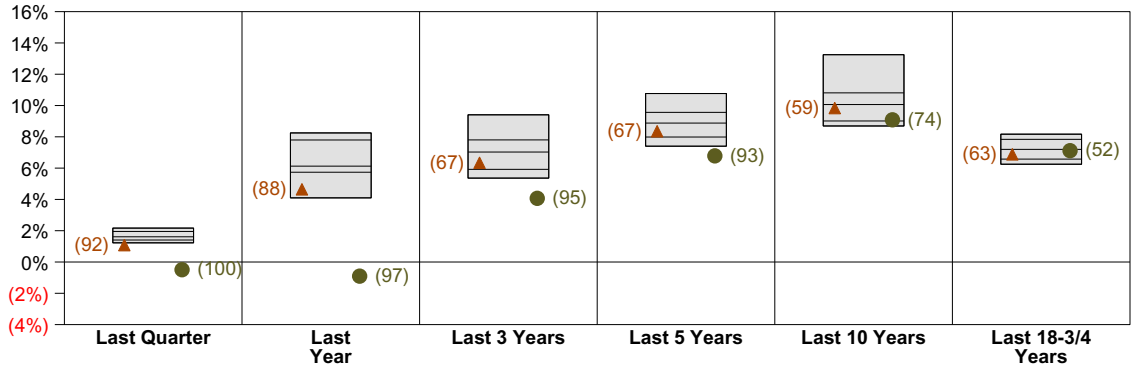
Quarterly Summary and Highlights

- JP Morgan Strategic Property Fund's portfolio posted a (0.49)% return for the quarter placing it in the 100 percentile of the Callan Open End Core Cmmingled Real Est group for the quarter and in the 97 percentile for the last year.
- JP Morgan Strategic Property Fund's portfolio underperformed the NCREIF NFI-ODCE Val Wt Nt by 1.57% for the quarter and underperformed the NCREIF NFI-ODCE Val Wt Nt for the year by 5.55%.

Quarterly Asset Growth

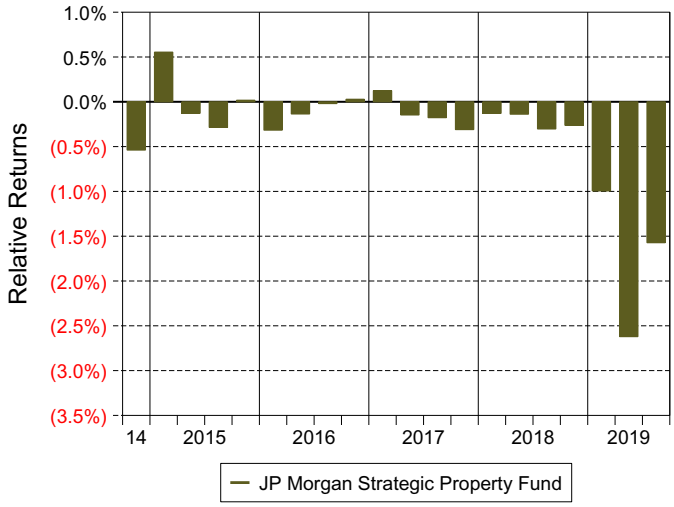
Beginning Market Value	$51,853,651
Net New Investment	$0
Investment Gains/(Losses)	$-255,832
Ending Market Value	$51,597,819

Performance vs Callan Open End Core Cmmingled Real Est (Net)

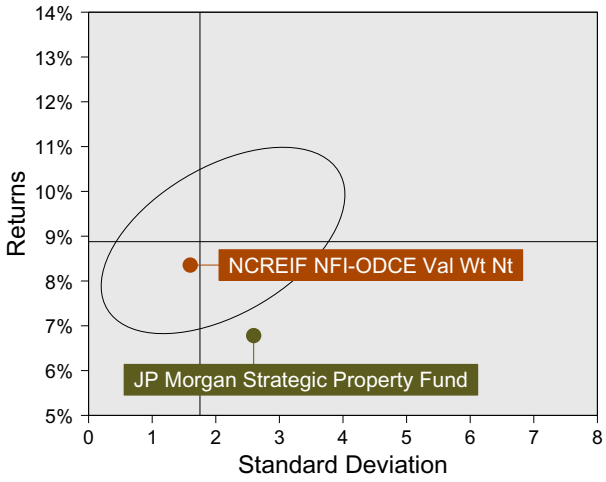


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 18-3/4 Years
10th Percentile	2.17	8.25	9.41	10.77	13.25	8.17
25th Percentile	1.95	7.80	7.80	9.56	10.81	7.84
Median	1.61	6.13	7.03	8.88	10.06	7.20
75th Percentile	1.41	5.74	5.92	7.99	9.01	6.58
90th Percentile	1.23	4.10	5.36	7.40	8.69	6.25
JP Morgan Strategic Property Fund ●	(0.49)	(0.90)	4.07	6.78	9.09	7.12
NCREIF NFI-ODCE Val Wt Nt ▲	1.08	4.64	6.34	8.36	9.84	6.88

Relative Returns vs NCREIF NFI-ODCE Val Wt Nt



Callan Open End Core Cmmingled Real Est (Net) Annualized Five Year Risk vs Return

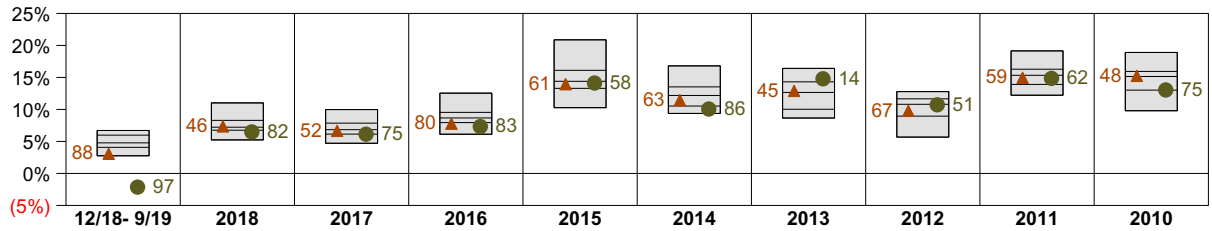


JP Morgan Strategic Property Fund
Return Analysis Summary

Return Analysis

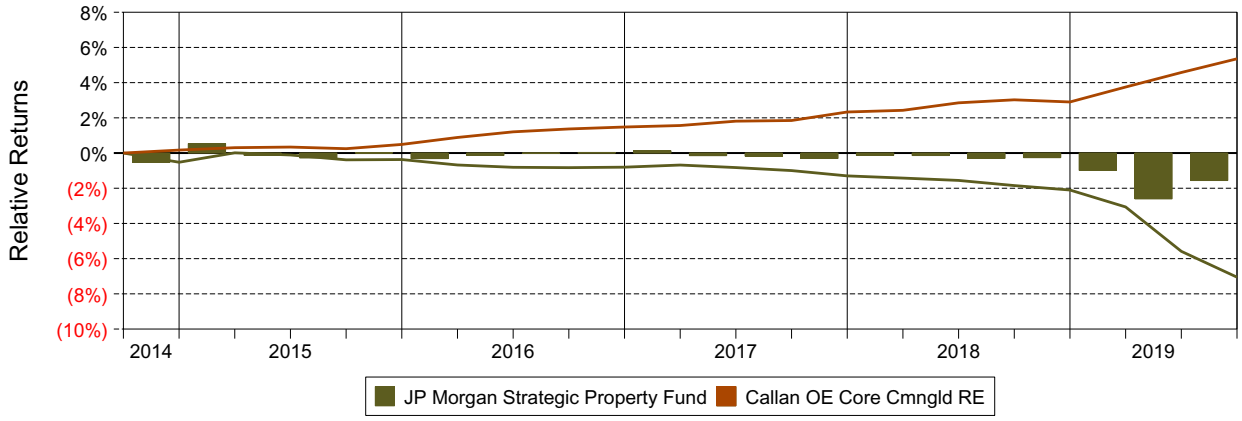
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

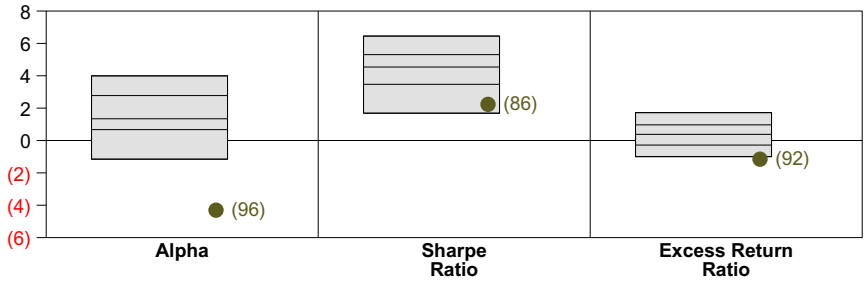


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	6.71	11.02	9.98	12.55	20.88	16.81	16.41	12.79	19.15	18.90
25th Percentile	5.98	8.29	7.86	9.54	16.11	13.53	14.31	11.66	16.29	15.94
Median	4.78	7.22	6.84	8.67	14.40	12.18	12.66	10.80	15.33	15.14
75th Percentile	4.08	6.75	6.15	7.95	13.29	10.53	10.03	8.95	13.91	13.02
90th Percentile	2.76	5.24	4.71	6.13	10.28	9.38	8.65	5.67	12.22	9.80
JP Morgan Strategic Property Fund ●	(2.14)	6.49	6.13	7.32	14.12	10.06	14.79	10.72	14.86	13.04
NCREIF NFI-ODCE Val Wt Nt ▲	3.08	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 September 30, 2019



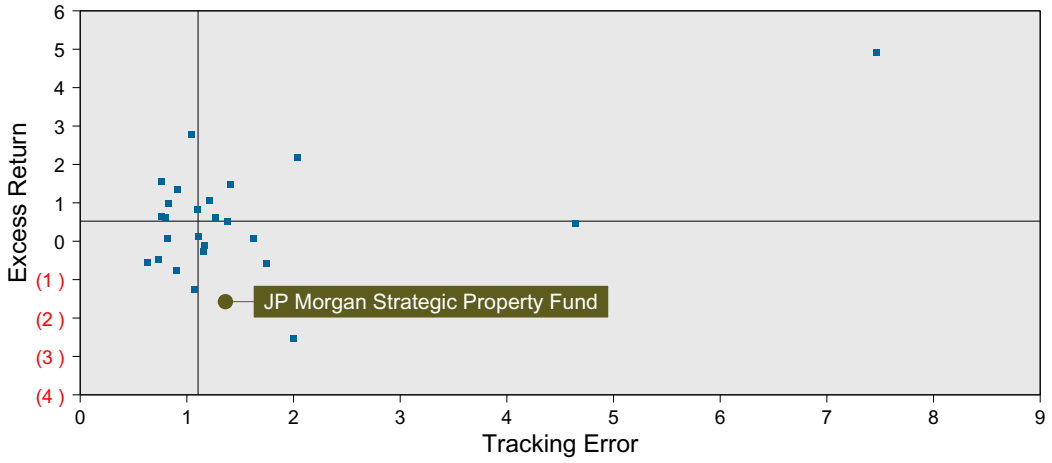
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	4.00	6.45	1.72
25th Percentile	2.78	5.31	0.97
Median	1.34	4.54	0.38
75th Percentile	0.67	3.47	(0.28)
90th Percentile	(1.15)	1.69	(1.00)
JP Morgan Strategic Property Fund ●	(4.31)	2.23	(1.16)

JP Morgan Strategic Property Fund
Risk Analysis Summary

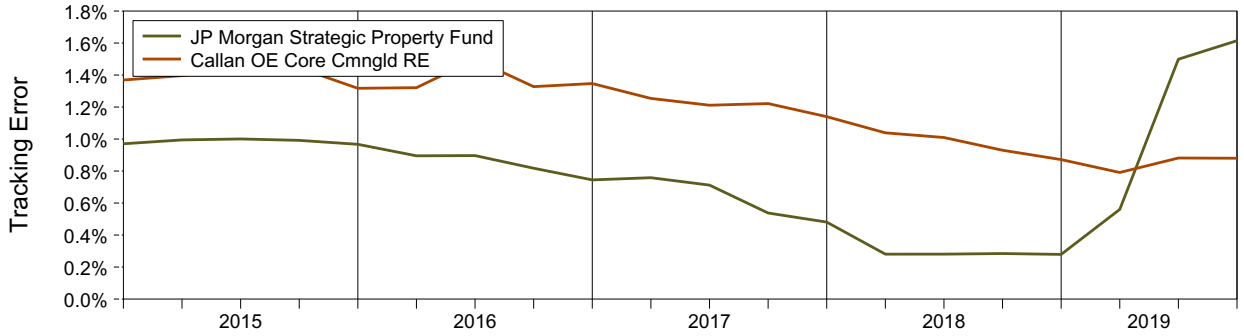
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows tracking error patterns versus the benchmark over time. The last two charts show the ranking of the manager's risk statistics versus the peer group.

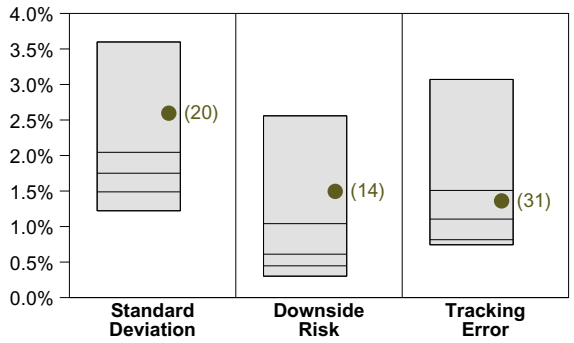
Risk Analysis vs Callan Open End Core Cmmingled Real Est (Net)
Five Years Ended September 30, 2019

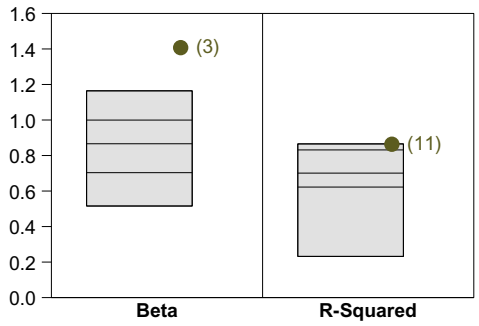


Rolling 12 Quarter Tracking Error vs NCREIF NFI-ODCE Value Weight Net



Risk Statistics Rankings vs NCREIF NFI-ODCE Value Weight Net
Rankings Against Callan Open End Core Cmmingled Real Est (Net)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	3.60	2.56	3.07
25th Percentile	2.04	1.04	1.51
Median	1.75	0.61	1.10
75th Percentile	1.49	0.45	0.81
90th Percentile	1.22	0.30	0.74
JP Morgan Strategic Property Fund ●	2.60	1.50	1.36

	Beta	R-Squared
10th Percentile	1.16	0.87
25th Percentile	1.00	0.83
Median	0.87	0.70
75th Percentile	0.70	0.62
90th Percentile	0.52	0.23
JP Morgan Strategic Property Fund ●	1.41	0.86

JP Morgan Income and Growth Fund
Period Ended September 30, 2019

Investment Philosophy

The product was funded in the fourth quarter of 2005.

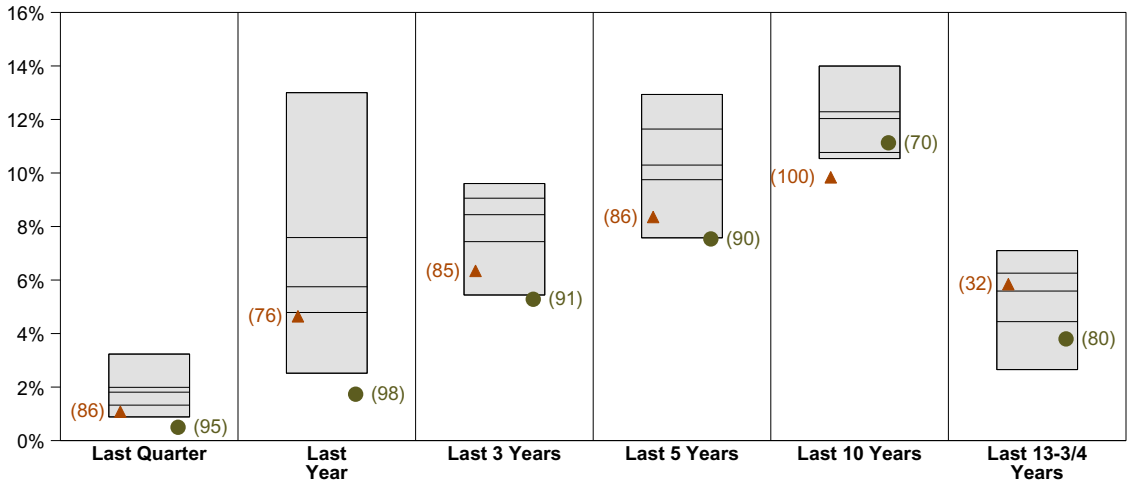
Quarterly Summary and Highlights

- JP Morgan Income and Growth Fund's portfolio posted a 0.50% return for the quarter placing it in the 95 percentile of the Callan Real Estate Val Add Open End Fds group for the quarter and in the 98 percentile for the last year.
- JP Morgan Income and Growth Fund's portfolio underperformed the NCREIF NFI-ODCE Val Wt Nt by 0.58% for the quarter and underperformed the NCREIF NFI-ODCE Val Wt Nt for the year by 2.91%.

Quarterly Asset Growth

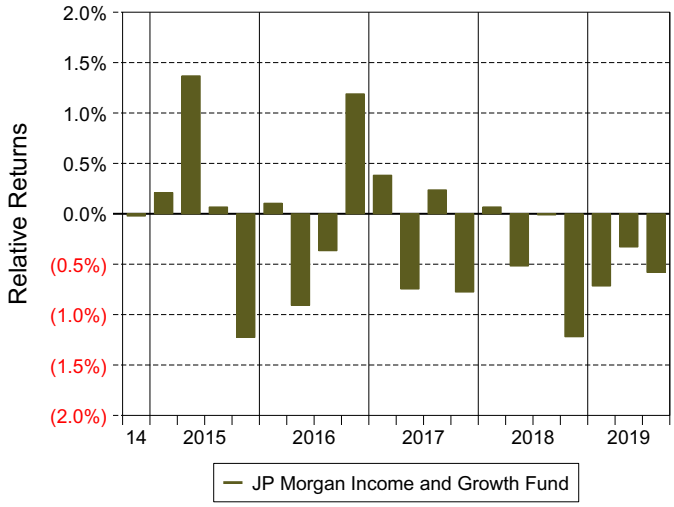
Beginning Market Value	$25,644,966
Net New Investment	$-240,114
Investment Gains/(Losses)	$127,177
Ending Market Value	$25,532,029

Performance vs Callan Real Estate Val Add Open End Fds (Net)

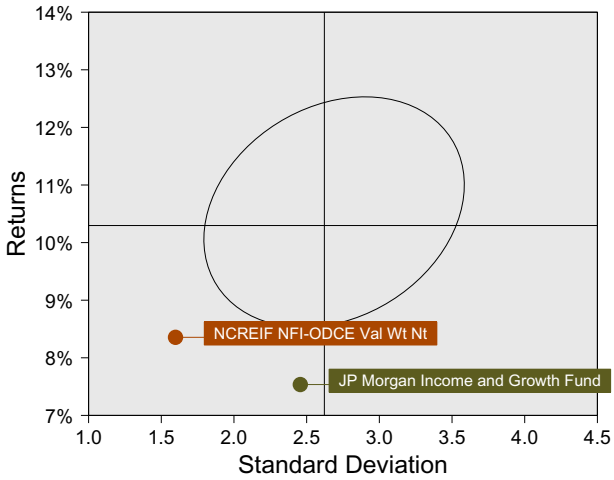


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 13-3/4 Years
10th Percentile	3.23	13.00	9.61	12.94	14.00	7.10
25th Percentile	1.99	7.59	9.06	11.64	12.29	6.26
Median	1.81	5.75	8.44	10.30	12.03	5.59
75th Percentile	1.33	4.79	7.43	9.75	10.77	4.45
90th Percentile	0.89	2.52	5.44	7.58	10.54	2.65
JP Morgan Income and Growth Fund ●	0.50	1.73	5.28	7.54	11.13	3.80
NCREIF NFI-ODCE Val Wt Nt ▲	1.08	4.64	6.34	8.36	9.84	5.84

Relative Returns vs NCREIF NFI-ODCE Val Wt Nt



Callan Real Estate Val Add Open End Fds (Net) Annualized Five Year Risk vs Return

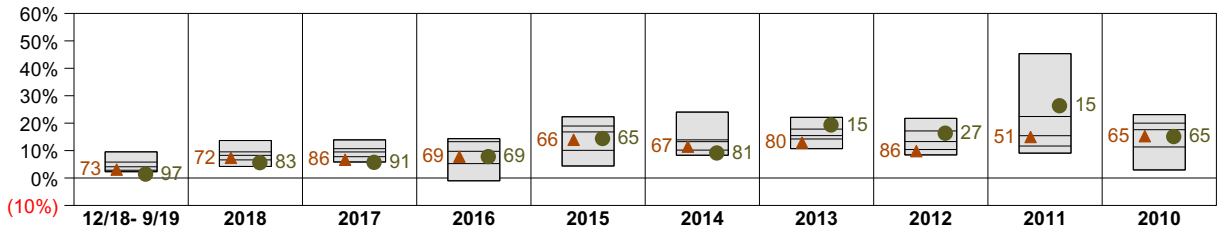


JPM Income and Growth Fund
Return Analysis Summary

Return Analysis

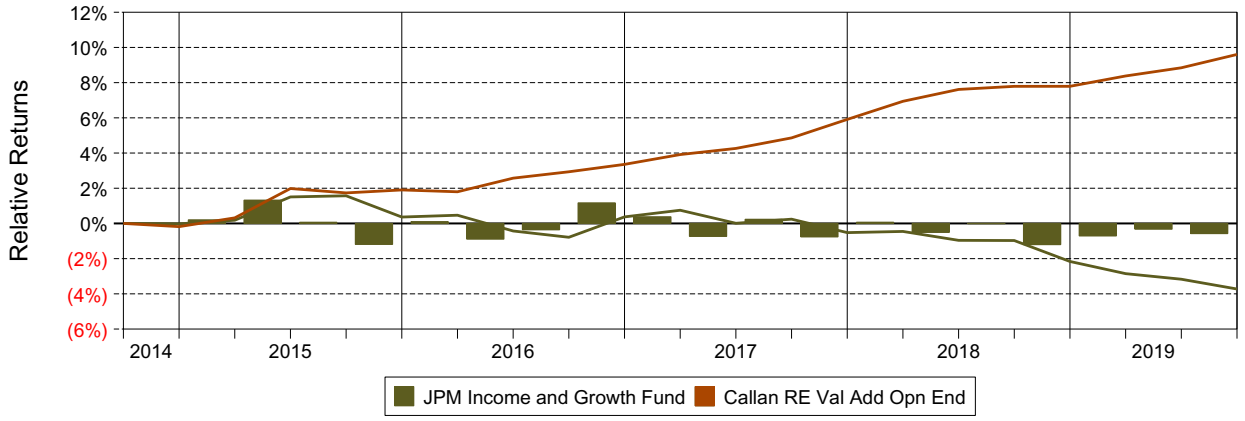
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

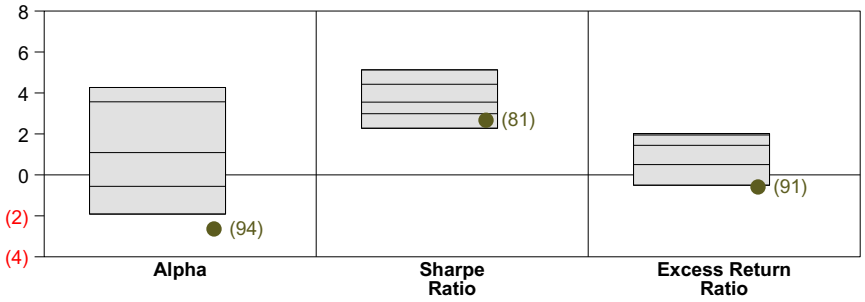


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	9.54	13.67	13.90	14.34	22.33	24.03	22.12	21.75	45.34	23.11
25th Percentile	5.81	9.54	10.69	13.24	18.95	13.91	17.84	17.17	22.42	20.00
Median	4.10	8.26	9.50	9.74	16.80	13.25	15.46	13.28	15.42	17.62
75th Percentile	2.83	6.60	7.78	5.25	10.09	10.18	14.23	10.39	11.66	11.32
90th Percentile	2.29	4.21	5.84	(1.02)	4.38	8.30	10.70	8.43	9.06	2.94
JPM Income and Growth Fund ●	1.43	5.59	5.71	7.80	14.39	9.13	19.35	16.33	26.36	15.12
NCREIF NFI-ODCE Val Wt Nt ▲	3.08	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 September 30, 2019



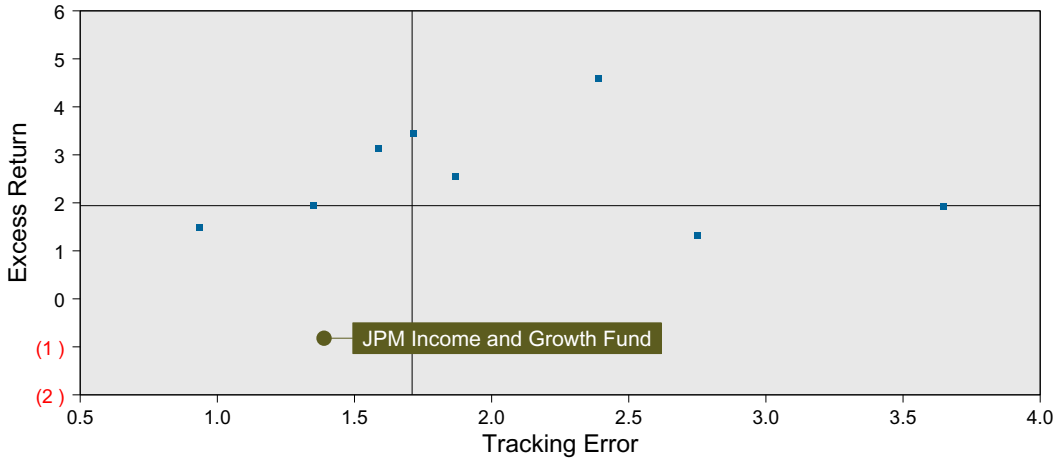
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	4.27	5.13	2.02
25th Percentile	3.57	4.42	1.95
Median	1.09	3.55	1.44
75th Percentile	(0.56)	2.99	0.50
90th Percentile	(1.91)	2.28	(0.51)
JPM Income and Growth Fund ●	(2.64)	2.67	(0.59)

JPM Income and Growth Fund
Risk Analysis Summary

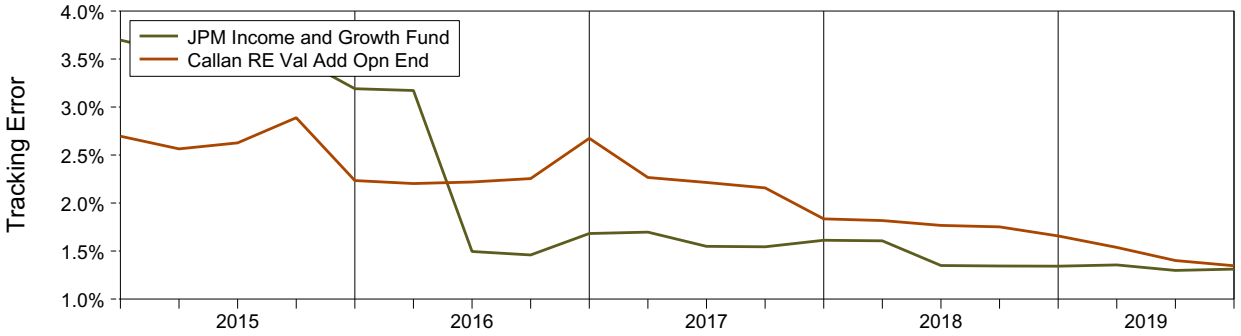
Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows tracking error patterns versus the benchmark over time. The last two charts show the ranking of the manager's risk statistics versus the peer group.

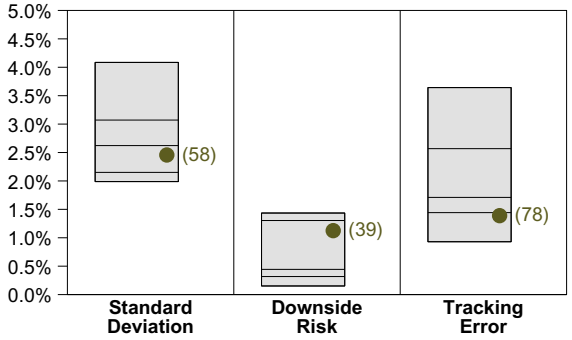
Risk Analysis vs Callan Real Estate Val Add Open End Fds (Net)
Five Years Ended September 30, 2019

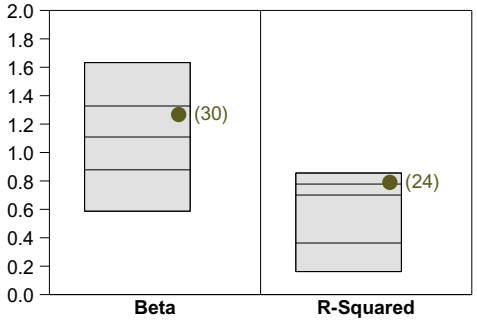


Rolling 12 Quarter Tracking Error vs NCREIF NFI-ODCE Value Weight Net



Risk Statistics Rankings vs NCREIF NFI-ODCE Value Weight Net
Rankings Against Callan Real Estate Val Add Open End Fds (Net)
Five Years Ended September 30, 2019





	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	4.09	1.44	3.64
25th Percentile	3.07	1.30	2.57
Median	2.62	0.44	1.71
75th Percentile	2.15	0.32	1.44
90th Percentile	1.99	0.15	0.93
JPM Income and Growth Fund ●	2.46	1.13	1.39

	Beta	R-Squared
10th Percentile	1.63	0.86
25th Percentile	1.33	0.78
Median	1.11	0.70
75th Percentile	0.88	0.36
90th Percentile	0.59	0.16
JPM Income and Growth Fund ●	1.27	0.79

Infrastructure

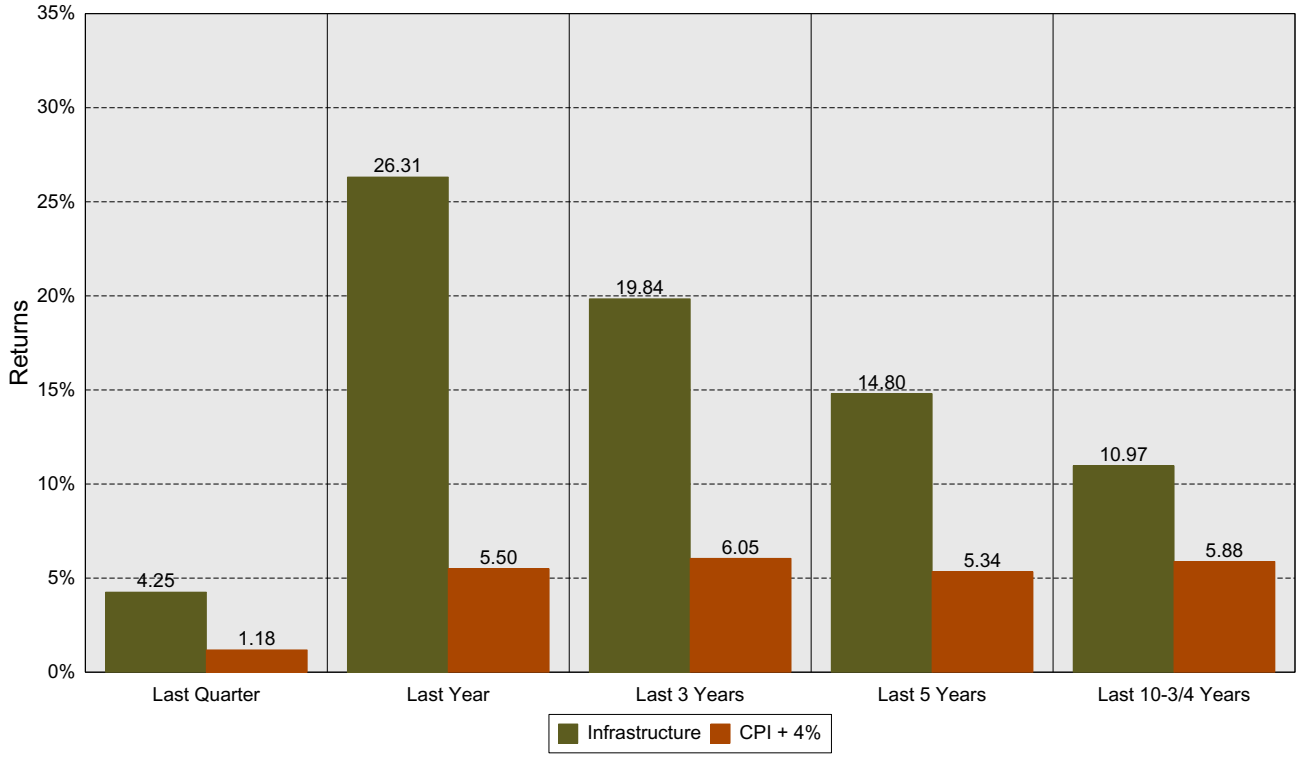
Infrastructure
Period Ended September 30, 2019

Quarterly Summary and Highlights

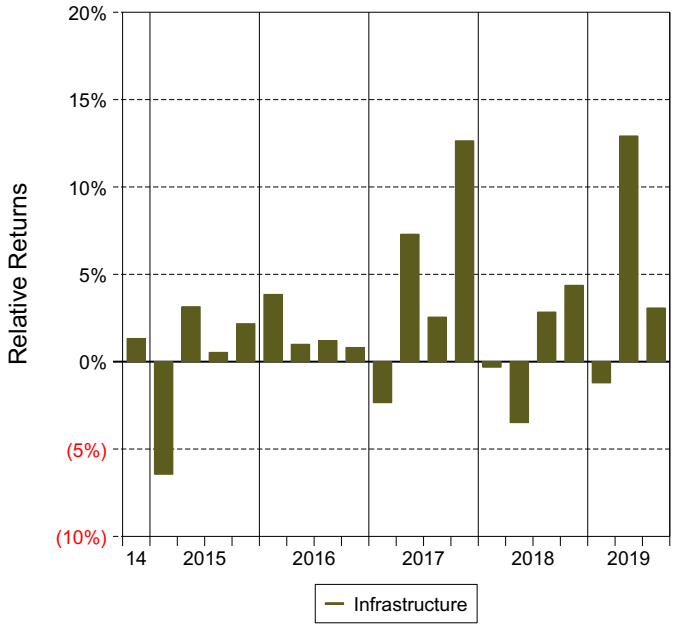
- Infrastructure's portfolio outperformed the CPI + 4% by 3.07% for the quarter and outperformed the CPI + 4% for the year by 20.82%.

Quarterly Asset Growth

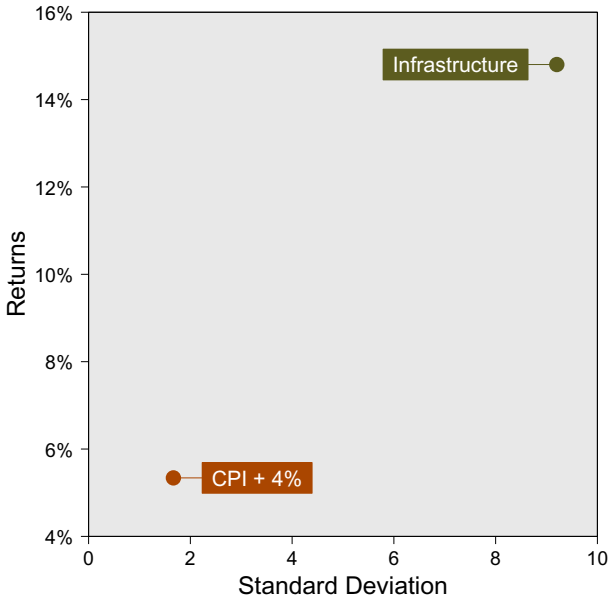
Beginning Market Value	$39,714,821
Net New Investment	$-4,750,744
Investment Gains/(Losses)	$1,637,107
Ending Market Value	$36,601,184



Relative Return vs CPI + 4%



Annualized Five Year Risk vs Return



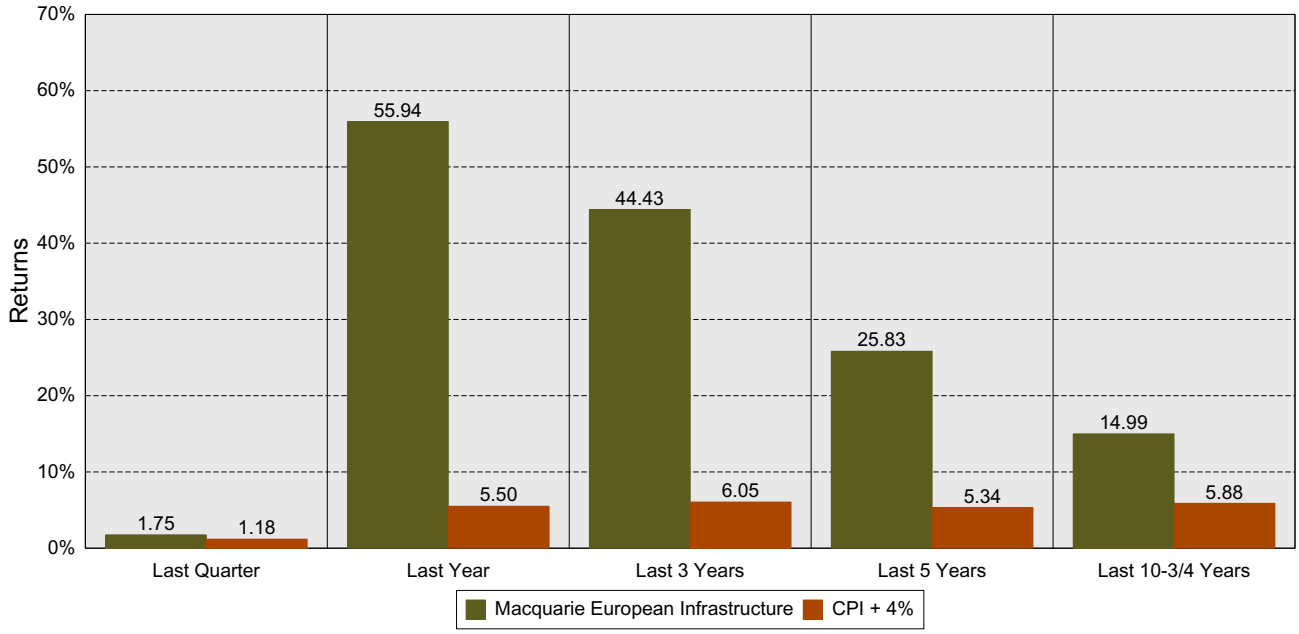
Macquarie European Infrastructure
Period Ended September 30, 2019

Investment Philosophy
The product was funded in the fourth quarter of 2008.

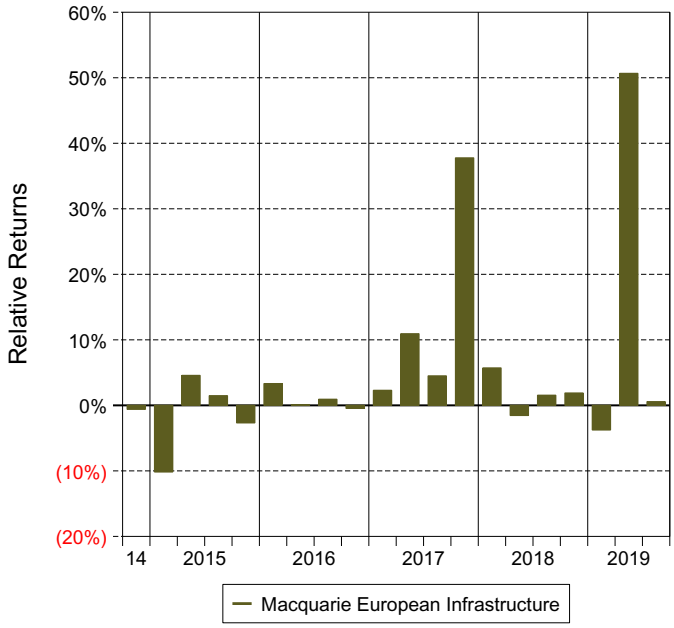
Quarterly Summary and Highlights
- Macquarie European Infrastructure's portfolio outperformed the CPI + 4% by 0.57% for the quarter and outperformed the CPI + 4% for the year by 50.45%.

Quarterly Asset Growth

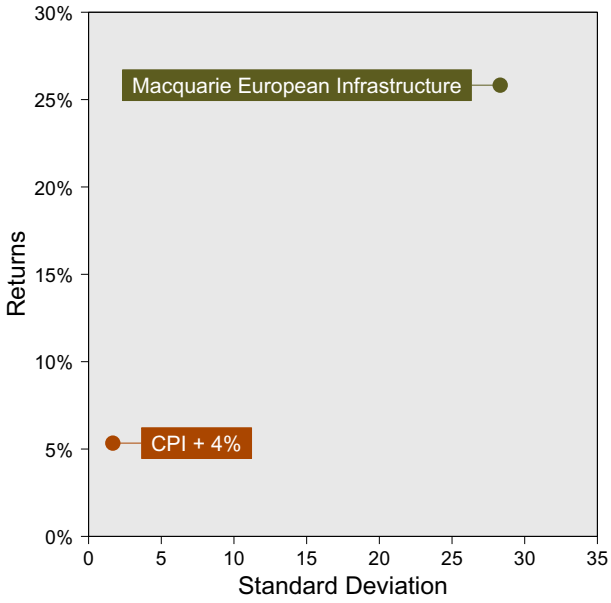
Beginning Market Value	$12,707,974
Net New Investment	$-179,416
Investment Gains/(Losses)	$215,106
Ending Market Value	$12,743,664



Relative Return vs CPI + 4%



Annualized Five Year Risk vs Return



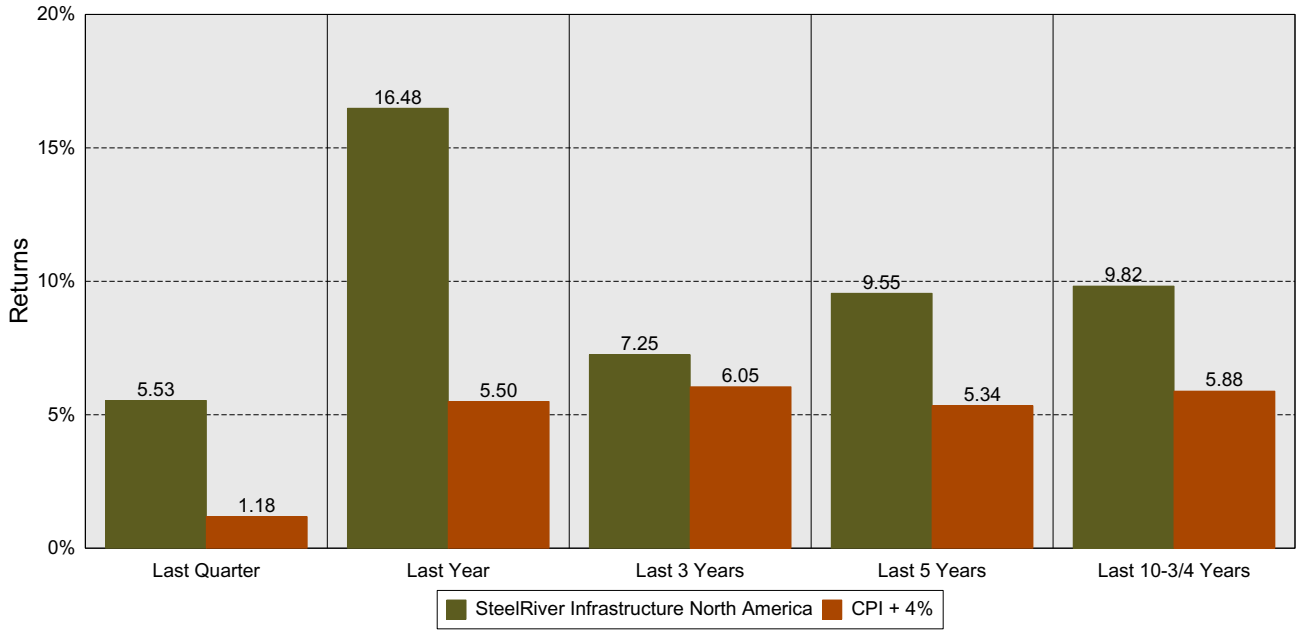
SteelRiver Infrastructure North America
Period Ended September 30, 2019

Investment Philosophy
The product was funded in the fourth quarter of 2008.

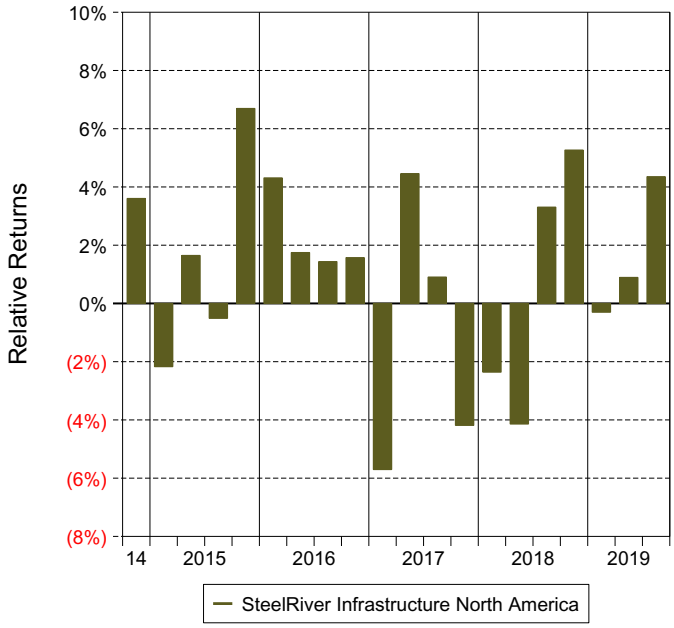
Quarterly Summary and Highlights
- SteelRiver Infrastructure North America's portfolio outperformed the CPI + 4% by 4.35% for the quarter and outperformed the CPI + 4% for the year by 10.99%.

Quarterly Asset Growth

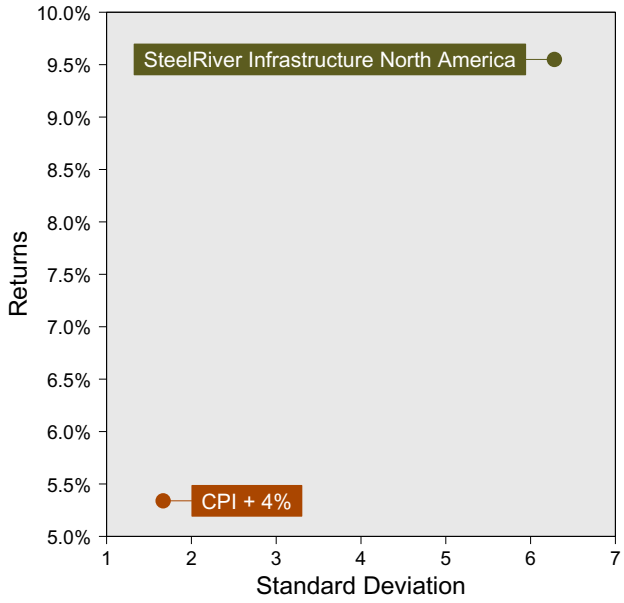
Beginning Market Value	$27,006,847
Net New Investment	$-4,571,328
Investment Gains/(Losses)	$1,422,001
Ending Market Value	$23,857,520



Relative Return vs CPI + 4%



Annualized Five Year Risk vs Return



Common Stock Portfolio Characteristics

All Portfolio Characteristics are derived by first calculating the characteristics for each security, and then calculating the weighted average of these values for the portfolio.

Cash Flow/Sales - Cash flow divided by sales. Cash flow is the cash generated by a company after all cash expenses, including income taxes and minority interest, but before provision for dividends. Expenses do not include non-cash expenses such as depreciation. Sales represent gross sales reduced by cash discounts, returned sales, etc.

Debt to Capital Ratio - The Debt to Capital ratio is a measure of the level of total debt of a company as a portion of the total capital. The Debt to Capital Ratio is equal to Total Debt divided by Total Capital. Total Debt includes both current and long term debt. Total Capital is equal to all invested capital. The invested capital includes: 1)Total Debt; 2) the carrying value (par or stated value per share) or preferred stock; 3) the par or stated value of preferred or common stocks not owned by the parent company; and 4) common equity, which includes common stock, capital surplus, and retained earnings.

Diversification Ratio - The ratio of the number of securities comprising the most concentrated half of the portfolio market value (see Issue Concentration) divided by the total number of portfolio securities (see Number of Securities). This value expresses to what extent a portfolio is equally weighted versus concentrated, given the number of names in the portfolio. This value can range from a high of 50% (equal weighted) to a low of 1% (half of the portfolio in 1% of the names).

Dividends/Cash Flow - The Dividend/Cash Flow ratio is a measure of the sustainability or safety of a given dividend payment amount. Common stock dividends divided by cash flow. The common stock dividends are the total dollar amount of dividends for a stock over the preceding twelve months. Cash flow is the cash generated by a company after all cash expenses, including income taxes and minority interest, but before the provision for dividends.

Earnings/Sales - Earnings/Sales is a measure of a company's profitability, specifically measuring the relationship between the firm's costs and its sales. The value is equal to the earnings of a company divided by net sales. Earnings represent the income of a company after all expenses, income taxes, and minority interest, but before provisions for common and/or preferred stock dividends. Sales represent gross sales reduced by cash discounts, returned sales, etc.

Forecasted Earnings Yield - This "yield" is a forward-looking valuation measure of a company's common stock. It expresses the amount of earnings estimated for next year per dollar of current share price as a percentage yield. This value is calculated by dividing, for each stock, the consensus (mean) analysts' earnings forecasts for the next year by the current share price. These earnings estimates are for recurring, non-extraordinary earnings per primary common share. The individual earnings yields (E/P) are then weighted by their respective portfolio market values in order to calculate a weighted average representative of the portfolio as a whole.

Forecasted Long-Term Earnings Growth - This growth rate is a measure of a company's expected long-term success in generating future year-over-year earnings growth. This growth rate is a market value weighted average of the consensus (mean) analysts' long-term earnings growth rate forecast for each company in the portfolio. The definition of long-term varies by analyst but is limited to a 3-8 year range. This value is expressed as the expected average annual growth of earnings in percent.

Forecasted Price/Earnings Ratio - This ratio is a forward-looking valuation measure of a company's common stock. It encapsulates the amount of earnings estimated for next year per dollar of current share price. This value is calculated by dividing the present stock price of each company in the portfolio by the consensus (mean) analysts' earnings forecasts for the next year. These earnings estimates are for recurring, non-extraordinary earnings per primary common share.

Common Stock Portfolio Characteristics

Growth in Assets - This value represents a weighted average five year annual growth rate of assets per common stock share. The rates of growth in assets for trailing twelve month periods are calculated using the assets-per-share values for each time period. The five-year growth in assets figure is calculated for each security in a portfolio. From these individual values, a weighted average value is calculated for the portfolio. The number of shares in each time period is adjusted to reflect any splits, mergers, or other capital changes. Total Assets includes the sum of current, non-current, and intangible assets.

Growth in Book Value - This value represents a weighted average five year annual growth rate of book value per common stock share. The rates of growth in book value for trailing twelve month periods are calculated using the book value-per-share values for each time period. The five-year growth in book value figure is calculated for each security in a portfolio. From these individual values, a weighted average value is calculated for the portfolio. The number of shares in each time period is adjusted to reflect any splits, mergers, or other capital changes. Total Book Value is the sum of the common stock outstanding, capital surplus, and retained earnings.

Growth in Cash Flows - This value represents a weighted average five year annual growth rate of cash flow per common stock share. The rates of growth in cash flow for trailing twelve month periods are calculated using the cash flow-per-share values for each time period. The five-year growth in cash flow figure is calculated for each security in a portfolio. From these individual values, a weighted average value is calculated for the portfolio. The number of shares in each time period is adjusted to reflect any splits, mergers, or other capital changes. Cash flow is the cash generated by a company after all cash expenses, including income taxes and minority interest, but before provision for dividends. In this case, common shares are the shares used to calculate primary earnings per share. Primary earnings per share are earnings per share that are not diluted, because it is assumed that securities that are convertible into equities are not converted.

Growth in Sales - This value represents a weighted average five year annual growth rate of sales per common stock share. The rates of growth in sales for trailing twelve month periods are calculated using the sales-per-share values for each time period. The five-year growth in sales figure is calculated for each security in a portfolio. From these individual values, a weighted average value is calculated for the portfolio. The number of shares in each time period is adjusted to reflect any splits, mergers, or other capital changes. Sales represent gross sales reduced by cash discounts, return sales, etc. In this case, common shares are the shares used to calculate primary earnings per share. Primary earnings per share are earnings per share that are not diluted, because it is assumed that securities that are convertible into equities are not converted.

Interest/Pretax Earnings - This value is used as a measure of the ability of a company to meet interest payments out of earnings. The ratio is equal to the interest expense divided by earnings. Earnings are the value before: 1) interest expense, the expense of securing both short and long-term debt; 2) state, federal, and foreign taxes; 3) extraordinary items and discontinued operation; 4) provision for common and preferred dividends; and 5) minority interests, which is that portion of the consolidated subsidiary income applicable to common stock not owned by the parent company.

MSCI Combined Z-Score is a holdings-based measure of the "growthyness" or "valueyness" of an individual stock or portfolio of stocks based on fundamental financial ratio analysis. The Combined Z-Score is the difference between the MSCI Growth Z-Score and the MSCI Value Z-Score (Growth-Value). The underlying Growth Z-Score is an aggregate score based on 5 financial fundamentals: Long Term Forward Earnings Growth, Short Term Forward Earnings Growth, Current Internal Growth Rate, Long Term Historical Earnings Growth and Long Term Historical Sales Growth. The underlying Value Z-Score is an aggregate score based on 3 financial fundamentals: Price/Book, Price/Forward Earnings, and Dividend Yield. The MSCI Combined Z-Score usually ranges between +2 and -2. A significantly positive Combined Z-Score implies significant portfolio "growthyness". A Combined Z-Score close to 0.0 (positive or negative) implies "core-like" characteristics, and a significantly negative Combined Z-Score implies portfolio "valueyness".

Common Stock Portfolio Characteristics

MSCI Growth Z-Score is a holdings-based measure of the "growthyness" of an individual stock or portfolio of stocks based on fundamental financial ratio analysis. The Growth Z-Score is an aggregate score based on the growth scores of 5 separate financial fundamentals: Long Term Forward Earnings Growth, Short Term Forward Earnings Growth, Current Internal Growth (ROE * (1-payout ratio)), Long Term Historical Earnings Growth and Long Term Historical Sales Growth. The MSCI Growth Z-Score usually ranges between +3 and -3. A significantly positive Growth Z-Score implies significant "growthyness" in the stock or portfolio. A Growth Z-Score close to 0.0 (positive or negative) implies "core-like" style characteristics, and a significantly negative Growth Z-Score implies more "valueyness" in the stock or portfolio (although the MSCI Value Z-Score should be used to confirm this).

MSCI Value Z-Score is a holdings-based measure of the "valueyness" of an individual stock or portfolio of stocks based on fundamental financial ratio analysis. The Value Z-Score is an aggregate score based on the value scores of 3 separate financial fundamentals: Price/Book, Price/Forward Earnings, and Dividend Yield. The MSCI Value Z-Score usually ranges between +3 and -3. A significantly positive Value Z-Score implies significant "valueyness" in the stock or portfolio. A Value Z-Score close to 0.0 (positive or negative) implies "core-like" style characteristics, and a significantly negative Value Z-Score implies more "growthyness" in the stock or portfolio (although the MSCI Growth Z-Score should be used to confirm this).

Market Capitalization (weighted median) - The weighted median market cap is the point at which half of the market value of the portfolio is invested in stocks with a greater market cap, and consequently the other half is invested in stocks with a lower market cap.

Payout Ratio - The Payout Ratio describes the portion of earnings over a twelve month period that is paid out as dividends and addresses the sustainability of a given dividend level. The ratio is equal to ex-dividends per share divided by fully diluted earnings per share, excluding extraordinary items and discontinued operations. Ex-dividend implies that the dividend is declared but not paid and that a buyer of a stock after an ex-dividend does not receive the dividend. Fully diluted earnings per share are earnings that are reduced or diluted, by assuming the conversion of all securities that are convertible into equities.

Plant and Equipment/Assets - This ratio shows the portion of Total Assets that consists of capital goods permanently employed in the business of a company. The ratio is equal to the book value of gross plant and equipment assets divided by the total assets. Plant and equipment includes land, buildings, machinery, and any other equipment permanently employed in the business of a company. Total assets includes the sum of all current, non-current, and intangible assets.

R & D/Sales - Research and development expenditures divided by sales. Research and development expenses are costs that relate to the development of new products or services. Sales represent gross sales reduced by cash discounts, returned sales, etc.

Relative Sector Variance - A measure illustrating how significantly a portfolio currently differs from the sector weights of the index. This measure is the sum of the differences (absolute value) between the portfolio and index sector weights across all sectors. The higher the number the more aggressive the deviation from the index sector weights, and vice versa. This relative risk measure can help explain the magnitude of past tracking error and potential future tracking error versus the index.

S & P Rating - This is the Standard and Poor's market weighted average rating of all of the rated securities in the portfolio. Stock ratings are intended to provide an objective measure of the risk of a company in terms of the perceived level of stability in earnings and dividends. Securities which are not rated by Standard and Poor's are excluded from the weighted average rating.

Common Stock Portfolio Characteristics

Sales - Equal to gross sales and earnings from interest, dividends, and rents. Gross sales is the amount of actual billings to customers for delivery of products and services in exchange for cash, a promise to pay, or a money equivalent, reduced by returns, allowances, and discounts. Earnings from interest, dividends, and rents is net of transaction costs.

Sector Concentration - A measure of current portfolio diversification by economic sector (equity) or market sector (fixed income) to illustrate potential risk from concentrated sector exposures. The measure itself represents how few sectors contain half of the portfolio market value. A low number means the assets are concentrated in a few sectors and potentially highly exposed to the risks of those sectors.

Total Assets - Everything a company owns or is due. Includes all current, non-current, and intangible assets. Current assets include cash, temporary investments, receivables, inventories, and prepaid expenses. Non-current assets include fixed assets such as buildings and machinery. Intangible assets include such items as patents and goodwill.

Value of Holdings - This represents the total market value of all the securities in the portfolio, computed as the sum of the products of the closing value per share and the number of shares of each security held in the portfolio.

Fixed Income Portfolio Characteristics

All Portfolio Characteristics are derived by first calculating the characteristics for each security, and then calculating the market value weighted average of these values for the portfolio.

Allocation by Sector - Sector allocation is one of the tools which managers often use to add value without impacting the duration of the portfolio. The sector weights exhibit can be used to contrast a portfolio's weights with those of the index to identify any significant sector bets.

Average Coupon - The average coupon is the market value weighted average coupon of all securities in the portfolio. The total portfolio coupon payments per year are divided by the total portfolio par value.

Average Moody's Rating for Total Portfolio - A measure of the credit quality as determined by the individual security ratings. The ratings for each security, from Moody's Investor Service, are compiled into a composite rating for the whole portfolio. Quality symbols range from Aaa+ (highest investment quality - lowest credit risk) to C (lowest investment quality - highest credit risk).

Average Option Adjusted (Effective) Convexity - Convexity is a measure of the portfolio's exposure to interest rate risk. It is a measure of how much the duration of the portfolio will change given a change in interest rates. Generally, securities with negative convexities are considered to be risky in that changes in interest rates will result in disadvantageous changes in duration. When a security's duration changes it indicates that the stream of expected future cash-flows has changed, generally having a significant impact on the value of the security. The option adjusted convexity for each security in the portfolio is calculated using models developed by Lehman Brothers and Salomon Brothers which determine the expected stream of cash-flows for the security based on various interest rate scenarios. Expected cash-flows take into account any put or call options embedded in the security, any expected sinking-fund paydowns or any expected mortgage principal prepayments.

Average Option Adjusted (Effective) Duration - Duration is one measure of the portfolio's exposure to interest rate risk. Generally, the higher a portfolio's duration, the more that its value will change in response to interest rate changes. The option adjusted duration for each security in the portfolio is calculated using models developed by Lehman Brothers and Salomon Brothers which determine the expected stream of cash-flows for the security based on various interest rate scenarios. Expected cash-flows take into account any put or call options embedded in the security, any expected sinking-fund paydowns or any expected mortgage principal prepayments.

Average Price - The average price is equal to the portfolio market value divided by the number of securities in the portfolio. Portfolios with an average price above par will tend to generate more current income than those with an average price below par.

Average Years to Expected Maturity - This is a measure of the market-value-weighted average of the years to expected maturity across all of the securities in the portfolio. Expected years to maturity takes into account any put or call options embedded in the security, any expected sinking-fund paydowns or any expected mortgage principal prepayments.

Average Years to Stated Maturity - The average years to stated maturity is the market value weighted average time to stated maturity for all securities in the portfolio. This measure does not take into account imbedded options, sinking fund paydowns, or prepayments.

Current Yield - The current yield is the current annual income generated by the total portfolio market value. It is equal to the total portfolio coupon payments per year divided by the current total portfolio market value.

Fixed Income Portfolio Characteristics

Duration Dispersion - Duration dispersion is the market-value weighted standard deviation of the portfolio's individual security durations around the total portfolio duration. The higher the dispersion, the more variable the security durations relative to the total portfolio duration ("barbellness"), and the smaller the dispersion, the more concentrated the holdings' durations around the overall portfolio's ("bulletness"). The purpose of this statistic is to gauge the "bulletness" or "barbellness" of a portfolio relative to its total duration and to that of its benchmark index.

Effective Yield - The effective yield is the actual total annualized return that would be realized if all securities in the portfolio were held to their expected maturities. Effective yield is calculated as the internal rate of return, using the current market value and all expected future interest and principal cash flows. This measure incorporates sinking fund paydowns, expected mortgage principal prepayments, and the exercise of any "in-the-money" imbedded put or call options.

Weighted Average Life - The weighted average life of a security is the weighted average time to payment of all remaining principal. It is calculated by multiplying each expected future principal payment amount by the time left to the payment. This amount is then divided by the total amount of principal remaining. Weighted average life is commonly used as a measure of the investment life for pass-through security types for comparison to non-pass-through securities.

Risk/Reward Statistics

The risk statistics used in this report examine performance characteristics of a manager or a portfolio relative to a benchmark (market indicator) which assumes to represent overall movements in the asset class being considered. The main unit of analysis is the excess return, which is the portfolio return minus the return on a risk free asset (3 month T-Bill).

Alpha measures a portfolio's return in excess of the market return adjusted for risk. It is a measure of the manager's contribution to performance with reference to security selection. A positive alpha indicates that a portfolio was positively rewarded for the residual risk which was taken for that level of market exposure.

Beta measures the sensitivity of rates of portfolio returns to movements in the market index. A portfolio's beta measures the expected change in return per 1% change in the return on the market. If a beta of a portfolio is 1.5, a 1 percent increase in the return on the market will result, on average, in a 1.5 percent increase in the return on the portfolio. The converse would also be true.

Downside Risk stems from the desire to differentiate between "good risk" (upside volatility) and "bad risk" (downside volatility). Whereas standard deviation punishes both upside and downside volatility, downside risk measures only the standard deviation of returns below the target. Returns above the target are assigned a deviation of zero. Both the frequency and magnitude of underperformance affect the amount of downside risk.

Excess Return Ratio is a measure of risk adjusted relative return. This ratio captures the amount of active management performance (value added relative to an index) per unit of active management risk (tracking error against the index.) It is calculated by dividing the manager's annualized cumulative excess return relative to the index by the standard deviation of the individual quarterly excess returns. The Excess Return Ratio can be interpreted as the manager's active risk/reward tradeoff for diverging from the index when the index is mandated to be the "riskless" market position.

Information Ratio measures the manager's market risk-adjusted excess return per unit of residual risk relative to a benchmark. It is computed by dividing alpha by the residual risk over a given time period. Assuming all other factors being equal, managers with lower residual risk achieve higher values in the information ratio. Managers with higher information ratios will add value relative to the benchmark more reliably and consistently.

R-Squared indicates the extent to which the variability of the portfolio returns are explained by market action. It can also be thought of as measuring the diversification relative to the appropriate benchmark. An r-squared value of .75 indicates that 75% of the fluctuation in a portfolio return is explained by market action. An r-squared of 1.0 indicates that a portfolio's returns are entirely related to the market and it is not influenced by other factors. An r-squared of zero indicates that no relationship exists between the portfolio's return and the market.

Relative Standard Deviation is a simple measure of a manager's risk (volatility) relative to a benchmark. It is calculated by dividing the manager's standard deviation of returns by the benchmark's standard deviation of returns. A relative standard deviation of 1.20, for example, means the manager has exhibited 20% more risk than the benchmark over that time period. A ratio of .80 would imply 20% less risk. This ratio is especially useful when analyzing the risk of investment grade fixed-income products where actual historical durations are not available. By using this relative risk measure over rolling time periods one can illustrate the "implied" historical duration patterns of the portfolio versus the benchmark.

Residual Portfolio Risk is the unsystematic risk of a fund, the portion of the total risk unique to the fund (manager) itself and not related to the overall market. This reflects the "bets" which the manager places in that particular asset market. These bets may reflect emphasis in particular sectors, maturities (for bonds), or other issue specific factors which the manager considers a good investment opportunity. Diversification of the portfolio will reduce or eliminate the residual risk of that portfolio.

Risk/Reward Statistics

Rising Declining Periods refer to the sub-asset class cycles vis-a-vis the broader asset class. This is determined by evaluating the cumulative relative sub-asset class index performance to that of the broader asset class index. For example, to determine the Growth Style cycle, the S&P 500 Growth Index (sub-asset class) performance is compared to that of the S&P 500 Index (broader asset class).

Sharpe Ratio is a commonly used measure of risk-adjusted return. It is calculated by subtracting the "risk-free" return (usually 3 Month Treasury Bill) from the portfolio return and dividing the resulting "excess return" by the portfolio's risk level (standard deviation). The result is a measure of return gained per unit of risk taken.

Sortino Ratio is a downside risk-adjusted measure of value-added. It measures excess return over a benchmark divided by downside risk. The natural appeal is that it identifies value-added per unit of truly bad risk. The danger of interpretation, however, lies in these two areas: (1) the statistical significance of the denominator, and (2) its reliance on the persistence of skewness in return distributions.

Standard Deviation is a statistical measure of portfolio risk. It reflects the average deviation of the observations from their sample mean. Standard deviation is used as an estimate of risk since it measures how wide the range of returns typically is. The wider the typical range of returns, the higher the standard deviation of returns, and the higher the portfolio risk. If returns are normally distributed (ie. has a bell shaped curve distribution) then approximately 2/3 of the returns would occur within plus or minus one standard deviation from the sample mean.

Total Portfolio Risk is a measure of the volatility of the quarterly excess returns of an asset. Total risk is composed of two measures of risk: market (non-diversifiable or systematic) risk and residual (diversifiable or unsystematic) risk. The purpose of portfolio diversification is to reduce the residual risk of the portfolio.

Tracking Error is a statistical measure of a portfolio's risk relative to an index. It reflects the standard deviation of a portfolio's individual quarterly or monthly returns from the index's returns. Typically, the lower the Tracking Error, the more "index-like" the portfolio.

Treynor Ratio represents the portfolio's average excess return over a specified period divided by the beta relative to its benchmark over that same period. This measure reflects the reward over the risk-free rate relative to the systematic risk assumed.

Note: Alpha, Total Risk, and Residual Risk are annualized.

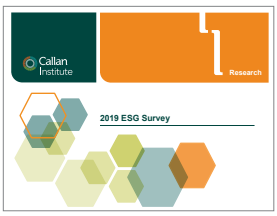
Callan Research/Education

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

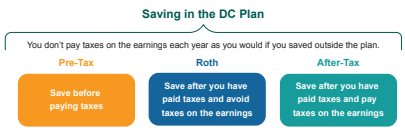
DTS Offers Some Key Advantages for Evaluating Fixed Income Portfolios | This paper describes duration times spread (DTS), which measures systematic credit-spread risk exposure. DTS estimates the return of any bond, by percentage, if its spread were to change from the current level, all else equal. DTS offers several advantages for monitoring risk in credit portfolios over other methods.



2019 ESG Survey | Callan's seventh annual survey assessing the status of environmental, social, and governance (ESG) investing in the U.S. institutional investment market.

Callan's DC Index in Detail | A video about the Callan DC Index™: why we started it, what it measures, and how it can benefit defined contribution plan sponsors.

DC Plan Hacks: Tips for an Efficient Design | Defined contribution plan sponsors should regularly evaluate their plans to make sure they serve the organization's benefits philosophy. When evaluating changes, the sponsor should consider its demographics, cost of benefits, vendor capabilities, impact on nondiscrimination testing, communication capabilities, and legal requirements.



2019 June Workshop Summary: In the Age of Illiquidity | For many nonprofits and defined benefit plans, the shift to higher-returning but less liquid asset classes has myriad implications. This summary discusses how consultants, institutional investors, and investment managers can work together to identify solutions tailored to each plan.

The Keys to Unlocking Private Equity Portfolio Assessment Private equity performance evaluation has some unique considerations, so return calculations and benchmarking methodologies differ from public securities. Closed-end private equity vehicles are assessed using ratio analyses and internal rate of return (IRR) measures. Using performance metrics, private equity portfolios can be evaluated at the partnership level, at the vintage year level, and then at the total portfolio level.

Survivorship Bias and the Walking Dead | Survivorship bias, the predisposition to evaluate a data set by focusing on the "survivors" rather than also examining the record of non-survivors, is important to understand for hedge fund peer groups, which tend to have a relatively large number of constituents that disappear. Using a proprietary approach, Callan is able to adjust peer group comparisons for survivorship bias. This better-informed perspective enables a more honest assessment in considering performance relative to other opportunities.

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 institutional investors, 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.

2020 National Conference
Celebrating the 40th anniversary of the Callan Institute
January 27-29, 2020 – San Francisco

Please also keep your eye out for upcoming Webinars in 2019! We will be sending invitations to register for these events and will also have registration links on our website at www.callan.com/webinarsupcoming.

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.

Introduction to Investments
April 21-22, 2020
July 21-22, 2020
This program familiarizes institutional investor trustees and 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.

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

Callan

Quarterly List as of September 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 an 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 Inc.
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
Aurelius Capital Management
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 LLC
Chartwell Investment Partners

Manager Name
ClearBridge Investments, LLC
Cohen & Steers Capital Management, Inc.
Columbia Threadneedle Investments
Columbus Circle Investors
Corbin Capital Partners, L.P.
Cooke & Bieler, L.P.
Credit Suisse Asset Management
DePrince, Race & Zollo, Inc.
Diamond Hill Capital Management, Inc.
Dimensional Fund Advisors LP
Doubleline
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Franklin Templeton
Fred Alger Management, Inc.
GAM (USA) Inc.
Glenmeade Investment Management, LP
GlobeFlex Capital, L.P.
Goldman Sachs
Green Square Capital Advisors, LLC
Guggenheim Investments
GW&K Investment Management
Harbor Capital Group Trust
Hartford Investment Management Co.

Manager Name
Heitman LLC
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HSBC Global Asset Management
Income Research + Management, Inc.
Insight Investment Management Limited
Intech Investment Management, LLC
Intercontinental Real Estate Corporation
Invesco
Investec Asset Management North America, Inc.
Ivy Investments
J.P. Morgan
Janus
Jarislowsky Fraser Global Investment Management
Jennison Associates LLC
Jobs Peak Advisors
KeyCorp
Lazard Asset Management
Legal & General Investment Management America
Lincoln National Corporation
LMCG Investments, LLC
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 Investment Management
Marathon Asset Management, L.P.
McKinley Capital Management, LLC
Mellon
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

Manager Name
Osterweis Capital Management, LLC
P/E Investments
Pacific Investment Management Company
Pathway Capital Management
Peregrine Capital Management, LLC.
Perkins Investment Management
PGIM Fixed Income
PineBridge Investments
PNC Capital Advisors, LLC
Polen Capital Management
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.
South Texas Money Management, Ltd.
State Street Global Advisors
Strategic Global Advisors
Stone Harbor Investment Partners, L.P.
Sun Life Investment Management
T. Rowe Price Associates, Inc.
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

CLIENT: Tucson Supplemental Retirement System		REPORT TYPE: IMS
ORGID: 10170	REPORT ID: 364	REPORT DATE: Sep 30, 2019

CONSULTANT	OFFICE	MAILING DUE DATE
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CLIENT: Tucson Supplemental Retirement System

Ms. Tina Gamez
Administrative Assistant
Tucson Supplemental Retirement System
255 W. Alameda Street, 5th Floor West
Tucson, AZ 85701

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2

D8

Callan

September 30, 2019

Tucson Supplemental Retirement System

Investment Measurement Service Quarterly Review

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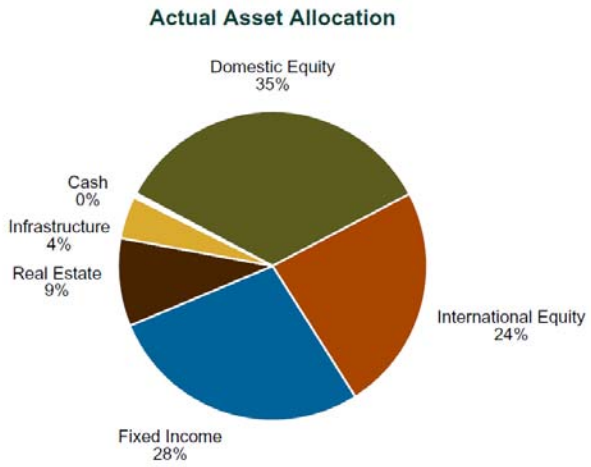
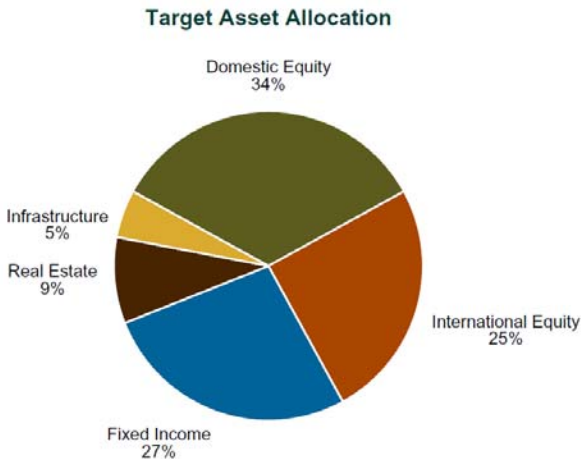
Tucson Supplemental Retirement System

Executive Summary for Period Ending September 30, 2019

Asset Allocation





Total Fund Performance

Returns for Periods Ended September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Total Fund Gross	0.44%	4.30%	9.05%	7.82%	9.63%
Total Fund Net	0.38%	3.95%	8.42%	7.26%	9.06%
Total Fund Benchmark*	0.73%	4.23%	7.70%	6.71%	8.76%

Returns for Fiscal Years Ended June 30th

	2019	2018	2017	2016	2015
Total Fund Gross	5.69%	9.81%	14.77%	2.33%	4.63%
Total Fund Net	6.29%	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

- JP Morgan Real Estate Americas announced several personnel changes effective as of the end of July, 2019:
  - Mike Kelly, formerly Head of Portfolio Management for JP Morgan Asset Management, has been elevated to Head of Real Estate Americas. He will take over the management and strategic direction of the Americas platform.
  - Ann Cole, formerly co-Portfolio Manager of JPMCB Strategic Property Fund (SPF) has been appointed to Global Head of Real Estate Client Strategy and will directly report to Kevin Faxon, Chairman Real Estate Americas.

- Lastly, Kim Adams has been promoted to Senior Portfolio Manager of SPF and the Fund's portfolio management team has been expanded to include Sue Kolasa and Steve Zaun. These changes are effective immediately.

Organizational Announcements

- N/A

Active Manager Performance

Fund	Peer Group Ranking		
	Last Year	Last 3 Years	Last 5 Years
PIMCO Stocks Plus	36	46	46
T. Rowe Price Large Cap Growth	71	10	11
Champlain Mid Cap	22	11	3
FIAM Small Cap	29	43	32
Causeway International Opportunities**	83	66	86
Aberdeen EAFE Plus	16	60	93
American Century Int'l Small Cap	58	[29]	[26]
PIMCO Fixed Income	5	1	1
JP Morgan Strategic Property Fund	97	95	93
JP Morgan Income and Growth Fund	98	91	90

** Brackets indicate actual performance linked with manager composite*

*** Transitioned from International Value to International Opportunities in May 2016*

- Aberdeen EAFE Plus outperformed the MSCI ACWI ex US by 39 basis points gross of fees in the third quarter and ranked in the 47th percentile among peers. However, performance of the fund was negative, as international equities were generally challenged in the third quarter and negative returns were compounded by a stronger dollar. The manager noted that Latin America, EM Europe, the Middle East and Africa were the weakest performing regions during the quarter, while Asia ex-Japan provided the strongest returns. Relative to the benchmark, outperformance largely stemmed from favorable stock selection. From a geographic perspective, stock selection in Australia and Germany benefited the fund, while security decisions in the U.K. and Latin America detracted. From a sector perspective, consumer staples provided the largest positive attribution while stock selection in financials weighed on relative returns, particularly in Asia.
- TSRS has been invested in Aberdeen for seven and one quarter years and the portfolio has returned 4.35% annualized on a gross of fee basis versus 5.87% for the benchmark. The five-year figure is also lackluster as the manager ranked in the 93rd percentile among peers. However, more recent performance has been encouraging with the fund outperforming the benchmark by over 3% during the trailing year. 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

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Market Overview
Capital Markets Review

Callan Institute

Third Quarter 2019

Capital Market Review

The Four Most Dangerous Words

ECONOMY

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"This time, it's different" has been trotted out near the peak of most cycles as justification for why the expansion can continue, at a time when imbalances typically push measures of economic soundness to their limits. This time, however, it may really be different.

Steady Returns Amid Equities Rebound

INSTITUTIONAL INVESTORS

4 PAGE

Corporate plans gained the most among plan types over the one-year period ending in the third quarter. Nonprofits trailed all fund types. Over the last 20 years, returns for investor types ranged from 6.2%-6.3%, outpacing the 6.1% return of a stocks-bonds benchmark.

U.S. Stocks Mixed; Global Markets Fall

EQUITY

6 PAGE

U.S. equity markets posted mixed results amid historic lows for 30-year Treasury yields and a historic factor rotation. Global equity markets turned negative after modest but positive results in the second quarter, buffeted by geopolitical turmoil.

After Two Rate Cuts, Yields Fall Globally

FIXED INCOME

8 PAGE

The Federal Open Market Committee cut short-term interest rates by 25 basis points twice in the third quarter. Yields fell in the U.S. and abroad given global growth headwinds. U.S. fixed income saw mostly positive returns; non-U.S. returns were mixed.

Real Estate Solid; Real Assets Down

REAL ESTATE/REAL ASSETS

10 PAGE

U.S. core real estate returns continue to be driven by income, with limited appreciation this late in the cycle. Global REITs gained 4.6% in the third quarter; U.S. REITs advanced 7.8%. Most real assets, with the notable exception of gold, finished the quarter lower.

A Bountiful but Smaller Harvest

PRIVATE EQUITY

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Most private equity activity measures were down in the third quarter. So far this year, all private equity liquidity measures that Callan tracks moderated. High prices, perceived slowing of global economic growth, and spooky geopolitical events dampened activity so far this year.

Hedge Funds Flat; MACs Struggle

HEDGE FUNDS/MACs

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Equity market churn, while Treasury yields fell further, had a mixed effect across hedge funds, leaving the broad hedge fund universe flat. Multi-asset class (MAC) performance varied depending on net market exposures, but was mostly flat or down.

Returns Moderate for Callan DC Index

DEFINED CONTRIBUTION

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The Callan DC Index™ rose 3.3% in the second quarter compared to 9.6% in the first quarter. The Age 45 Target Date Fund gained 3.5%, largely due to its higher equity allocation. The Index's growth in balances returned to a normal level after a big gain in the first quarter.

Broad Market Quarterly Returns

U.S. Equity Russell 3000	Non-U.S. Equity MSCI ACWI ex USA	U.S. Fixed Income Bloomberg Barclays Agg	Non-U.S. Fixed Income Bloomberg Barclays Gbl ex US
↑	↓	↑	↓
1.2%	-1.8%	2.3%	-0.6%

Sources: Bloomberg Barclays, FTSE Russell, MSCI

The Four Most Dangerous Words (This Time, It's Different…)

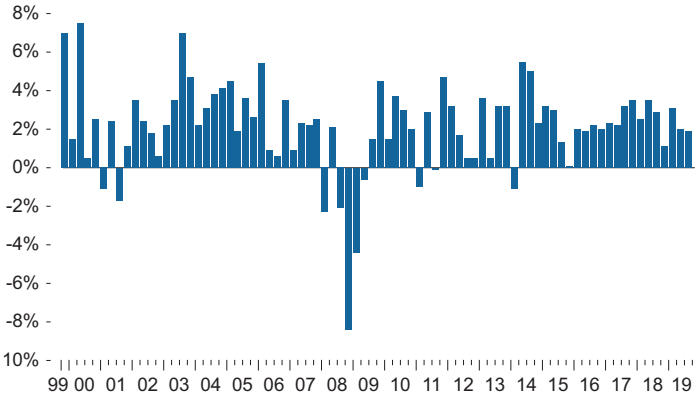
ECONOMY | Jay Kloepfer

Third quarter U.S. GDP growth surprised on the upside, coming in at 1.9% and extending what is now the longest economic expansion on record to 124 months. While 1.9% sounds modest compared to past cycles, it is positively robust compared to developed economies around the globe. The U.S. economy, and to an extent the entire global economy, has defied fears of an imminent collapse all year. While the current expansion may appear long in the tooth, elapsed time is not an economic variable. This expansion has been far weaker than each of the past 10, whether measured by cumulative GDP growth (at just under 25%, it's about half that of the 1990s), by job creation, or by investment. The overhang of the housing market collapse has weighed heavily on growth since 2009, and the measured pace of growth has in fact enabled the U.S. economy to maintain a slow burn.

Several long-held tenets of fundamental macroeconomics appear to be under serious re-consideration after the extraordinary 10-year period following the Global Financial Crisis: the cause (and the absence) of inflation; the execution of monetary policy; the role of central banks and in particular the pivot by the Federal Reserve at the start of 2019; and the business cycle. The new macroeconomic narrative says that first, the business cycle as we know it has been disrupted; second, the source and volatility of inflation has been altered going forward; third, central banks have added sustaining economic expansion to their official remit, therefore the quantitative easing (QE) genie is out of the bottle and we will not be stuffing it back in anytime soon. All of these changes to the macro world are interrelated, one sustaining the other, and are potentially pointing to a different path for the U.S. and global economy than would be expected, given past accepted relationships between inflation, monetary policy, and the business cycle.

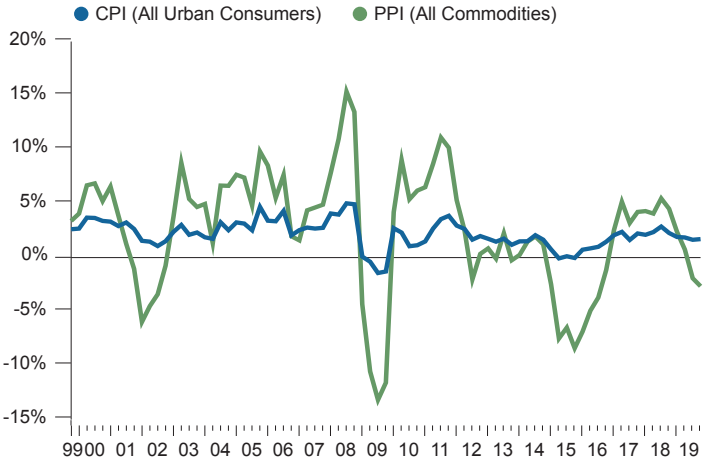
"This time, it's different" has been trotted out near the peak of most cycles to justify why the expansion can continue, at a time when imbalances typically push measures of economic soundness to their limits. This time, however, it may really be different.

Quarterly Real GDP Growth (20 Years)



Source: Bureau of Economic Analysis

Inflation Year-Over-Year



Source: Bureau of Labor Statistics

In the words of many analysts, the Fed rate hike in December 2018 may have been the end of an era. The Fed's standard operating procedure until now has been to tighten preemptively before inflation takes off, and following the extraordinary period of zero interest rate policy, the Fed's goal had been to normalize rates while inflation was low. The Fed pivot in January to pause on rate hikes, and then to implement two cuts in the third quarter while the expansion continues, indicates that preemptive tightening and rate normalization are over, and we may not see them again. The macro world as we know it may have changed.

The headlines of impending doom that have dominated 2019 make the coming recession, if it ever materializes, the most anticipated slowdown ever. The economic result so far in 2019 is that the U.S. economy has shrugged off slowing global growth, a prolonged trade war with China, and geopolitical uncertainty in the euro zone due to Brexit—and continued to steam along. The job market remains strong, and the unemployment rate is at a generational low of 3.6%. U.S. economic growth is clearly moderating, but the expected plunge has yet to materialize, in part because of the lack of obvious imbalances, and in part because of the relatively insular nature of the U.S. economy. The trade war with China is top of the news, yet the cumulative impact on GDP growth since 2018 is less than 1%, as estimated by Capital Economics. The rest of the world has clearly slowed, and global GDP growth looks ready to fall to its weakest pace (near 2% next year) since 2012.

The source of inflation has shifted from the goods and commodities sectors to the service sector. Goods and commodities have shown substantial variability, with the attendant impact on the business cycle and on prices. The service sector shows much more subdued cyclicality, and as a result both the business cycle and inflation may become irrevocably less volatile, with the boom and bust of past cycles no longer the expectation. Headline inflation came in at a 1.7% annual rate in the third quarter, still well below the Fed's target of 2%, and producer price inflation in particular went negative during 2019, dragged down by commodity and goods prices. The persistence of low inflation in the face of continued expansion and a decade of accommodative monetary policy is one factor giving the Fed cover to cut rates while growth continues.

The Long-Term View

Index	2019 3rd Qtr	Periods ended Dec. 31, 2018 Year	5 Yrs	10 Yrs	25 Yrs
U.S. Equity					
Russell 3000	1.2	-5.2	7.9	13.2	9.0
S&P 500	1.7	-4.4	8.5	13.1	9.1
Russell 2000	-2.4	-11.0	4.4	12.0	8.3
Non-U.S. Equity					
MSCI EAFE	-1.1	-13.8	0.5	6.3	4.6
MSCI ACWI ex USA	-1.8	-14.2	0.7	6.6	--
MSCI Emerging Markets	-4.2	-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	2.3	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	-0.6	-2.1	0.0	1.7	4.4
Real Estate					
NCREIF Property	1.4	6.7	9.3	7.5	9.3
FTSE Nareit Equity	7.8	-4.6	7.9	12.1	9.8
Alternatives					
CS Hedge Fund	0.3	-3.2	1.7	5.1	7.3
Cambridge PE*	4.3	10.6	11.9	13.8	15.2
Bloomberg Commodity	-1.8	-11.2	-8.8	-3.8	2.0
Gold Spot Price	4.2	-2.1	1.3	3.8	4.9
Inflation – CPI-U	0.2	1.9	1.5	1.8	2.2

*Data for most recent period lags by a quarter. Data as of June 30, 2019.
Sources: Bloomberg, Bloomberg Barclays, Bureau of Economic Analysis, Credit Suisse, FTSE Russell, MSCI, NCREIF, Standard & Poor's, Refinitiv/Cambridge

Recent Quarterly Economic Indicators

	3Q19	2Q19	1Q19	4Q18	3Q18	2Q18	1Q18	4Q17
Employment Cost–Total Compensation Growth	2.8%	2.7%	2.8%	2.9%	2.8%	2.8%	2.7%	2.6%
Nonfarm Business–Productivity Growth	-0.1%*	2.3%	3.5%	0.1%	1.2%	1.8%	0.9%	0.9%
GDP Growth	1.9%	2.0%	3.1%	1.1%	2.9%	3.5%	2.5%	3.5%
Manufacturing Capacity Utilization	75.5%	75.5%	76.4%	77.0%	76.9%	76.4%	76.1%	75.8%
Consumer Sentiment Index (1966=100)	93.8	98.4	94.5	98.2	98.1	98.3	98.9	98.4

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

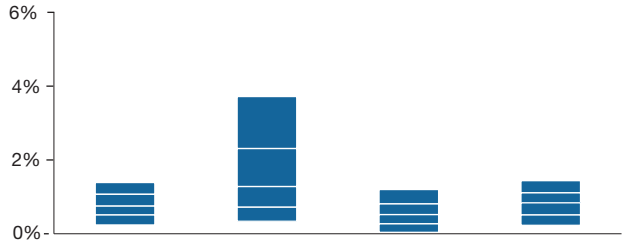
* Estimated figure provided by IHS Markit

Steady Returns Continue Amid Equities Rebound

INSTITUTIONAL INVESTORS

- A quarterly rebalanced 60% S&P 500/40% Bloomberg Barclays Aggregate portfolio returned 7.1% over the one year ended September 30, 2019. All broad institutional investor groups underperformed this benchmark.
- Both U.S. and non-U.S. equity markets continued their rebound in the third quarter after dropping during 2018. Non-U.S. equity underperformed relative to U.S. equity during 2018 and so far this year.
- Corporate plans gained the most among plan types over the one-year period, followed by public defined benefit (DB) plans. Nonprofits trailed all fund types. Over longer periods, Taft-Hartley plans have tended to perform best, but the range of returns for all institutional investor types tended to be in a narrow range; for instance, over the last 10 years, returns for all investor types ranged from 7.9%-8.4%.
- As the expansion continues, investors are discussing how long it can go on, and the fear of missing out is fading the longer the bull market runs. Investors are also addressing how the reversal in Fed policy changes the landscape, as it and other central banks take on the added role of sustaining the expansion. In addition, investors are examining what current yields portend for capital market assumptions.

Quarterly Returns, Callan Database Groups



	Public Database	Corporate Database	Nonprofit Database	Taft-Hartley Database
10th Percentile	1.39	3.72	1.20	1.44
25th Percentile	1.07	2.31	0.81	1.11
Median	0.75	1.28	0.52	0.84
75th Percentile	0.51	0.72	0.27	0.51
90th Percentile	0.24	0.34	0.04	0.23

Source: Callan

- Public DB plans are focused on returns from private markets, but face mounting pressure to control costs. One approach they have adopted is a barbelled pursuit of active management 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.

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

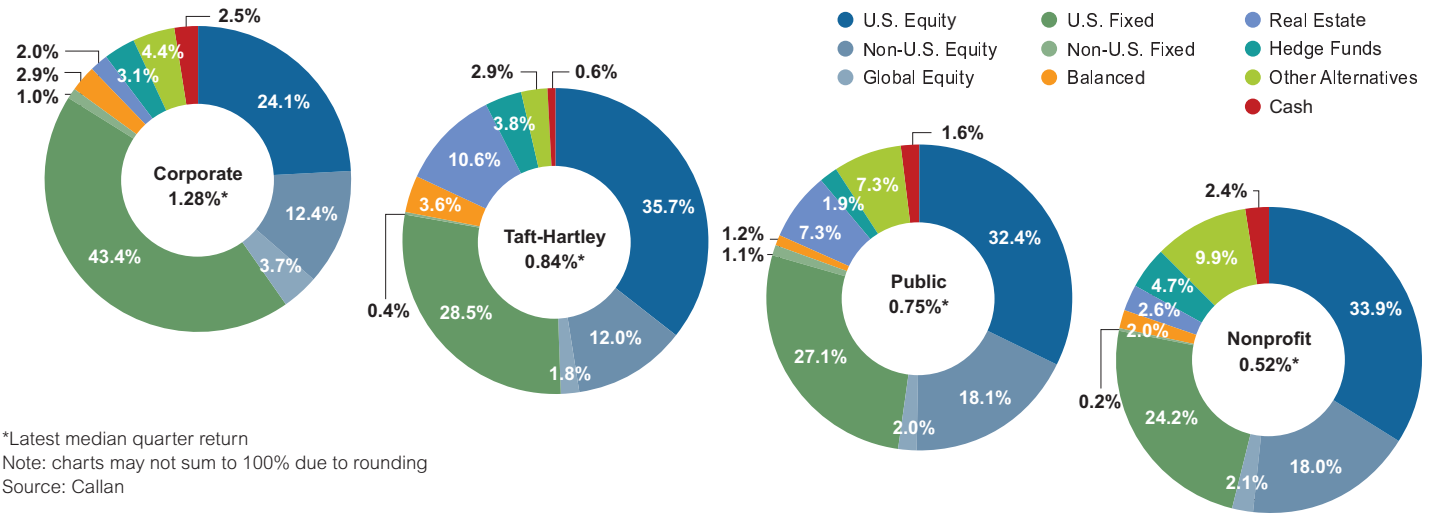
Database Group	Quarter	Year-to-date	Year	3 Years	5 Years	10 Years
Public Database	**0.75**	**12.03**	**4.17**	**7.80**	**6.39**	**8.10**
Corporate Database	**1.28**	**14.11**	**6.39**	**7.78**	**6.51**	**8.17**
Nonprofit Database	**0.52**	**12.59**	**3.63**	**7.88**	**5.98**	**7.94**
Taft-Hartley Database	**0.84**	**11.92**	**3.88**	**8.03**	**6.91**	**8.40**
All Institutional Investors	**0.77**	**12.62**	**4.19**	**7.88**	**6.39**	**8.18**
Large (>$1 billion)	**0.88**	**11.86**	**4.57**	**8.11**	**6.63**	**8.43**
Medium ($100mm - $1bn)	**0.83**	**12.54**	**4.25**	**7.91**	**6.46**	**8.17**
Small (<$100 million)	**0.70**	**12.87**	**4.00**	**7.72**	**6.19**	**7.95**

*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.

- All investor types are considering lower equity exposures. They are also reevaluating the purpose and implementation of:
  - Real assets
  - Hedge funds and liquid alternatives
  - Fixed income
  - Equity
- For public DB plans, return enhancement is the most important issue. Alternative assets such as private equity and private real estate continue to draw interest from investors. Some plans appear to be rethinking their approach to passive investments and holding off increasing their allocation to them. Plans continue to express interest in reducing their allocations to U.S. equity.
- Corporate DB plans are most focused on risk control. Many are looking to decrease their equity allocation, with nearly the same number considering increases to fixed income. The percentage of corporate DB plans continuing to implement the process of de-risking has increased significantly over the last four years.
- For DC plans, fees remain top of mind. Retirement income options are also getting attention.
- Enhancing returns is the biggest concern for nonprofits, as they seek to meet spending needs and grow the corpus over time. Among all investor types, nonprofits historically have implemented or considered an outsourced chief investment officer (OCIO) at a higher rate than other types of institutional investors, and that trend continued this quarter.
- As part of their efforts to increase returns to meet plan targets, investors are evaluating how to implement private market allocations, and whether it is feasible to create a customized program implementation.
- For instance, public DB plans are expressing interest in multi-asset class (MAC) strategies. However, that interest is not widely shared. Corporate DB plans and nonprofits do not seem to be interested in increasing their exposure to MACs, and in fact corporate DB plans are increasingly expressing a desire to reduce their MAC allocations. Nonprofits showed a similar shift in sentiment.
- Private real estate and private equity have been staples of many investors' portfolios, and they continue to express interest in increasing their allocations to these asset classes. Investors, most notably nonprofits, are also beginning to indicate growing interest in increasing allocations to private credit.
- Fund liquidity may be a concern that prevents some investors from adding to illiquid investments.
- Despite the interest in alternatives, some plans are terminating their hedge fund exposures.

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

U.S. equities posted mixed results amid a market that saw 30-year Treasury yields hit historic lows and the most meaningful, albeit short-lived, factor rotation among stocks since the Global Financial Crisis (GFC). Large cap (+1.4%) and mid cap stocks (+0.5%) posted modest gains for the quarter while small caps declined (Russell 2000: -2.4%). Ongoing U.S.-China trade tension, earnings and interest rate uncertainty, and the global political landscape continued to drive investor uncertainty.

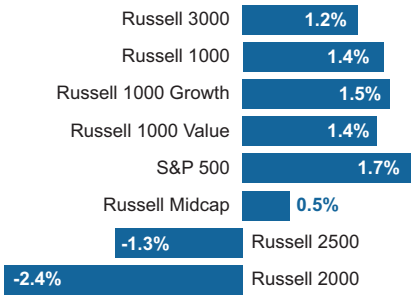
Large Cap ► *S&P 500: +1.7% | Russell 1000: +1.4%*

- Top sectors were in defensive areas including Utilities (+9.3%), Real Estate (+7.7%), and Consumer Staples (+6.1%) in response to investors' continued flight to quality.
- Energy, hurt by falling oil prices, fell 6.3%; Health Care lagged (-2.2%) amid discussions around price transparency and pricing reform by U.S. presidential candidates.
- Cyclical sector exposure has been volatile given uncertainty around the trade deal (and continued sideways movement of markets) along with slowed global growth.
- Up to September, momentum stocks (which have shifted to include many of the market's least volatile stocks) outperformed as investors shunned the cheapest quintile of value (and more volatile) stocks. This trend sharply reversed in early September as the 10-year Treasury yield rose from 1.46% to 1.73% and momentum stocks fell precipitously while value stocks traded up over the course of two days. The magnitude of the reversal gave a boost to value stocks across market capitalizations for the quarter.

Growth vs. Value ► *Russell 1000 Value: +1.4%, Russell 1000 Growth: +1.5% | Russell 2000 Value: -0.6%, Russell 2000 Growth: -4.2%)*

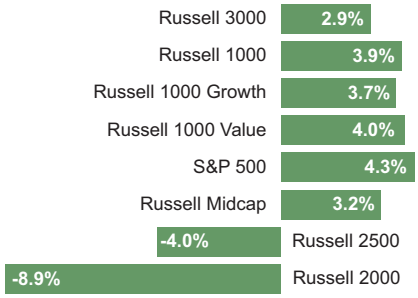
- While value continues to trail growth year-to-date, it gained ground during September's factor reversal, finishing the quarter essentially in line with growth within large caps.

U.S. Equity: Quarterly Returns



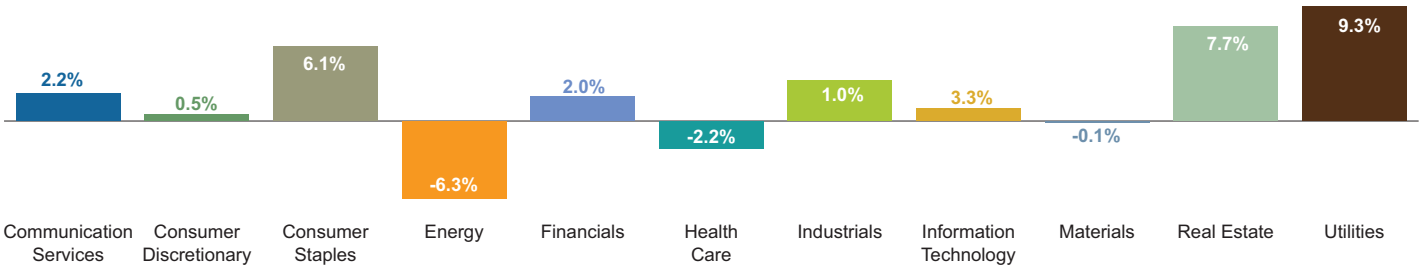
Sources: FTSE Russell and Standard & Poor's

U.S. Equity: One-Year Returns



Sources: FTSE Russell and Standard & Poor's

Quarterly Performance of Industry Sectors



Source: Standard & Poor's

– Within small cap, value benefited as investors favored the cheapest 20% of small caps while the most expensive quintile within the Russell 2000 declined double digits.

Non-U.S./Global Equities

Global equity markets turned negative in the third quarter. After more modest positive results in the second quarter, fears over continued trade war impacts, a no-deal Brexit, and a potential global slowdown impacted investor behavior. Given this backdrop, more defensive areas of the market outperformed.

Developed ► *MSCI EAFE: -1.1% | MSCI World ex USA: -0.9% | MSCI ACWI ex USA: -1.8% | MSCI Hong Kong: -11.9% | MSCI Japan: +3.1%*

– Boris Johnson's attempted suspension of Parliament and no-deal Brexit proclamations weighed on U.K. stocks (-2.5%).
– Germany (-4.0%) experienced recession fears; industrial production dropped 1.5% in June from the prior month, while the estimate was -0.5%.
– Hong Kong protests proved to be a headwind as its market fell 11.9% over the three-month period.
– Japan (+3.1%) was one of the few bright spots within developed markets as low short-term interest rates remain unchanged and a resolution to the Japan/South Korea trade war looked more promising.
– Cyclical sectors trailed as investors were positioned defensively; Energy (-6.5%) had the worst performance.
– For the quarter, factor performance reflected cautious investor behavior as quality and low volatility did well. However, the month of September saw a brief recovery in value across all markets as trade talks improved and central banks eased.

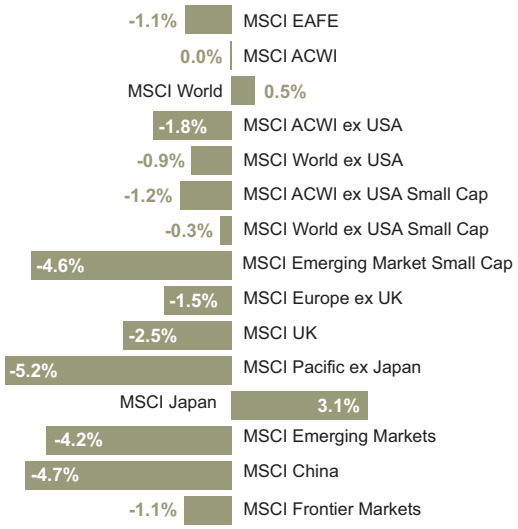
Emerging Markets ► *MSCI Emerging Markets Index: -4.2%*

– Emerging markets fared worst among global markets; uncertainty weighed heavily on these volatile countries.
– Though most emerging market countries fell during the quarter, Turkey (+11.7%) had strong results as its central bank cut rates two times in less than two months.
– Factor performance in emerging markets favored quality and price momentum as investors moved toward safe assets.

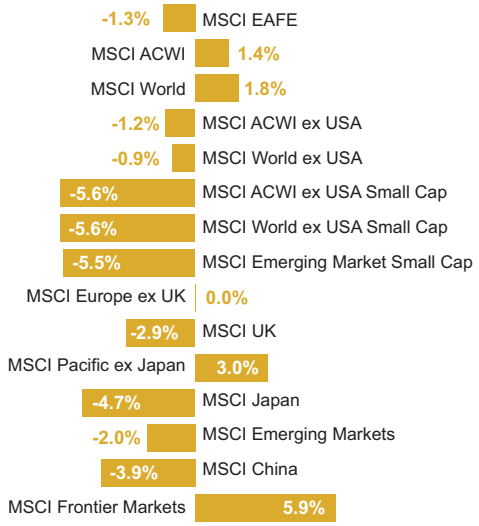
Non-U.S. Small Cap ► *MSCI World ex USA Small Cap: -0.3% | MSCI EM Small Cap: -4.6%*

– Small cap marginally outperformed large cap, both in developed and all country ex-U.S. markets; despite overall defensive posturing, idiosyncratic businesses pushed past global market issues.
– Japan (+4.0%) helped drive developed returns as small cap companies also benefited from low rates and resolved trade tensions; Hong Kong (-7.6%) detracted as local businesses were hurt by the protests.

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



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



Source: MSCI

Fixed Income

The Federal Open Market Committee (FOMC) cut short-term interest rates by 25 basis points twice in the third quarter amid an economic backdrop that has been supported by strong consumer spending and a solid labor market, but challenged by weakening manufacturing data and business investment. The Fed chair stated that the FOMC would act as "appropriate to sustain the expansion," and the European Central Bank and other central banks around the world also moved in the direction of easing monetary policy. Yields fell in the U.S. and abroad given global growth headwinds fueled by mounting trade tensions as well as geopolitical uncertainty.

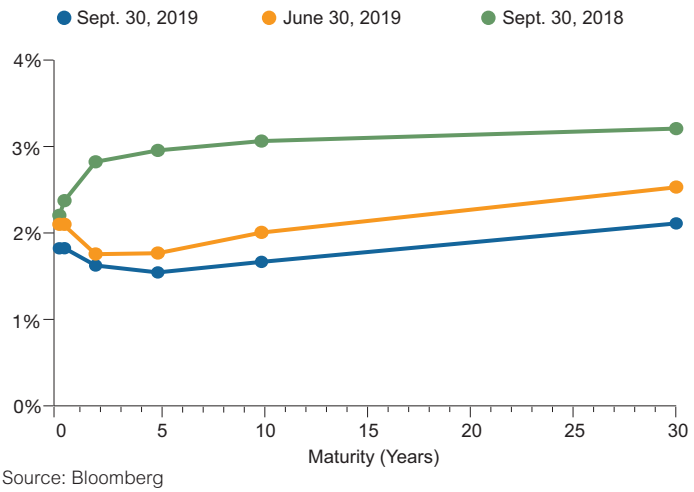
Core Fixed Income ► *Bloomberg Barclays US Agg: +2.3%*

- Treasuries returned 2.4% as rates fell across the yield curve.
- While the widely monitored 2- and 10-year key rates remained positive, the spread between the 3-month and 10-year key rates remained inverted.
- Long Treasuries soared (+7.9%) as 30-year yields fell roughly 40 bps.
- Nominal Treasuries outperformed TIPS as inflation expectations continued to fall; 10-year breakeven spreads were 1.53% as of quarter-end, down from 1.69% as of June 30. The 10-year real yield dipped briefly into negative territory in early September.

Investment-Grade Corporates ► *Bloomberg Barclays Corporate (Inv. Grade): +3.1%*

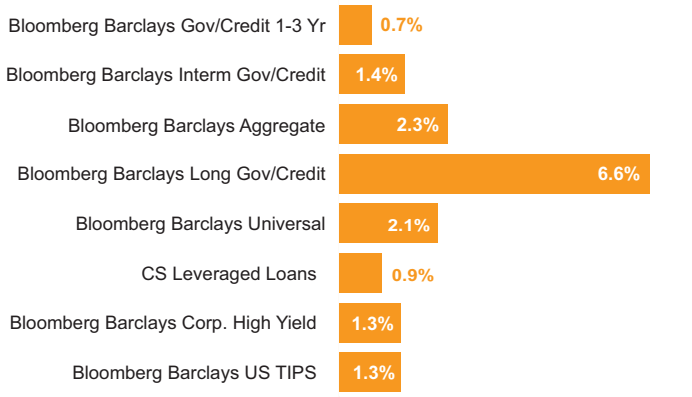
- Investment grade corporate credit spreads were range-bound, but their yield advantage was enough to generate positive excess returns versus like-duration Treasuries.
- Issuance in the corporate bond market was $320 billion in the quarter, $50 billion higher than a year ago; demand remained solid. BBB-rated corporates (+3.1%) modestly outperformed A-rated or higher corporates (+3.0%).

U.S. Treasury Yield Curves



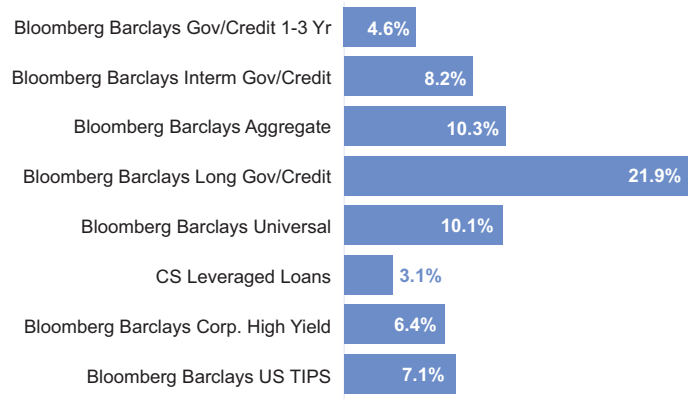
Source: Bloomberg

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: +1.3%*

- BB-rated corporates (+2.0%) outperformed CCC-rated corporates (-1.8%). BB- and B-rated spreads narrowed slightly, but the rally in rates helped drive outperformance as a result of higher quality bonds' greater sensitivity to interest rate movements.
- CCC-rated bond spreads widened significantly, representing some concern about deteriorating quality at the lower-end of the spectrum.

Leveraged Loans ► *CS Leveraged Loans: +0.9%*

- Bank loans, which have floating rate coupons, underperformed high yield bonds as rates rallied and investors worried about deteriorating credit quality.
- CLO issuance continued to exceed expectations, providing positive technical support to the leveraged loan market.

Non-U.S. Fixed Income

Global Fixed Income ► *Bloomberg Barclays Global Aggregate (unhedged): +0.7% | (hedged): +2.6%*

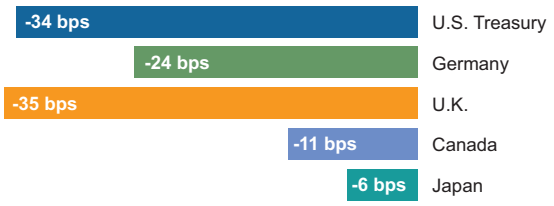
- Developed market sovereign bond yields rallied, pushing European sovereigns further into negative territory as the ECB reduced its deposit rate and announced a new bond purchasing stimulus program.
- Negative yielding debt totals nearly $17 trillion, a record high.
- The U.S. dollar was up 3.4% versus a basket of trade partner currencies and up 4.3% versus the beleaguered euro.

Emerging Market Debt ($US) ► *JPM EMBI Global Diversified: +1.5%* | (Local currency) ► *JPM GBI-EM Global Diversified: -0.8%*

- Broadly, emerging market currencies depreciated versus the U.S. dollar, hampering local currency returns.
- Within the dollar-denominated benchmark, Argentina (-42%) and Venezuela (-51%) were among the few to post negative returns. Conversely, returns in the local debt benchmark were more mixed with Turkey (+19%) and Argentina (-60%) being outliers.

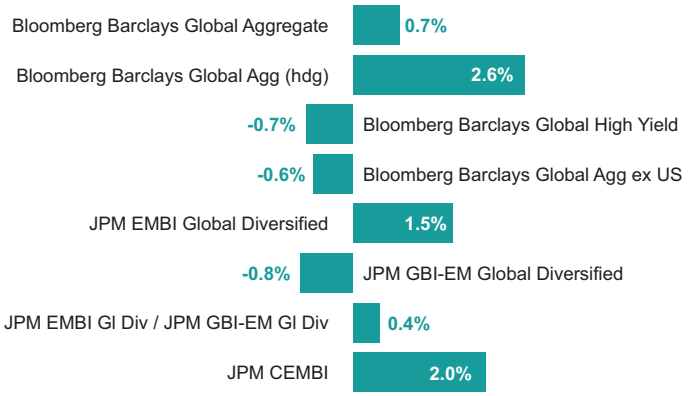
Change in 10-Year Global Government Bond Yields

2Q19 to 3Q19



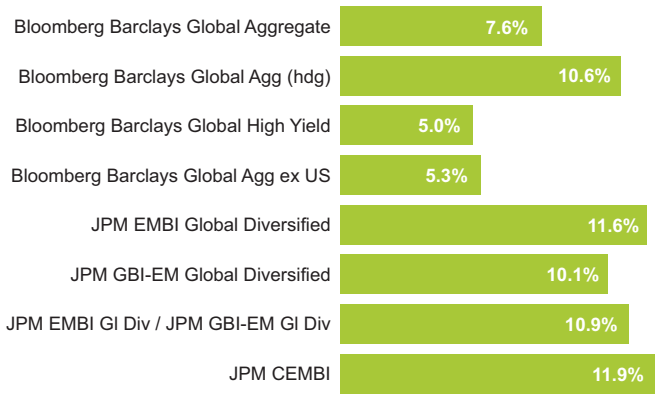
Source: Bloomberg Barclays

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 Stays Solid; Real Assets Mostly Down

REAL ESTATE/REAL ASSETS | Munir Iman and Kristin Bradbury

U.S. Real Estate

Real Estate Returns Continue to Moderate

- U.S. core real estate returns continue to be driven by income, with limited appreciation this late in the cycle.
- Returns are coming from net operating income (NOI) growth rather than further cap rate compression.
- Industrial continues to outperform other property types.
- Retail showing signs of depreciation

U.S. Real Estate Fundamentals Remain Healthy

- Steady returns continued, driven by above inflation-level rent growth in many metros.
- Within the NCREIF Property Index, the vacancy rate for U.S. Office was 9.6% in the quarter, the lowest in over 12 years.
- Net operating income (NOI) has been growing annually and is expected to be the primary return driver. Apartment and Industrial NOI growth fell slightly from the second quarter.

Pricing Remains Expensive in the U.S.

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

REITs Outperformed Global Equities

- U.S. REITs advanced 7.8% in the quarter, outpacing the S&P 500 Index, which rose 1.7%.
- Global REITs gained 4.6% compared to -0.2% for the MSCI ACWI IMI.
- Both U.S. and non-U.S. REITs are trading at net asset value.

Non-U.S. Real Estate

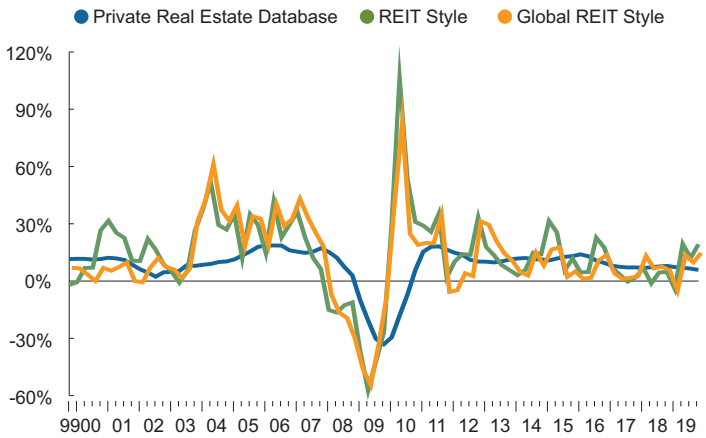
Asia Is Increasingly Important

- U.S.-China trade talks, unrest in Hong Kong, and other areas of political uncertainty have impacted real estate markets in the region. Managers continue to find attractive opportunities in some sectors of the market such as restructuring opportunities, necessity-based retail, and logistics.
- The number of open-end core funds focused on the Asia-Pacific market has increased in 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.
- During 2019, India had its first successful IPO for a REIT.

Europe Buffeted by Political Uncertainty

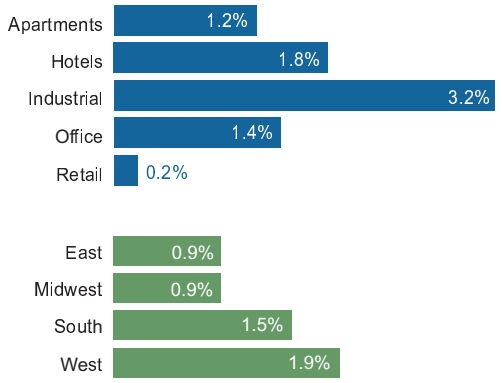
- Political uncertainty continues to weigh on overall economic growth throughout Europe, but real estate fundamentals remain strong in key gateway markets given strong demand and the continued lack of new supply. Cap rates for prime real estate remain low, as real estate continues to be an attractive asset class as a result of low interest rates throughout the region.
- Yields between prime and secondary real estate remain wide, providing opportunities for investors targeting transitional assets, as markets across Europe have less modern stock compared to 10 years ago.

Rolling One-Year Returns



Source: Callan

Sector Quarterly Returns by Property Type and Region



Source: NCREIF

Infrastructure Fundraising Momentum Continues

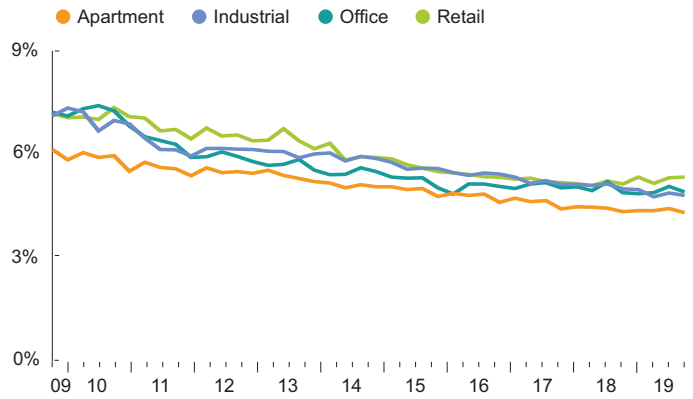
- Open end funds are raising significant capital, and the universe of investible funds keeps increasing.
- The closed end fund market continues to expand, with additional offerings in infrastructure debt, emerging markets, and sector-specific areas (e.g., communications and renewables).

Real Assets

Challenging Quarter as Oil Prices Slide

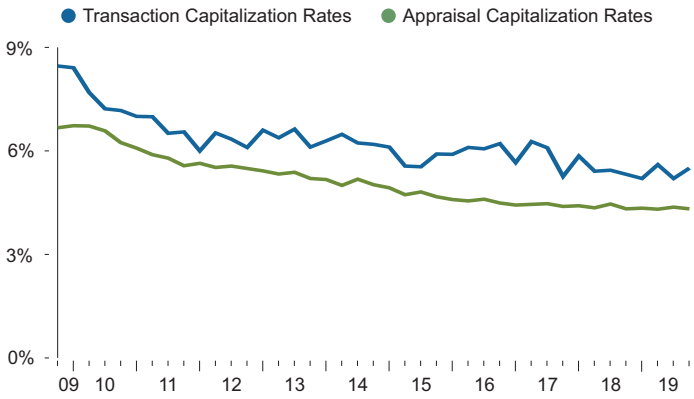
- While the MLP category generally benefits from declining rate environments, volatile and falling oil prices weighed more heavily on the space in the quarter (Alerian MLP Index: -5.0%; +11.0% YTD).
- Oil prices slid from $58.47 to $54.07 (WTI) during the quarter, and the energy-heavy Goldman Sachs Commodity Index was off 4.2%, while Gold (S&P Gold spot price: +4.3%; +15.0% YTD) benefited from its safe haven status.
- Looking across the rest of the commodity complex, Agriculture Commodities finished in negative territory (Bloomberg Commodity Agriculture Subindex: -6.2%), weighed down by coffee, corn, and cotton in particular, while nickel (+35.5%) almost single-handedly lifted the Industrial Metals Subindex (+2.4%) into positive territory for the quarter.

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 September 30, 2019

Private Real Assets	Quarter	Year to Date	Year	3 Years	5 Years	10 Years	15 Years
Real Estate ODCE Style	**1.5**	**4.5**	**5.9**	**7.1**	**9.0**	**9.9**	**6.8**
NFI-ODCE (value wt net)	1.1	3.1	4.6	6.3	8.4	9.8	6.9
NCREIF Property	1.4	4.8	6.2	6.8	8.6	9.8	8.6
NCREIF Farmland	1.0	2.4	5.3	6.1	7.9	11.0	14.2
NCREIF Timberland	0.2	1.3	2.1	3.1	4.4	4.0	7.0
Public Real Estate							
Global Real Estate Style	**4.6**	**22.3**	**14.7**	**7.4**	**8.3**	**10.2**	**8.3**
FTSE EPRA Nareit Developed	4.6	19.8	13.0	5.6	6.8	8.6	--
Global ex-U.S. Real Estate Style	**2.8**	**17.9**	**11.7**	**7.9**	**7.8**	**8.1**	**7.8**
FTSE EPRA Nareit Dev ex US	1.5	14.6	8.9	5.9	5.0	6.5	--
U.S. REIT Style	**7.7**	**28.5**	**19.2**	**8.4**	**10.7**	**13.6**	**9.7**
EPRA Nareit Equity REITs	7.8	27.0	18.4	7.4	10.3	13.0	9.0

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

A Bountiful but Smaller Harvest

PRIVATE EQUITY | Gary Robertson

Private equity activity measures were down in the third quarter, except for upticks in dollar volume for fundraising and buyout exits. So far this year, all private equity liquidity measures that Callan tracks moderated. High prices, perceived slowing of global economic growth, and challenging geopolitical events dampened activity so far this year.

Private equity partnerships holding final closes totaled $188 billion, with 201 new partnerships formed, according to PitchBook. The dollar volume rose 27% from the prior quarter, but the number of funds holding final closes fell 7%. So far this year, 2019 is running 7% behind 2018. No strategy is dominating the market compared to historical commitment ranges, as investors focus on diversification.

New buyout transactions declined, according to PitchBook. Funds closed 1,491 company investments with $110 billion in disclosed deal value, representing a 14% decline in count and a 16% dip in dollar value from the second quarter.

According to PitchBook, new investments in venture capital companies totaled 4,664 rounds of financing with $57 billion of announced value. The number of investments was down 13% from the prior quarter, and announced value fell 15%. The median pre-money valuations of Series A through D rounds continued to increase, with only Seed Stage remaining flat.

Funds Closed January 1 to September 30, 2019

Strategy	No. of Funds	Amt ($mm)	Share
Venture Capital	263	46,702	10%
Growth Equity	50	61,789	13%
Buyouts	158	241,920	51%
Mezzanine Debt	39	60,308	13%
Distressed	8	12,203	3%
Energy	10	14,767	3%
Secondary and Other	39	27,970	6%
Fund-of-funds	20	7,358	2%
Totals	**587**	**473,017**	**100%**

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

There were 404 private M&A exits of private equity-backed companies (excluding venture capital), PitchBook reports, with disclosed values totaling $122 billion. Private sale count was down 6% from the prior quarter but announced dollar volume rose 12%. The year-to-date exit count declined 35%. There were 16 private-equity backed IPOs in the third quarter raising $6 billion, a steep decline from 42 totaling $16 billion previously.

Venture-backed M&A exits totaled 320 transactions with disclosed value of $12 billion. The number of sales fell 12% and announced dollar volume plunged 52%. The year-to-date exit count declined 13%. There were 47 VC-backed IPOs in the third quarter with a combined float of $9 billion. For comparison, the second quarter had 59 IPOs and total issuance of $22 billion. Peloton was the largest third quarter IPO, raising $1.2 billion.

Private Equity Performance Database (%) (Pooled Horizon IRRs through June 30, 2019*)

Strategy	3 Months	Year	3 Years	5 Years	10 Years	15 Years	20 Years
All Venture	6.25	18.96	15.93	14.95	15.01	11.80	13.06
Growth Equity	4.70	15.37	17.71	13.26	14.77	13.59	13.53
All Buyouts	4.12	10.72	16.06	11.85	15.27	13.72	12.07
Mezzanine	2.37	8.05	11.64	10.28	11.05	10.63	8.73
Credit Opportunities	1.09	3.20	9.37	5.68	13.39	9.61	10.13
Control Distressed	1.95	4.27	10.47	7.62	12.16	10.63	10.58
All Private Equity	**4.34**	**12.31**	**15.52**	**11.98**	**14.79**	**12.88**	**12.13**
S&P 500	4.30	10.42	14.19	10.71	14.70	8.75	5.90

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.

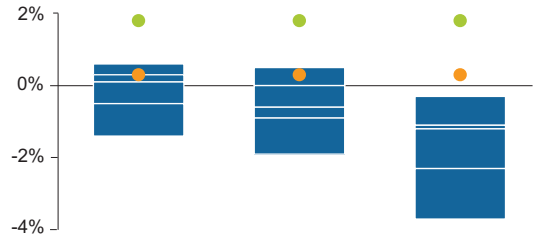
Hedge Funds Flat; MACs Struggle

HEDGE FUNDS/MACs | Jim McKee

Alpha trades flat as markets soften during the quarter

- Equity market churn, while Treasury yields fell further, had a mixed effect across hedge funds, leaving the broad hedge fund universe flat.
- *Managed Futures* (+3.5%) and *Global Macro* (+2.1%) were lead performers for the second quarter in a row, benefiting from continuing rate and currency trends.
- *Equity Market Neutral* (-1.7%) slipped hard, particularly given September's sudden factor rotation to value while momentum reversed.
- *Long/Short Equity* (+0.1%) was unchanged without much equity beta support; the equity factor reversal in September also hurt.
- *Distressed* (-3.5%) sank as spreads among weaker credits widened amid a flight-to-quality.
- Hedge fund portfolios with exposure to macro trading fared better while those with emerging market exposure, particularly Argentina, suffered more.

Hedge Fund-of-Funds Style Group Returns



	Absolute Return	Core Diversified	Long/Short Equity
10th Percentile	0.6	0.5	-0.3
25th Percentile	0.3	0.0	-1.1
Median	0.1	-0.6	-1.2
75th Percentile	-0.5	-0.9	-2.3
90th Percentile	-1.4	-1.9	-3.7
CS Hedge Fund ●	0.3	0.3	0.3
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 September 30, 2019

Hedge Fund Universe	Quarter	Year	3 Years	5 Years	10 Years	15 Years
Callan Fund-of-Funds Database	**-0.63**	**0.46**	**3.76**	**2.35**	**4.22**	**4.24**
Callan Absolute Return FOF Style	**0.07**	**0.80**	**3.60**	**2.32**	**4.16**	**3.95**
Callan Core Diversified FOF Style	**-0.62**	**0.23**	**3.37**	**2.02**	**3.99**	**4.12**
Callan Long/Short Equity FOF Style	**-1.19**	**0.02**	**4.57**	**3.40**	**4.67**	**5.37**
Credit Suisse Hedge Fund	0.26	2.13	3.83	2.30	4.32	4.97
CS Convertible Arbitrage	-0.41	1.29	2.55	2.28	4.36	3.78
CS Distressed	-3.46	-3.09	3.06	0.79	4.65	5.22
CS Emerging Markets	-4.11	1.81	3.29	3.02	4.28	5.99
CS Equity Market Neutral	-1.74	-4.37	0.27	0.16	1.14	-0.57
CS Event-Driven Multi	-0.80	0.18	3.49	0.16	3.37	5.05
CS Fixed Income Arb	0.28	2.38	4.39	3.23	5.66	3.84
CS Global Macro	2.12	7.66	5.35	3.11	4.89	6.43
CS Long/Short Equity	0.10	-0.36	4.85	3.38	4.88	5.74
CS Managed Futures	3.53	7.81	0.59	2.07	1.57	3.58
CS Multi-Strategy	0.68	1.94	4.23	4.18	6.23	5.95
CS Risk Arbitrage	0.23	1.98	3.18	2.64	2.68	3.81
HFRI Asset Wtd Composite	0.30	2.65	4.39	2.93	4.49	--
90-Day T-Bill + 5%	1.77	7.39	6.54	5.98	5.54	6.39

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

Amid choppy markets, MACs struggle for gains

- Multi-asset class (MAC) performance varied depending on net market exposures, but was mostly flat or down.
- The **HFR Risk Parity Index** targeting 10% volatility was positive (+1.9%), reflecting the modest lift of stocks and bonds.
- **Eurekahedge Multi-Factor Risk Premia Index** fell 5.1%, indicating broad headwinds for those seeking diversifying returns outside long-only markets.
- Within risk premia, *equity momentum* was a key detractor in light of September's factor reversal; *rates momentum* was an offsetting contributor given the trend of falling yields.
- *Long-Biased* trailed due to exposure to risk-on assets.
- *Absolute Return* benefited from exposure to higher-quality assets.

Volatility simmers slightly below average

- Markets are further discounting growth with lower expected rates, long and short.
- If global manufacturing data softens further, thereby overwhelming expectations of central banks easing, hedge funds are positioned reasonably well for an equity downturn.
- However, any economic rebound with tepid inflation will cause most hedge funds to lag.

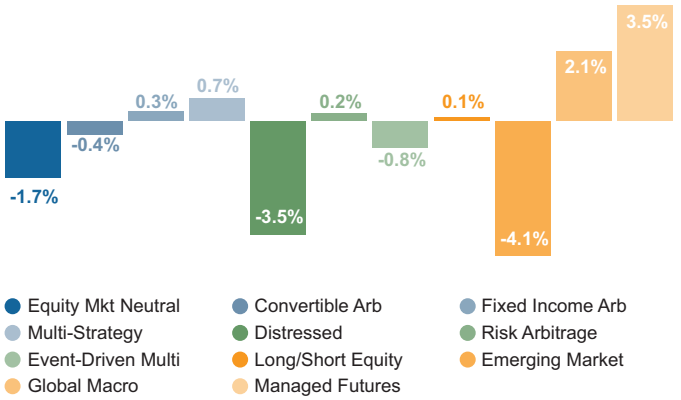
Falling yield curve shrinks the playing field, however level it may be

- Lower long rates factored into stocks and bonds leave less room for traditional assets to run, giving hedged strategies more opportunity to shine.
- However, as short rates also settle to lower levels, dwindling cash returns and short interest rebates take some wind out of hedge fund sails.

Industry outflows shade constructive mood

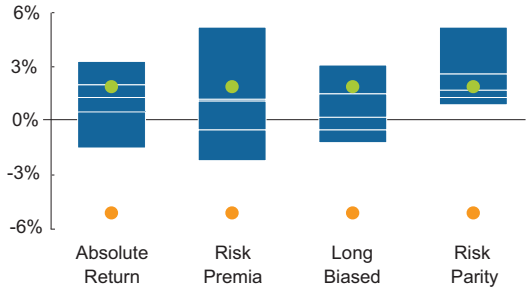
- The third quarter was the sixth consecutive quarter of industry asset outflows, which runs counter to the industry's positive view of an improving opportunity set ahead with increasing volatility tied to growing economic uncertainty.

Credit Suisse Hedge Fund Strategy Returns



Source: Credit Suisse

MAC Style Group Returns



	Absolute Return	Risk Premia	Long Biased	Risk Parity
10th Percentile	3.3	5.2	3.1	5.2
25th Percentile	2.0	1.2	1.5	2.6
Median	1.3	1.1	0.2	1.7
75th Percentile	0.5	-0.5	-0.5	1.3
90th Percentile	-1.5	-2.2	-1.2	0.9
Eurekahedge MFRP (5%v)	-5.1	-5.1	-5.1	-5.1
60% S&P 500/ 40% BB Barclays Agg	1.9	1.9	1.9	1.9

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

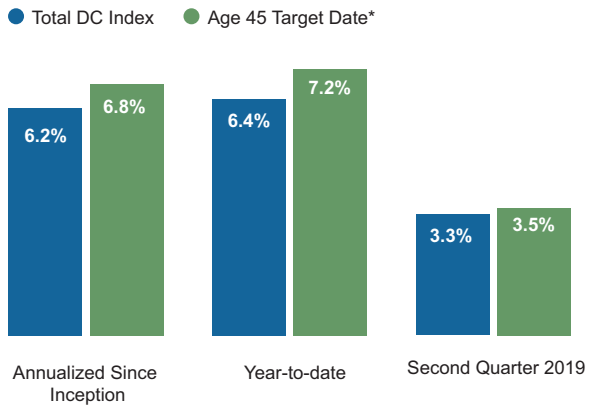
Performance Slows but Remains Solid

DEFINED CONTRIBUTION | Patrick Wisdom

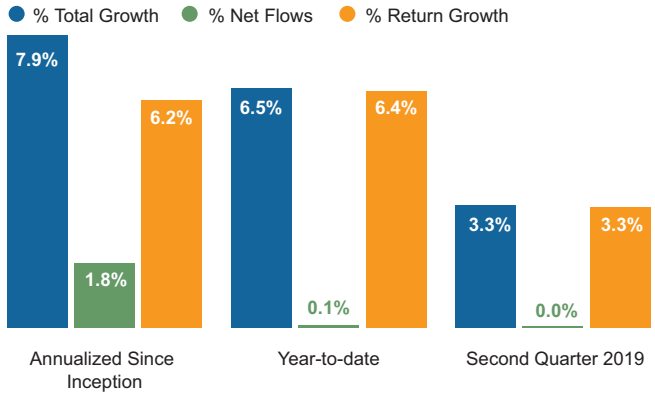
- The Callan DC Index™ gained 3.3% in the second quarter, compared to the first quarter's jump of 9.6%. The Age 45 Target Date Fund gained 3.5%, largely due to its higher equity allocation.
- The Index's growth in balances in the second quarter (3.3%) returned to a normal level after a robust gain in the first quarter (9.8%). Net flows were also positive but very small (0.03%).
- Target date funds (TDFs) yet again saw the largest inflows for the quarter. Both large-cap and small/mid-cap U.S. equity experienced large outflows. U.S. fixed income had relatively large inflows, while stable value options had relatively large outflows.
- Second quarter turnover (i.e., net transfer activity levels within DC plans) increased to 0.54% from the previous quarter's measure of 0.48%. Turnover has risen for three consecutive quarters but still sits below the historical average (0.60%).
- The overall allocation to equity increased to 70.0% from 69.5% in the previous quarter. The current allocation exceeds the Index's historical average by 2.2 percentage points.
- The percentage of assets allocated to U.S. large-cap equity rose. Gains as a result of strong performance outweighed outflows from the asset class. The current allocation to U.S. large-cap equity (25.2%) is now at its second highest level over the past decade.
- On the other hand, the percentage allocated to stable value decreased, while the allocation to TDFs remained steady.
- Stable value's prevalence within DC plans rose for the seventh consecutive quarter and is now at 77%. Additionally, more plans are now offering emerging market equity, global equity, and high yield fixed income as investment options.

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 (Second Quarter 2019)

(Top Two and Bottom Two Asset Gatherers)

Asset Class	Flows as % of Total Net Flows
Target Date Funds	62.56%
U.S. Fixed Income	26.82%
U.S. Smid Cap	-20.40%
U.S. Large Cap	-45.95%
Total Turnover**	**0.54%**

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.

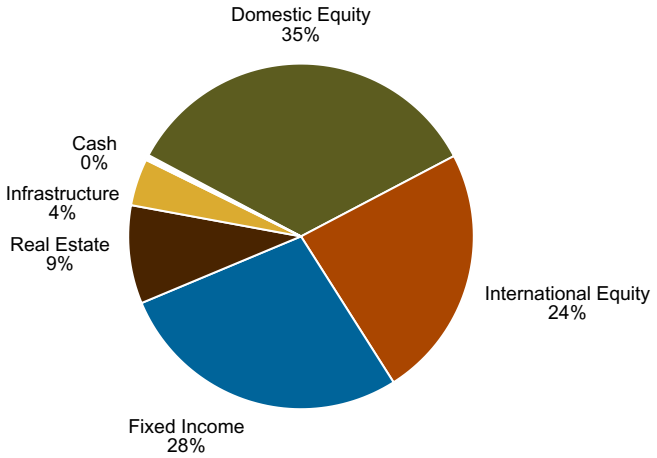
** Total Index "turnover" measures the percentage of total invested assets (transfers only, excluding contributions and withdrawals) that moved between asset classes.

Total Fund

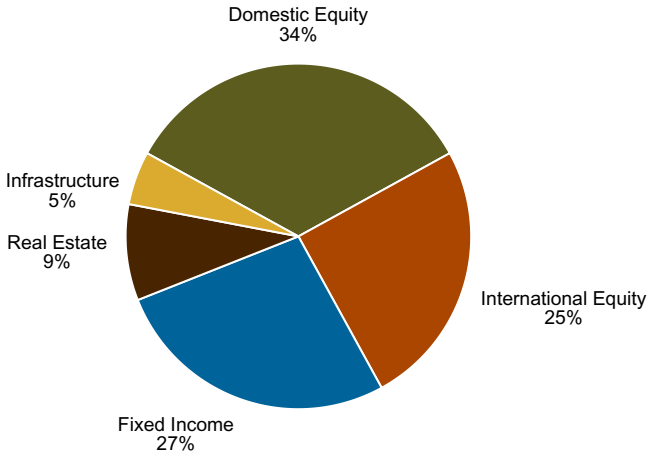
Actual vs Target Asset Allocation
As of September 30, 2019

The top left chart shows the Fund's asset allocation as of September 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

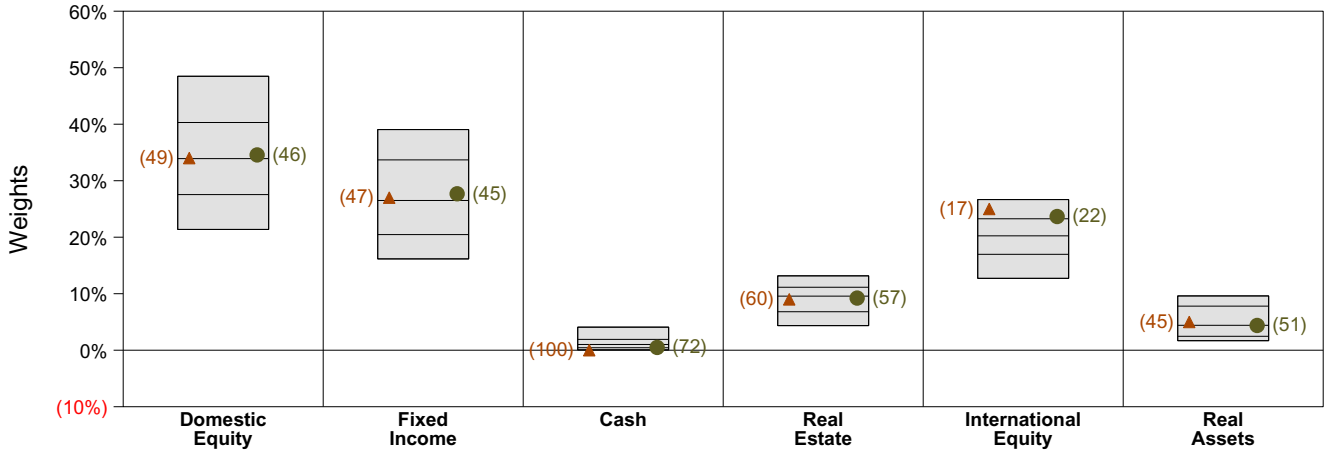


Target Asset Allocation



Asset Class	$000s Actual	Weight Actual	Target	Percent Difference	$000s Difference
Domestic Equity	288,922	34.6%	34.0%	0.6%	4,677
International Equity	197,788	23.7%	25.0%	(1.3%)	(11,217)
Fixed Income	231,455	27.7%	27.0%	0.7%	5,730
Real Estate	77,130	9.2%	9.0%	0.2%	1,888
Infrastructure	36,601	4.4%	5.0%	(0.6%)	(5,200)
Cash	4,121	0.5%	0.0%	0.5%	4,121
Total	836,017	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	48.48	39.05	4.08	13.16	26.66	9.61
25th Percentile	40.30	33.68	1.92	11.15	23.26	7.80
Median	33.91	26.50	1.02	9.57	20.24	4.41
75th Percentile	27.54	20.46	0.44	6.81	16.97	2.46
90th Percentile	21.38	16.16	0.07	4.35	12.72	1.69
Fund ●	34.56	27.69	0.49	9.23	23.66	4.38
Target ▲	34.00	27.00	0.00	9.00	25.00	5.00
% Group Invested	98.53%	97.06%	80.15%	79.41%	95.59%	27.21%

* 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 September 30, 2019, with the distribution as of June 30, 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

	September 30, 2019				June 30, 2019	
	Market Value	Weight	Net New Inv.	Inv. Return	Market Value	Weight
Domestic Equity	**$288,922,358**	**34.56%**	**$(3,016,697)**	**$548,064**	**$291,390,991**	**34.80%**
Large Cap Equity	**$221,653,467**	**26.51%**	**$(2,411,853)**	**$1,919,917**	**$222,145,403**	**26.53%**
Alliance S&P Index	67,885,488	8.12%	(605,636)	1,145,694	67,345,430	8.04%
PIMCO StocksPLUS	34,706,848	4.15%	0	556,743	34,150,105	4.08%
BlackRock Russell 1000 Value	60,662,981	7.26%	(600,000)	843,102	60,419,879	7.22%
T. Rowe Price Large Cap Growth	58,398,150	6.99%	(1,206,216)	(625,622)	60,229,989	7.19%
Small/Mid Cap Equity	**$67,268,891**	**8.05%**	**$(604,845)**	**$(1,371,853)**	**$69,245,588**	**8.27%**
Champlain Mid Cap	34,092,738	4.08%	(1,040)	(196,681)	34,290,459	4.09%
Pyramis Small Cap	33,176,153	3.97%	(603,805)	(1,175,172)	34,955,130	4.17%
International Equity	**$197,787,656**	**23.66%**	**$(137,084)**	**$(3,713,741)**	**$201,638,481**	**24.08%**
Causeway International Opportunities (3)	76,698,492	9.17%	0	(1,833,954)	78,532,446	9.38%
Aberdeen EAFE Plus	82,139,291	9.83%	(137,084)	(1,173,178)	83,449,553	9.97%
American Century Non-US SC [1]	38,949,873	4.66%	0	(706,609)	39,656,482	4.74%
Fixed Income	**$231,454,613**	**27.69%**	**$0**	**$5,138,343**	**$226,316,271**	**27.03%**
BlackRock U.S. Debt Fund	114,250,935	13.67%	0	2,547,713	111,703,222	13.34%
PIMCO Fixed Income	117,203,678	14.02%	0	2,590,629	114,613,049	13.69%
Real Estate	**$77,129,848**	**9.23%**	**$(307,309)**	**$(61,460)**	**$77,498,617**	**9.25%**
JP Morgan Strategic Property Fund	51,597,819	6.17%	0	(255,832)	51,853,651	6.19%
JP Morgan Income and Growth Fund	25,532,029	3.05%	(307,309)	194,372	25,644,966	3.06%
Infrastructure	**$36,601,184**	**4.38%**	**$(4,750,744)**	**$1,637,107**	**$39,714,821**	**4.74%**
Macquarie European Infrastructure	12,743,664	1.52%	(179,416)	215,106	12,707,974	1.52%
SteelRiver Infrastructure	23,857,520	2.85%	(4,571,328)	1,422,001	27,006,847	3.23%
Cash Composite	**$4,121,331**	**0.49%**	**$3,273,709**	**$17,395**	**$830,226**	**0.10%**
Cash	4,121,331	0.49%	3,273,709	17,395	830,226	0.10%
Total Plan	**$836,016,990**	**100.0%**	**$(4,938,125)**	**$3,565,708**	**$837,389,407**	**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 September 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 September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Gross of Fees					
Domestic Equity	**0.19%**	**3.00%**	**14.02%**	**11.53%**	**13.94%**
Total Domestic Equity Target (1)	1.04%	2.41%	12.55%	10.36%	13.05%
Large Cap Equity	**0.87%**	**3.60%**	**14.20%**	**11.24%**	**13.68%**
S&P 500 Index	1.70%	4.25%	13.39%	10.84%	13.24%
Alliance S&P Index	1.70%	4.27%	13.35%	10.80%	13.22%
PIMCO StocksPLUS	1.63%	4.15%	13.52%	10.76%	14.85%
S&P 500 Index	1.70%	4.25%	13.39%	10.84%	13.24%
BlackRock Russell 1000 Value Index	1.40%	4.14%	9.55%	7.87%	11.56%
Russell 1000 Value Index	1.36%	4.00%	9.43%	7.79%	11.46%
T. Rowe Price Large Cap Growth	(1.02%)	2.20%	20.07%	15.25%	16.45%
Russell 1000 Growth Index	1.49%	3.71%	16.89%	13.39%	14.94%
Small/Mid Cap Equity U.S. Equity	**(2.01%)**	**1.14%**	**13.42%**	**12.57%**	**14.80%**
Russell 2500 Index	(1.28%)	(4.04%)	9.51%	8.57%	12.22%
Champlain Mid Cap	(0.57%)	6.36%	16.79%	14.57%	15.59%
Russell MidCap Index	0.48%	3.19%	10.69%	9.10%	13.07%
Pyramis Small Cap	(3.45%)	(4.45%)	9.81%	10.33%	13.98%
Russell 2000 Index	(2.40%)	(8.89%)	8.23%	8.19%	11.19%
International Equity	**(1.80%)**	**(2.74%)**	**6.08%**	**2.28%**	**4.67%**
MSCI ACWI x US (Net)	(1.80%)	(1.23%)	6.33%	2.90%	4.46%
Causeway International Opportunities (3)	(2.34%)	(5.23%)	5.69%	2.34%	6.33%
Causeway Linked Index (3)	(1.80%)	(1.23%)	6.33%	3.45%	4.99%
Aberdeen EAFE Plus	(1.41%)	2.11%	6.01%	1.46%	5.23%
MSCI ACWI x US (Net)	(1.80%)	(1.23%)	6.33%	2.90%	4.46%
American Century Non-US SC (4)	(1.55%)	(6.96%)	7.64%	-	-
MSCI ACWI ex US Small Cap	(1.19%)	(5.63%)	4.64%	3.98%	6.13%
Fixed Income	**2.27%**	**11.00%**	**4.67%**	**4.86%**	**5.23%**
Blmbg Aggregate Index	2.27%	10.30%	2.92%	3.38%	3.75%
BlackRock U.S. Debt Fund	2.28%	10.37%	3.02%	3.48%	3.87%
Blmbg Aggregate Index	2.27%	10.30%	2.92%	3.38%	3.75%
PIMCO Fixed Income	2.26%	11.62%	6.07%	5.93%	6.38%
Custom Index (2)	1.18%	9.57%	3.62%	4.41%	5.16%

(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 September 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 September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Gross of Fees					
Real Estate	**(0.08%)**	**0.46%**	**5.33%**	**7.99%**	**9.96%**
NFI-ODCE Value Weight Gr	1.31%	5.59%	7.30%	9.34%	10.86%
JP Morgan Strategic Property Fund	(0.49%)	(0.66%)	4.86%	7.69%	10.09%
NFI-ODCE Value Weight Gr	1.31%	5.59%	7.30%	9.34%	10.86%
JP Morgan Income and Growth Fund	0.76%	2.80%	6.30%	8.70%	12.61%
NFI-ODCE Value Weight Gr	1.31%	5.59%	7.30%	9.34%	10.86%
Infrastructure	**4.25%**	**26.31%**	**19.84%**	**14.80%**	**10.80%**
CPI + 4%	1.18%	5.50%	6.05%	5.34%	5.71%
Macquarie European Infrastructure	1.75%	55.94%	44.43%	25.83%	15.29%
SteelRiver Infrastructure	5.53%	16.48%	7.25%	9.55%	9.23%
CPI + 4%	1.18%	5.50%	6.05%	5.34%	5.71%
Cash Composite	**0.53%**	**2.18%**	**1.49%**	**0.93%**	**0.54%**
Total Fund	**0.44%**	**4.30%**	**9.05%**	**7.82%**	**9.63%**
Total Fund Benchmark*	0.73%	4.23%	7.70%	6.71%	8.76%

* 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.

	6/2019-9/2019	FY 2019	FY 2018	FY 2017	FY 2016
Gross of Fees					
Domestic Equity	**0.19%**	**9.87%**	**16.87%**	**21.35%**	**1.24%**
Total Domestic Equity Target (1)	1.04%	8.50%	14.79%	18.34%	2.28%
Large Cap Equity	**0.87%**	**9.94%**	**16.40%**	**21.12%**	**1.60%**
S&P 500 Index	1.70%	10.42%	14.37%	17.90%	3.99%
Alliance S&P Index	1.70%	10.39%	14.33%	17.80%	3.97%
PIMCO StocksPLUS	1.63%	10.64%	14.13%	19.11%	2.68%
S&P 500 Index	1.70%	10.42%	14.37%	17.90%	3.99%
BlackRock Russell 1000 Value Index	1.40%	8.61%	6.88%	15.61%	2.75%
Russell 1000 Value Index	1.36%	8.46%	6.77%	15.53%	2.86%
T. Rowe Price Large Cap Growth	(1.02%)	10.46%	29.95%	31.65%	(2.64%)
Russell 1000 Growth Index	1.49%	11.56%	22.51%	20.42%	3.02%
Small/Mid Cap Equity U.S. Equity	**(2.01%)**	**9.76%**	**18.33%**	**21.97%**	**0.17%**
Russell 2500 Index	(1.28%)	1.77%	16.24%	19.84%	(3.67%)
Champlain Mid Cap	(0.57%)	16.06%	18.85%	22.50%	4.64%
Russell MidCap Index	0.48%	7.83%	12.33%	16.48%	0.56%
Pyramis Small Cap	(3.45%)	2.94%	17.78%	21.31%	(4.41%)
Russell 2000 Index	(2.40%)	(3.31%)	17.57%	24.60%	(6.73%)
International Equity	**(1.80%)**	**(1.87%)**	**8.64%**	**20.73%**	**(9.40%)**
MSCI ACWI x US (Net)	(1.80%)	1.29%	7.28%	20.45%	(10.24%)
Causeway International Opportunities (3)	(2.34%)	(2.57%)	7.29%	23.39%	(11.66%)
Causeway Linked Index (3)	(1.80%)	1.29%	7.28%	20.45%	(9.42%)
Aberdeen EAFE Plus	(1.41%)	3.04%	3.38%	18.30%	(7.60%)
MSCI ACWI x US (Net)	(1.80%)	1.29%	7.28%	20.45%	(10.24%)
American Century Non-US SC	(1.55%)	(9.14%)	23.86%	21.46%	-
MSCI ACWI ex US Small Cap	(1.19%)	(5.94%)	10.57%	20.32%	(5.46%)
Fixed Income	**2.27%**	**9.29%**	**0.43%**	**4.58%**	**6.39%**
Blmbg Aggregate Index	2.27%	7.87%	(0.40%)	(0.31%)	6.00%
BlackRock U.S. Debt Fund	2.28%	7.97%	(0.31%)	(0.21%)	6.13%
Blmbg Aggregate Index	2.27%	7.87%	(0.40%)	(0.31%)	6.00%
PIMCO Fixed Income	2.26%	10.57%	1.16%	7.99%	6.55%
Custom Index (2)	1.18%	9.53%	(1.05%)	3.83%	7.28%

(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.

	6/2019-9/2019	FY 2019	FY 2018	FY 2017	FY 2016
Gross of Fees					
Real Estate	**(0.08%)**	**2.47%**	**7.72%**	**8.07%**	**10.80%**
NFI-ODCE Value Weight Gr	1.31%	6.41%	8.44%	7.87%	11.82%
JP Morgan Strategic Property Fund	(0.49%)	1.65%	7.80%	7.94%	11.10%
NFI-ODCE Value Weight Gr	1.31%	6.41%	8.44%	7.87%	11.82%
JP Morgan Income and Growth Fund	0.76%	4.19%	7.54%	8.27%	10.06%
NFI-ODCE Value Weight Gr	1.31%	6.41%	8.44%	7.87%	11.82%
Infrastructure	**4.25%**	**25.97%**	**18.95%**	**12.69%**	**12.61%**
CPI + 4%	1.18%	5.44%	7.09%	5.50%	4.64%
Macquarie European Infrastructure	1.75%	57.37%	59.87%	20.04%	6.82%
SteelRiver Infrastructure	5.53%	15.27%	(2.94%)	7.09%	17.75%
CPI + 4%	1.18%	5.44%	7.09%	5.50%	4.64%
Cash Composite	**0.53%**	**2.11%**	**1.22%**	**0.68%**	**0.12%**
Total Fund	**0.44%**	**6.69%**	**9.81%**	**14.77%**	**2.33%**
Total Fund Benchmark*	0.73%	6.28%	7.96%	12.04%	1.82%

* 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 September 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 September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Net of Fees					
Domestic Equity	**0.19%**	**2.91%**	**13.76%**	**11.25%**	**13.59%**
Total Domestic Equity Target (1)	1.04%	2.41%	12.55%	10.36%	13.05%
Large Cap Equity	**0.87%**	**3.55%**	**14.07%**	**11.10%**	**13.48%**
S&P 500 Index	1.70%	4.25%	13.39%	10.84%	13.24%
Alliance S&P Index	1.70%	4.26%	13.32%	10.77%	13.18%
PIMCO StocksPLUS	1.63%	4.15%	13.52%	10.76%	14.75%
S&P 500 Index	1.70%	4.25%	13.39%	10.84%	13.24%
BlackRock Russell 1000 Value Index	1.40%	4.11%	9.51%	7.83%	11.54%
Russell 1000 Value Index	1.36%	4.00%	9.43%	7.79%	11.46%
T. Rowe Price Large Cap Growth	(1.02%)	2.06%	19.66%	14.81%	15.95%
Russell 1000 Growth Index	1.49%	3.71%	16.89%	13.39%	14.94%
Small/Mid Cap Equity U.S. Equity	**(2.01%)**	**0.92%**	**12.75%**	**11.82%**	**13.97%**
Russell 2500 Index	(1.28%)	(4.04%)	9.51%	8.57%	12.22%
Champlain Mid Cap	(0.57%)	6.12%	16.03%	13.73%	14.68%
Russell MidCap Index	0.48%	3.19%	10.69%	9.10%	13.07%
Pyramis Small Cap	(3.45%)	(4.65%)	9.23%	9.66%	13.21%
Russell 2000 Index	(2.40%)	(8.89%)	8.23%	8.19%	11.19%
International Equity	**(1.91%)**	**(3.10%)**	**5.64%**	**1.76%**	**4.01%**
MSCI ACWI x US (Net)	(1.80%)	(1.23%)	6.33%	2.90%	4.46%
Causeway International Opportunities (3)	(2.34%)	(5.32%)	5.37%	1.90%	5.75%
Causeway Linked Index (3)	(1.80%)	(1.23%)	6.33%	3.45%	4.99%
Aberdeen EAFE Plus	(1.57%)	1.60%	5.36%	0.80%	4.47%
MSCI ACWI x US (Net)	(1.80%)	(1.23%)	6.33%	2.90%	4.46%
American Century Non-US SC	(1.78%)	(7.85%)	6.60%	-	-
MSCI ACWI ex US Small Cap	(1.19%)	(5.63%)	4.64%	3.98%	6.13%
Fixed Income	**2.27%**	**10.92%**	**4.45%**	**4.59%**	**4.95%**
Blmbg Aggregate Index	2.27%	10.30%	2.92%	3.38%	3.75%
BlackRock U.S. Debt Fund	2.28%	10.36%	2.98%	3.43%	3.84%
Blmbg Aggregate Index	2.27%	10.30%	2.92%	3.38%	3.75%
PIMCO Fixed Income	2.26%	11.48%	5.69%	5.49%	5.94%
Custom Index (2)	1.18%	9.57%	3.62%	4.41%	5.16%

(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 September 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 September 30, 2019

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Net of Fees					
Real Estate	**(0.17%)**	**(0.05%)**	**4.47%**	**7.01%**	**8.82%**
NFI-ODCE Equal Weight Net	1.18%	5.26%	6.69%	8.68%	9.89%
JP Morgan Strategic Property Fund	(0.49%)	(0.90%)	4.07%	6.78%	9.09%
NFI-ODCE Equal Weight Net	1.18%	5.26%	6.69%	8.68%	9.89%
JP Morgan Income and Growth Fund	0.50%	1.73%	5.28%	7.54%	11.13%
NFI-ODCE Equal Weight Net	1.18%	5.26%	6.69%	8.68%	9.89%
Infrastructure	**3.71%**	**21.86%**	**14.29%**	**11.18%**	**8.15%**
CPI + 4%	1.18%	5.50%	6.05%	5.34%	5.71%
Macquarie European Infrastructure	0.33%	38.03%	27.87%	16.55%	10.14%
SteelRiver Infrastructure	5.41%	15.81%	6.79%	8.85%	7.90%
CPI + 4%	1.18%	5.50%	6.05%	5.34%	5.71%
Cash Composite	**0.53%**	**2.18%**	**1.49%**	**0.93%**	**0.54%**
Total Fund	**0.38%**	**3.95%**	**8.42%**	**7.26%**	**9.06%**
Total Fund Benchmark*	0.73%	4.23%	7.70%	6.71%	8.76%

* 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.

	6/2019-9/2019	FY 2019	FY 2018	FY 2017	FY 2016
Net of Fees					
Domestic Equity	**0.19%**	**9.69%**	**16.55%**	**20.96%**	**0.94%**
Total Domestic Equity Target (1)	1.04%	8.50%	14.79%	18.34%	2.28%
Large Cap Equity	**0.87%**	**9.84%**	**16.25%**	**20.92%**	**1.44%**
S&P 500 Index	1.70%	10.42%	14.37%	17.90%	3.99%
Alliance S&P Index	1.70%	10.37%	14.29%	17.76%	3.93%
PIMCO StocksPLUS	1.63%	10.64%	14.13%	19.11%	2.68%
S&P 500 Index	1.70%	10.42%	14.37%	17.90%	3.99%
BlackRock Russell 1000 Value Index	1.40%	8.57%	6.82%	15.59%	2.71%
Russell 1000 Value Index	1.36%	8.46%	6.77%	15.53%	2.86%
T. Rowe Price Large Cap Growth	(1.02%)	10.16%	29.47%	30.96%	(3.13%)
Russell 1000 Growth Index	1.49%	11.56%	22.51%	20.42%	3.02%
Small/Mid Cap Equity U.S. Equity	**(2.01%)**	**9.31%**	**17.44%**	**20.95%**	**(0.61%)**
Russell 2500 Index	(1.28%)	1.77%	16.24%	19.84%	(3.67%)
Champlain Mid Cap	(0.57%)	15.57%	17.80%	21.43%	3.76%
Russell MidCap Index	0.48%	7.83%	12.33%	16.48%	0.56%
Pyramis Small Cap	(3.45%)	2.54%	17.06%	20.34%	(5.10%)
Russell 2000 Index	(2.40%)	(3.31%)	17.57%	24.60%	(6.73%)
International Equity	**(1.91%)**	**(2.15%)**	**8.12%**	**20.24%**	**(10.04%)**
MSCI ACWI x US (Net)	(1.80%)	1.29%	7.28%	20.45%	(10.24%)
Causeway International Opportunities (3)	(2.34%)	(2.75%)	6.84%	22.89%	(12.24%)
Causeway Linked Index (3)	(1.80%)	1.29%	7.28%	20.45%	(9.42%)
Aberdeen EAFE Plus	(1.57%)	2.70%	2.61%	17.60%	(8.32%)
MSCI ACWI x US (Net)	(1.80%)	1.29%	7.28%	20.45%	(10.24%)
American Century Non-US SC	(1.78%)	(10.00%)	22.61%	20.31%	-
MSCI ACWI ex US Small Cap	(1.19%)	(5.94%)	10.57%	20.32%	(5.46%)
Fixed Income	**2.27%**	**9.14%**	**0.14%**	**4.27%**	**6.05%**
Blmbg Aggregate Index	2.27%	7.87%	(0.40%)	(0.31%)	6.00%
BlackRock U.S. Debt Fund	2.28%	7.96%	(0.38%)	(0.25%)	6.07%
Blmbg Aggregate Index	2.27%	7.87%	(0.40%)	(0.31%)	6.00%
PIMCO Fixed Income	2.26%	10.30%	0.65%	7.49%	6.04%
Custom Index (2)	1.18%	9.53%	(1.05%)	3.83%	7.28%

(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.

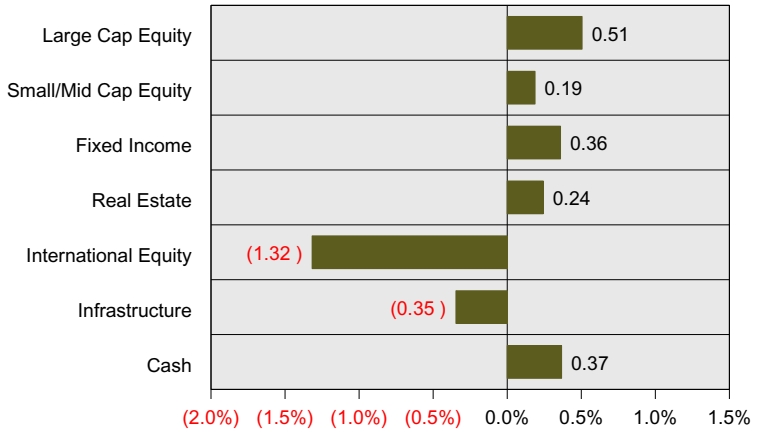
	6/2019-9/2019	FY 2019	FY 2018	FY 2017	FY 2016
Net of Fees					
Real Estate	**(0.17%)**	**1.78%**	**6.59%**	**7.07%**	**9.64%**
NFI-ODCE Equal Weight Net	1.18%	5.99%	7.68%	7.23%	11.24%
JP Morgan Strategic Property Fund	(0.49%)	1.15%	6.68%	6.88%	10.02%
NFI-ODCE Equal Weight Net	1.18%	5.99%	7.68%	7.23%	11.24%
JP Morgan Income and Growth Fund	0.50%	3.11%	6.43%	7.37%	8.69%
NFI-ODCE Equal Weight Net	1.18%	5.99%	7.68%	7.23%	11.24%
Infrastructure	**3.71%**	**21.76%**	**8.04%**	**11.42%**	**12.30%**
CPI + 4%	1.18%	5.44%	7.09%	5.50%	4.64%
Macquarie European Infrastructure	0.33%	40.10%	27.95%	17.65%	6.82%
SteelRiver Infrastructure	5.41%	14.56%	(3.21%)	6.64%	17.13%
CPI + 4%	1.18%	5.44%	7.09%	5.50%	4.64%
Cash Composite	**0.53%**	**2.11%**	**1.22%**	**0.68%**	**0.12%**
Total Fund	**0.38%**	**6.29%**	**8.77%**	**14.26%**	**1.89%**
Total Fund Benchmark*	0.73%	6.28%	7.96%	12.04%	1.82%

* 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%.

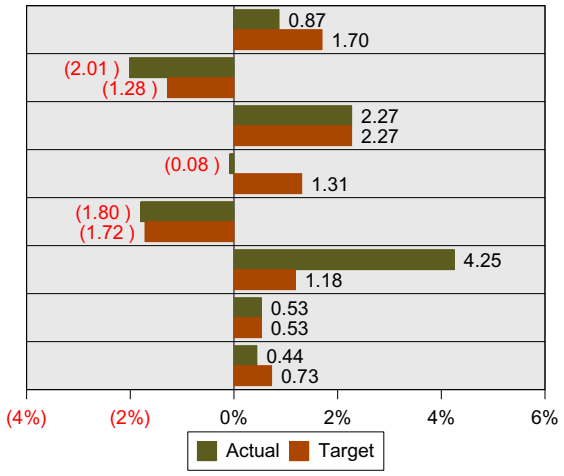
Quarterly Style Attribution - September 30, 2019

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.

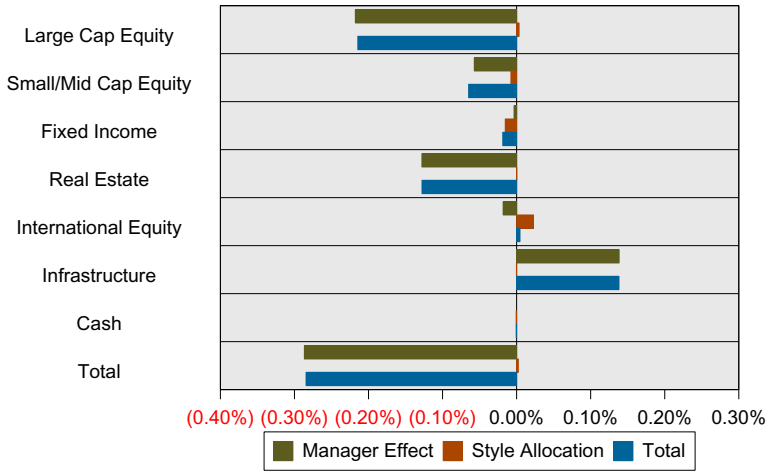
Style Class Under or Overweighting



Actual vs Target Returns



Relative Attribution by Style Class



Relative Attribution Effects for Quarter ended September 30, 2019

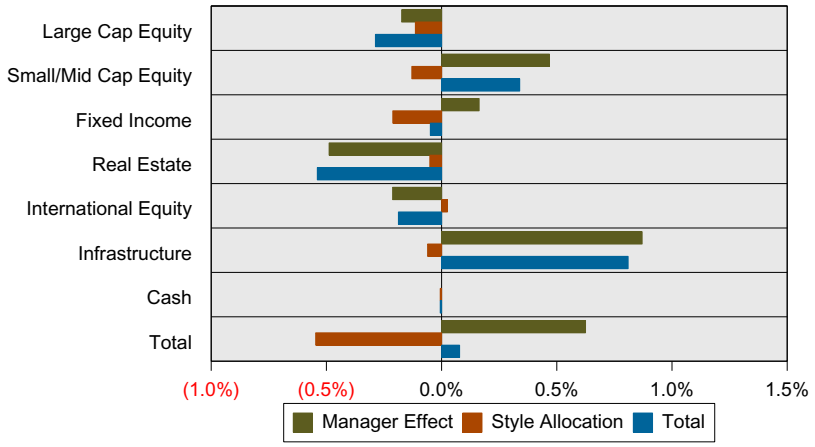
Style Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Style Allocation	Total Relative Return
Large Cap Equity	27%	26%	0.87%	1.70%	(0.22%)	0.00%	(0.21%)
Small/Mid Cap Equity	8%	8%	(2.01%)	(1.28%)	(0.06%)	(0.01%)	(0.06%)
Fixed Income	27%	27%	2.27%	2.27%	(0.00%)	(0.02%)	(0.02%)
Real Estate	9%	9%	(0.08%)	1.31%	(0.13%)	0.00%	(0.13%)
International Equity	24%	25%	(1.80%)	(1.72%)	(0.02%)	0.02%	0.00%
Infrastructure	5%	5%	4.25%	1.18%	0.14%	(0.00%)	0.14%
Cash	0%	0%	0.53%	0.53%	0.00%	(0.00%)	(0.00%)
Total			**0.44% =**	**0.73% +**	**(0.29%) +**	**0.00%**	**(0.28%)**

* 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%.

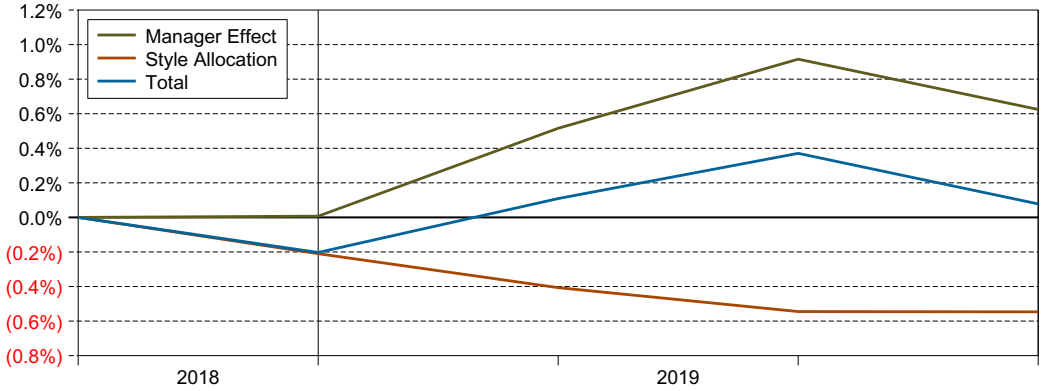
Cumulative Style Relative Attribution - September 30, 2019

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

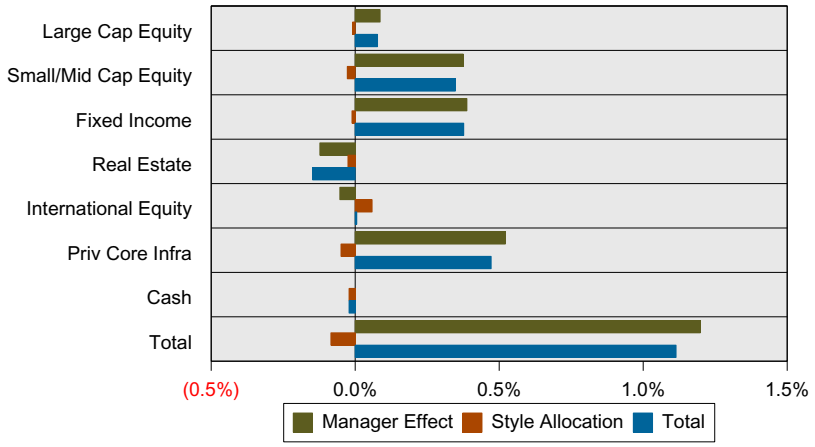
Style Class	Effective Actual Weight	Effective Target Weight	Actual Return		Target Return		Manager Effect		Style Allocation	Total Relative Return
Large Cap Equity	27%	26%	3.60%		4.25%		(0.17%)		(0.11%)	(0.29%)
Small/Mid Cap Equity	8%	8%	1.14%		(4.04%)		0.47%		(0.13%)	0.34%
Fixed Income	27%	27%	11.00%		10.30%		0.16%		(0.21%)	(0.05%)
Real Estate	10%	9%	0.46%		5.59%		(0.49%)		(0.05%)	(0.54%)
International Equity	24%	25%	(2.74%)		(1.84%)		(0.21%)		0.03%	(0.19%)
Infrastructure	5%	5%	26.31%		5.50%		0.87%		(0.06%)	0.81%
Cash	0%	0%	2.18%		2.18%		0.00%		(0.01%)	(0.01%)
Total			**4.30%**	**=**	**4.23%**	**+**	**0.62%**	**+**	**(0.55%)**	**0.08%**

* 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%.

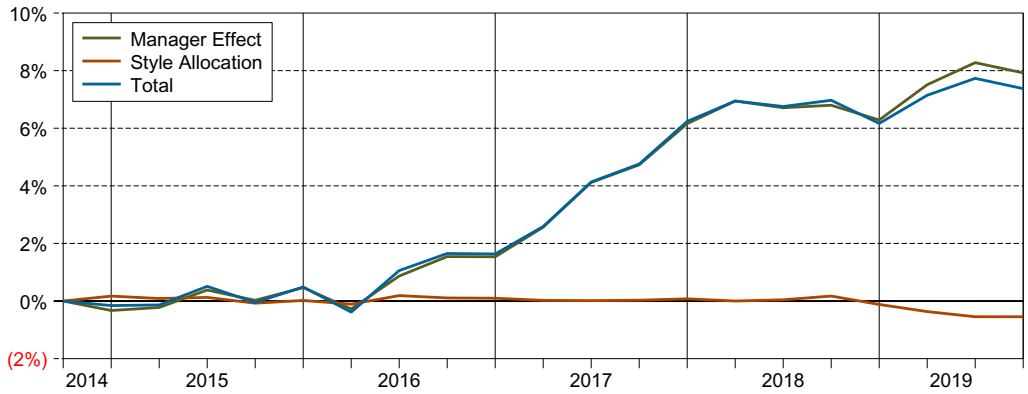
Cumulative Style Relative Attribution - September 30, 2019

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

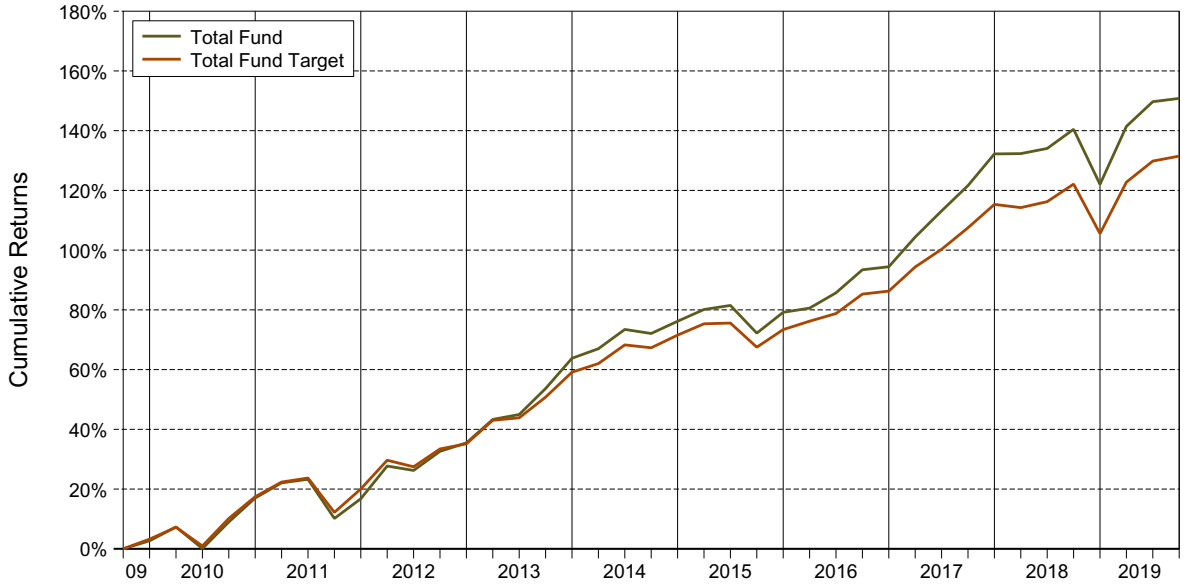
Style Class	Effective Actual Weight	Effective Target Weight	Actual Return		Target Return		Manager Effect		Style Allocation	Total Relative Return
Large Cap Equity	30%	29%	11.24%		10.84%		0.09%		(0.01%)	0.08%
Small/Mid Cap Equity	9%	9%	12.57%		8.57%		0.38%		(0.03%)	0.35%
Fixed Income	25%	27%	4.86%		3.38%		0.39%		(0.01%)	0.38%
Real Estate	9%	9%	7.99%		9.34%		(0.12%)		(0.03%)	(0.15%)
International Equity	21%	22%	2.28%		2.78%		(0.05%)		0.06%	0.01%
Priv Core Infra	5%	5%	14.80%		5.34%		0.52%		(0.05%)	0.47%
Cash	0%	0%	0.93%		0.93%		0.00%		(0.02%)	(0.02%)
Total			**7.82%**	**=**	**6.71%**	**+**	**1.20%**	**+**	**(0.08%)**	**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%.

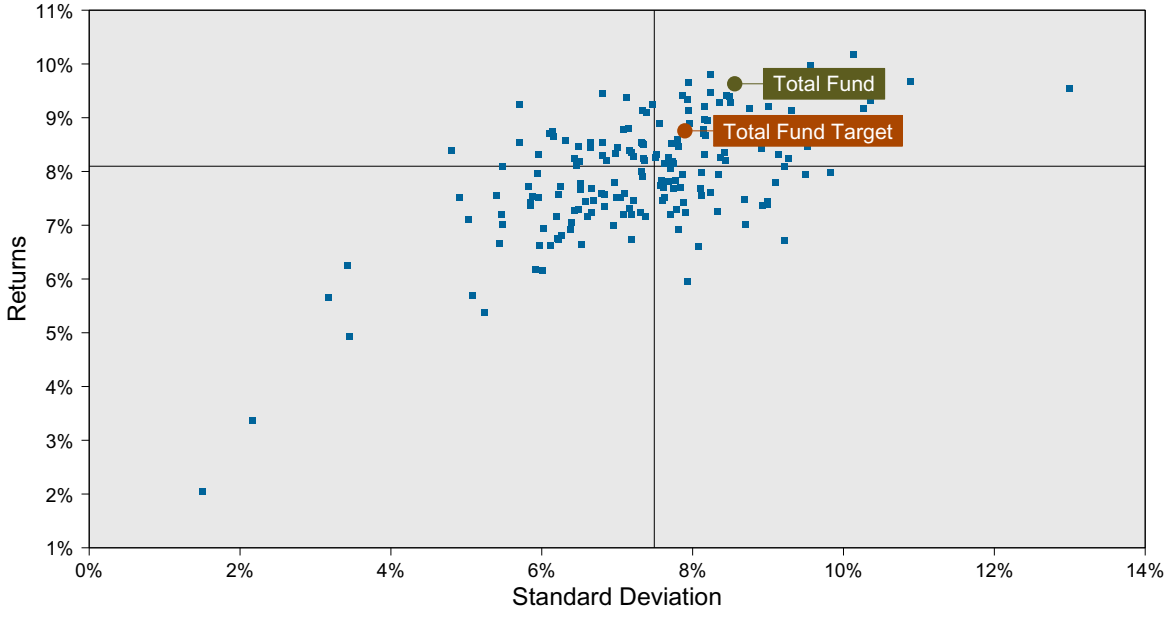
Cumulative Performance Relative to Target

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



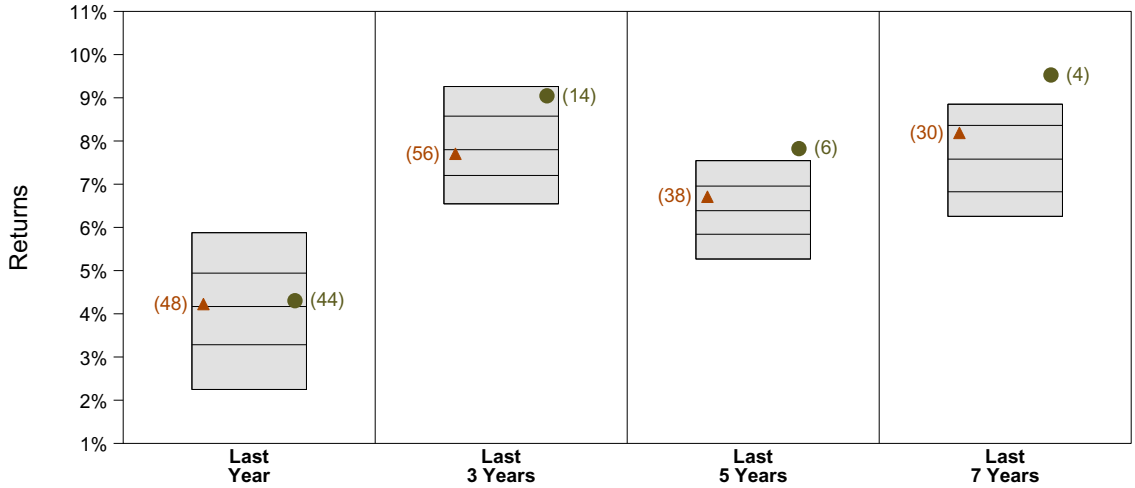
Squares represent membership of the Callan Public Fund Sponsor Database

* 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

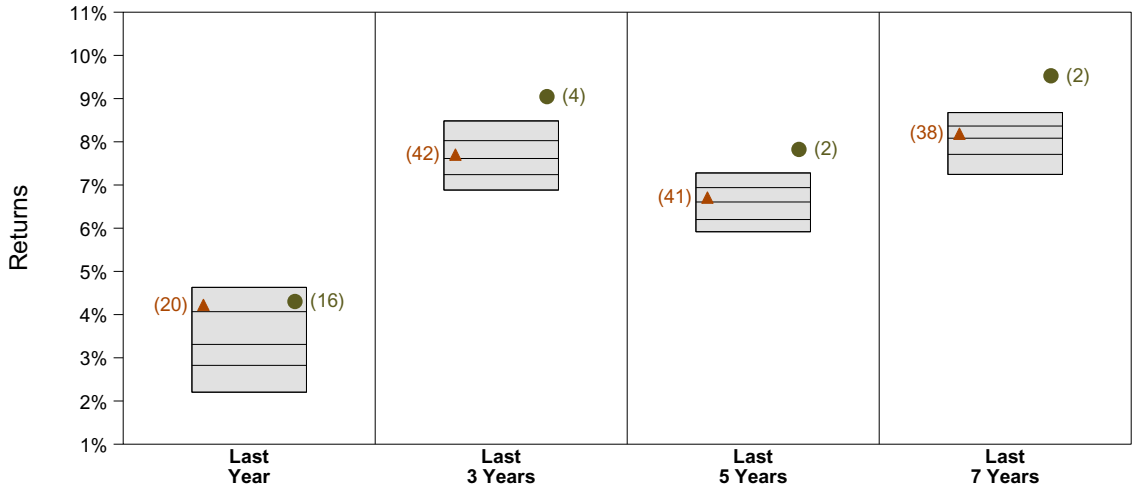
The first two charts show the ranking of the Total Fund's performance relative to that of the Callan Public Fund Sponsor Database for periods ended September 30, 2019. The first chart is a standard unadjusted ranking. In the second chart each fund in the database is adjusted to have the same historical 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	5.88	9.26	7.55	8.85
25th Percentile	4.94	8.58	6.96	8.36
Median	4.17	7.80	6.39	7.58
75th Percentile	3.28	7.20	5.84	6.82
90th Percentile	2.25	6.55	5.27	6.26
Total Fund ●	4.30	9.05	7.82	9.53
Policy Target ▲	4.23	7.70	6.71	8.19

Asset Allocation Adjusted Ranking



	Last Year	Last 3 Years	Last 5 Years	Last 7 Years
10th Percentile	4.63	8.48	7.28	8.68
25th Percentile	4.07	8.03	6.94	8.36
Median	3.31	7.61	6.61	8.08
75th Percentile	2.82	7.24	6.20	7.71
90th Percentile	2.20	6.88	5.92	7.24
Total Fund ●	4.30	9.05	7.82	9.53
Policy Target ▲	4.23	7.70	6.71	8.19

* 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 September 30, 2019

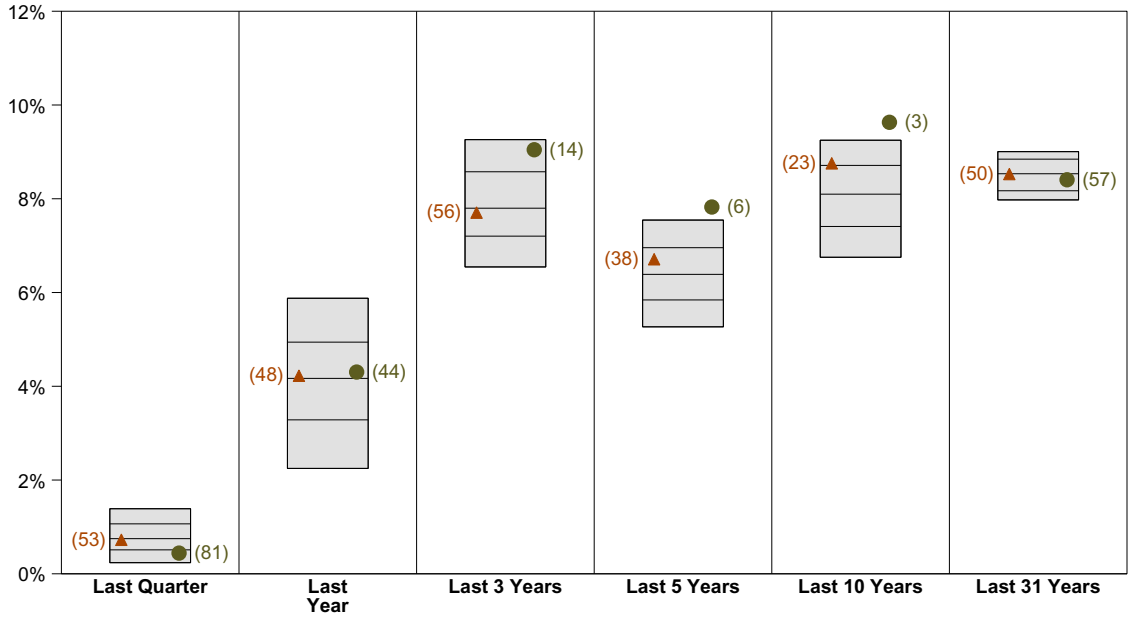
Investment Philosophy

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

Quarterly Summary and Highlights

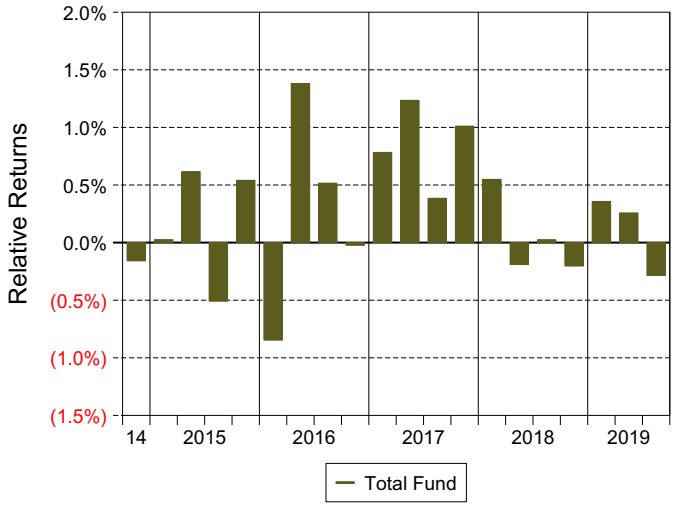
- Total Fund's portfolio posted a 0.44% return for the quarter placing it in the 81 percentile of the Callan Public Fund Sponsor Database group for the quarter and in the 44 percentile for the last year.
- Total Fund's portfolio underperformed the Total Fund Benchmark by 0.28% for the quarter and outperformed the Total Fund Benchmark for the year by 0.08%.

Performance vs Callan Public Fund Sponsor Database (Gross)

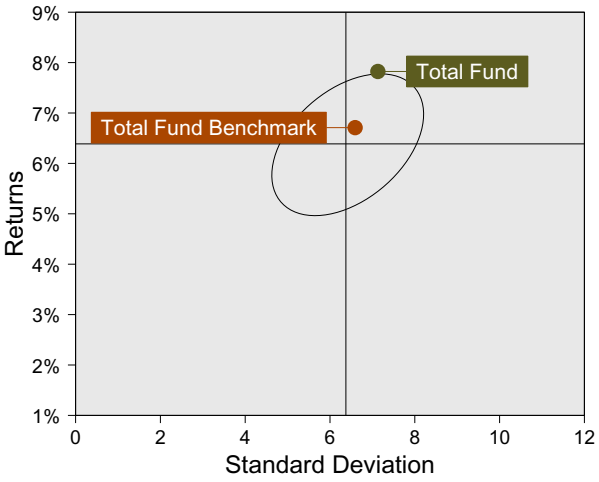


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 31 Years
10th Percentile	1.39	5.88	9.26	7.55	9.25	9.01
25th Percentile	1.07	4.94	8.58	6.96	8.71	8.84
Median	0.75	4.17	7.80	6.39	8.10	8.53
75th Percentile	0.51	3.28	7.20	5.84	7.41	8.17
90th Percentile	0.24	2.25	6.55	5.27	6.75	7.98
Total Fund ●	0.44	4.30	9.05	7.82	9.63	8.40
Total Fund Benchmark ▲	0.73	4.23	7.70	6.71	8.76	8.53

Relative Return vs Total Fund Benchmark



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



Domestic Equity

Domestic Equity
Period Ended September 30, 2019

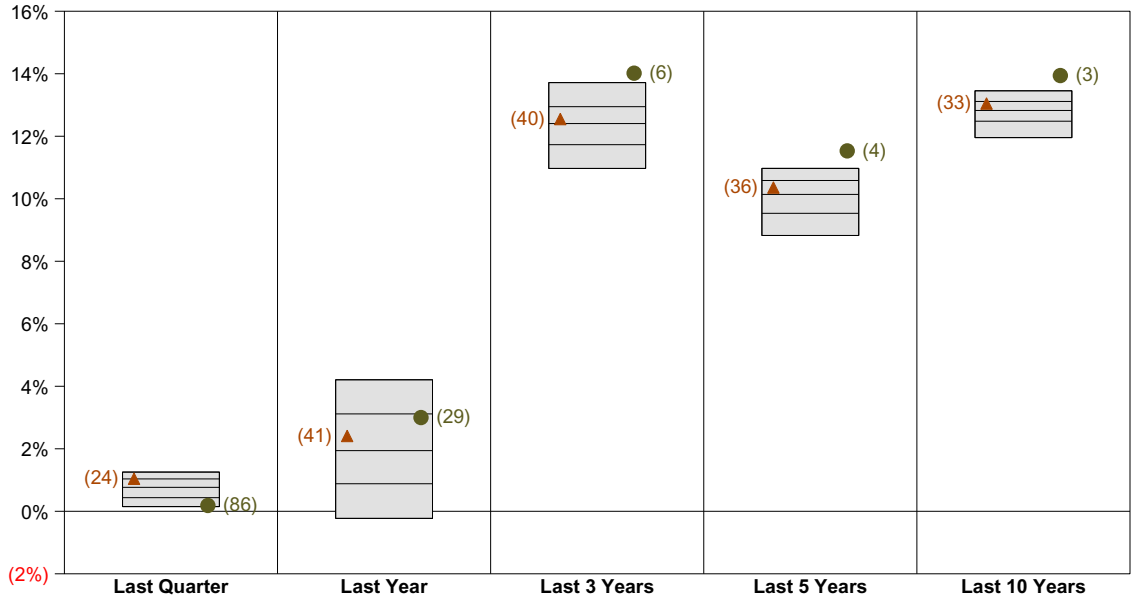
Investment Philosophy

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

Quarterly Summary and Highlights

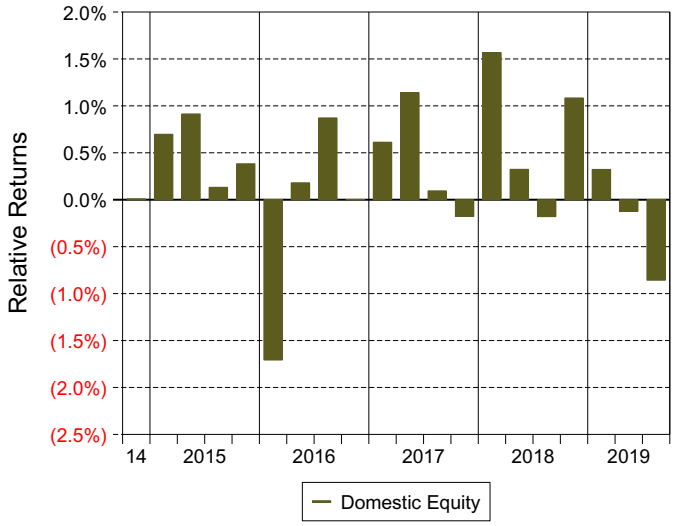
- Domestic Equity's portfolio posted a 0.19% return for the quarter placing it in the 86 percentile of the Public Fund - Domestic Equity group for the quarter and in the 29 percentile for the last year.
- Domestic Equity's portfolio underperformed the Total Domestic Equity Target by 0.86% for the quarter and outperformed the Total Domestic Equity Target for the year by 0.59%.

Performance vs Public Fund - Domestic Equity (Gross)

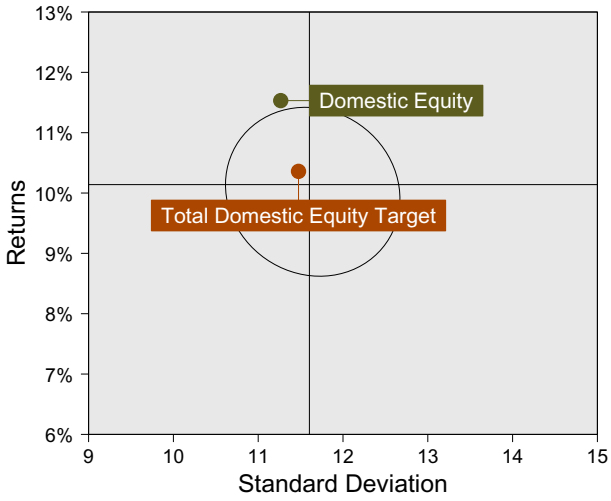


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	1.26	4.21	13.72	10.97	13.45
25th Percentile	1.04	3.12	12.95	10.58	13.11
Median	0.77	1.94	12.41	10.14	12.82
75th Percentile	0.44	0.88	11.73	9.53	12.48
90th Percentile	0.15	(0.23)	10.97	8.83	11.96
Domestic Equity ●	0.19	3.00	14.02	11.53	13.94
Total Domestic Equity Target ▲	1.04	2.41	12.55	10.36	13.05

Relative Returns vs Total Domestic Equity Target



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

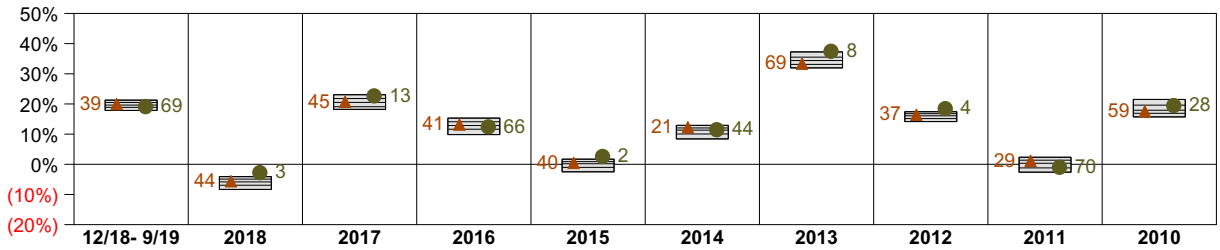


Domestic Equity
Return Analysis Summary

Return Analysis

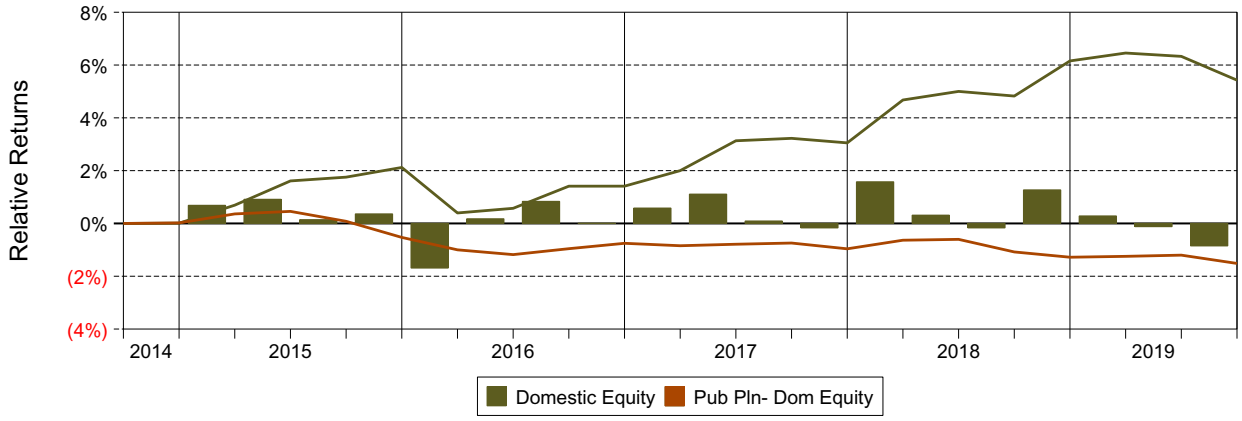
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

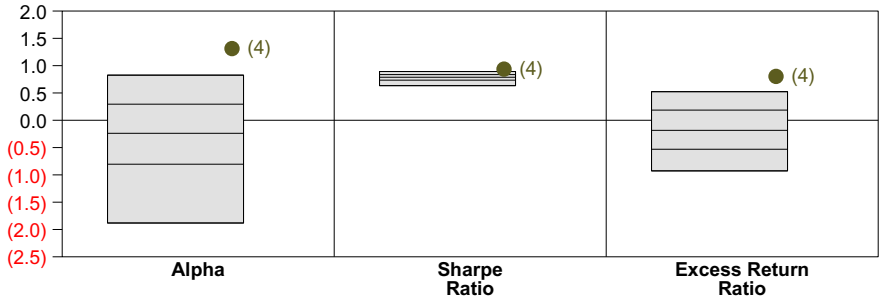


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	21.27	(4.09)	23.06	15.31	1.70	12.91	37.25	17.42	2.34	21.49
25th Percentile	20.48	(4.91)	21.80	14.10	0.89	12.05	35.51	16.79	1.36	19.60
Median	19.63	(5.83)	20.51	12.86	0.19	11.32	34.39	16.08	0.33	17.92
75th Percentile	18.87	(6.94)	19.08	11.63	(1.03)	10.05	33.11	15.15	(1.19)	16.90
90th Percentile	17.85	(8.33)	18.20	9.85	(2.49)	8.41	31.95	14.16	(2.61)	15.71
Domestic Equity ●	19.11	(2.77)	22.67	12.40	2.59	11.46	37.46	18.44	(0.99)	19.45
Total Domestic Equity Target ▲	19.94	(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 September 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.83	0.89	0.52
25th Percentile	0.29	0.84	0.19
Median	(0.24)	0.79	(0.18)
75th Percentile	(0.80)	0.73	(0.53)
90th Percentile	(1.88)	0.63	(0.93)
Domestic Equity ●	1.31	0.94	0.80

Alliance S&P Index
Period Ended September 30, 2019

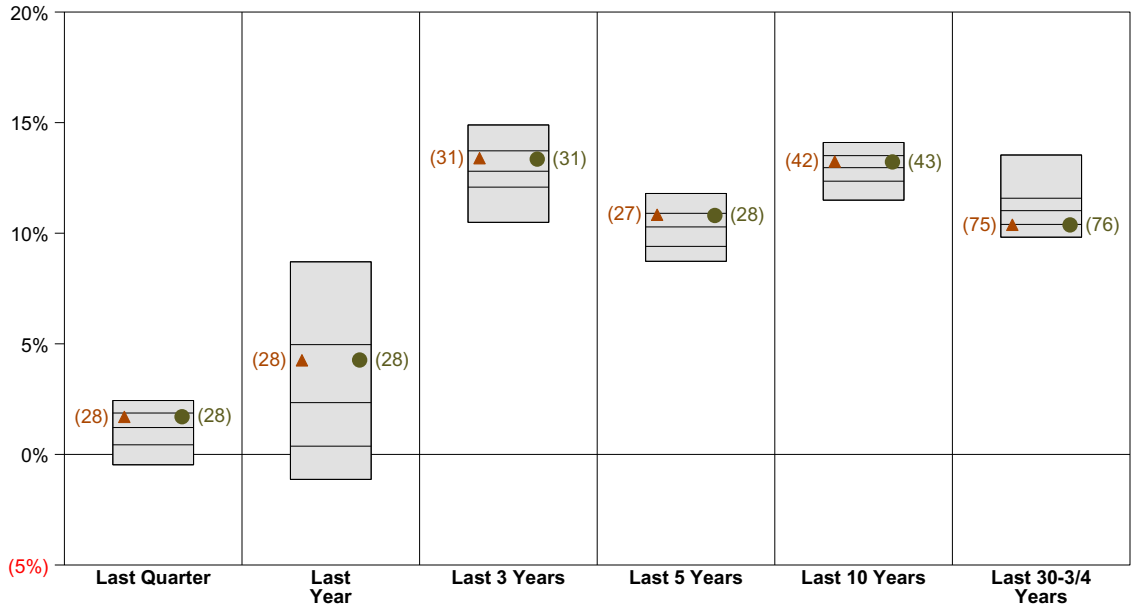
Investment Philosophy

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

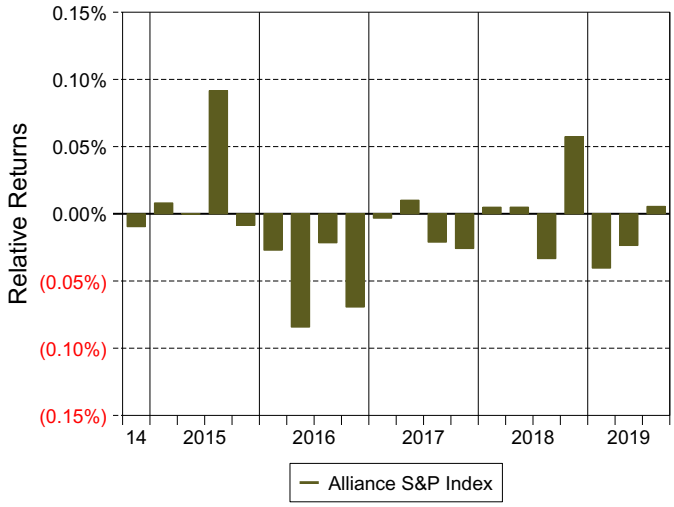
- Alliance S&P Index's portfolio posted a 1.70% return for the quarter placing it in the 28 percentile of the Callan Large Cap Core group for the quarter and in the 28 percentile for the last year.
- Alliance S&P Index's portfolio outperformed the S&P 500 Index by 0.01% for the quarter and outperformed the S&P 500 Index for the year by 0.01%.

Performance vs Callan Large Cap Core (Gross)

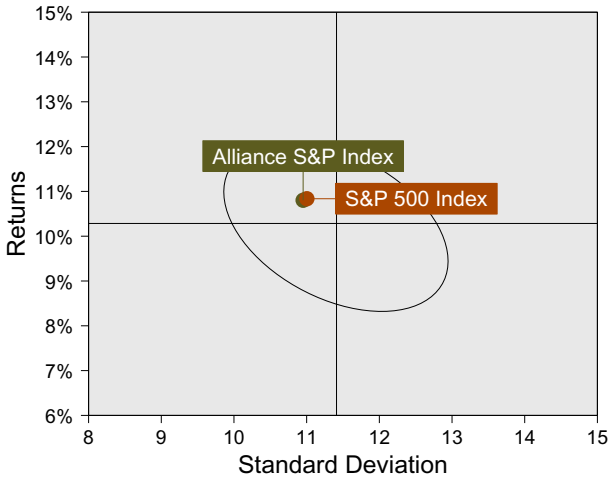


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 30-3/4 Years
10th Percentile	2.44	8.71	14.90	11.80	14.10	13.54
25th Percentile	1.87	4.96	13.73	10.90	13.51	11.58
Median	1.21	2.34	12.80	10.28	12.96	11.02
75th Percentile	0.43	0.37	12.08	9.40	12.35	10.40
90th Percentile	(0.47)	(1.13)	10.49	8.73	11.49	9.82
Alliance S&P Index ●	1.70	4.27	13.35	10.80	13.22	10.38
S&P 500 Index ▲	1.70	4.25	13.39	10.84	13.24	10.38

Relative Return vs S&P 500 Index



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

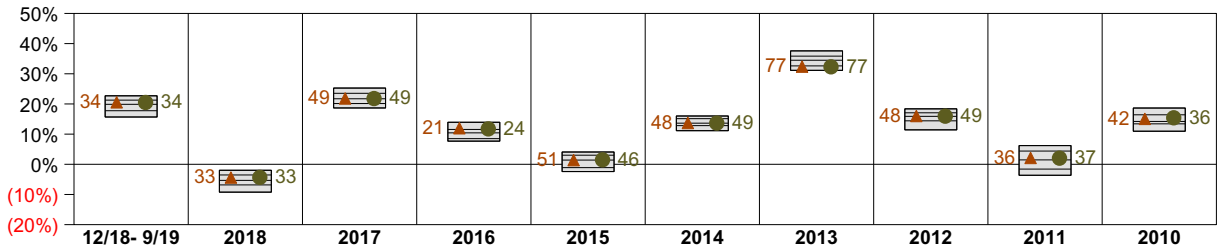


Alliance S&P Index
Return Analysis Summary

Return Analysis

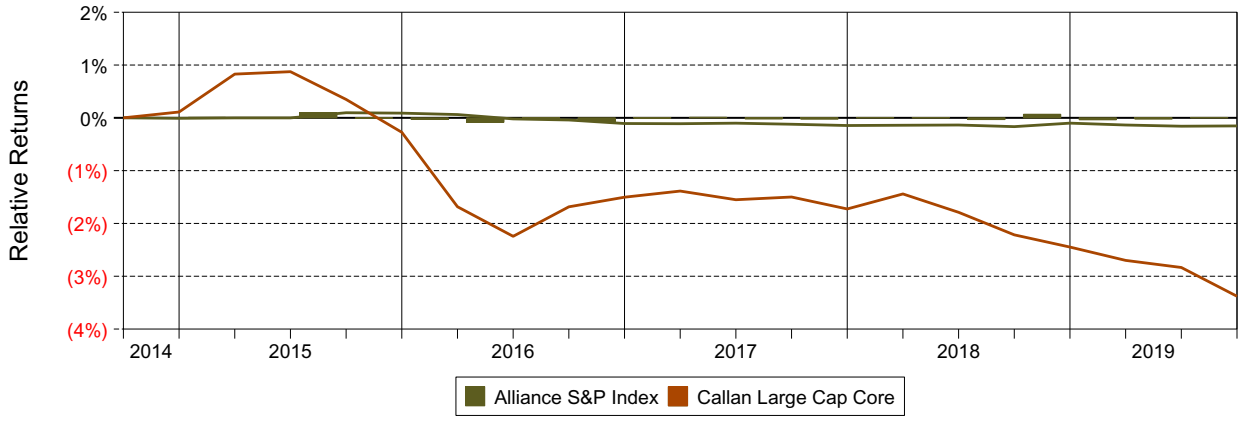
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

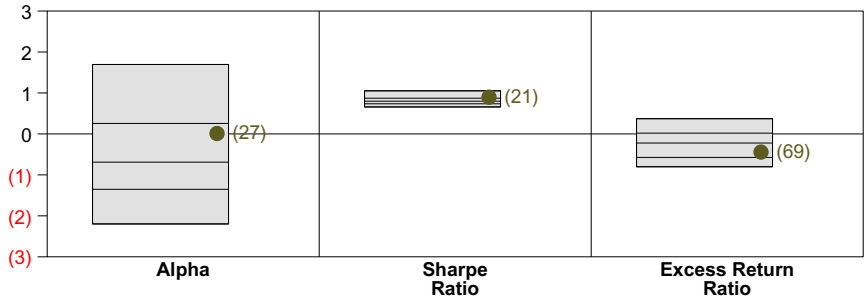


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	22.70	(1.97)	25.27	13.93	4.08	16.01	37.59	18.38	6.19	18.65
25th Percentile	21.27	(3.53)	23.53	11.55	3.01	15.12	35.85	17.07	4.38	16.40
Median	19.88	(5.33)	21.72	10.42	1.40	13.63	34.49	15.89	1.46	14.20
75th Percentile	17.76	(6.83)	20.14	8.50	(1.10)	12.82	32.61	14.41	(1.59)	13.41
90th Percentile	15.68	(9.24)	18.67	7.68	(2.41)	11.14	31.14	11.41	(3.64)	10.96
Alliance S&P Index ●	20.49	(4.34)	21.79	11.74	1.48	13.65	32.31	15.95	2.03	15.41
S&P 500 Index ▲	20.55	(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 September 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.70	1.05	0.37
25th Percentile	0.26	0.87	0.02
Median	(0.69)	0.80	(0.22)
75th Percentile	(1.35)	0.74	(0.57)
90th Percentile	(2.20)	0.66	(0.80)
Alliance S&P Index ●	0.01	0.90	(0.44)

PIMCO StocksPLUS
Period Ended September 30, 2019

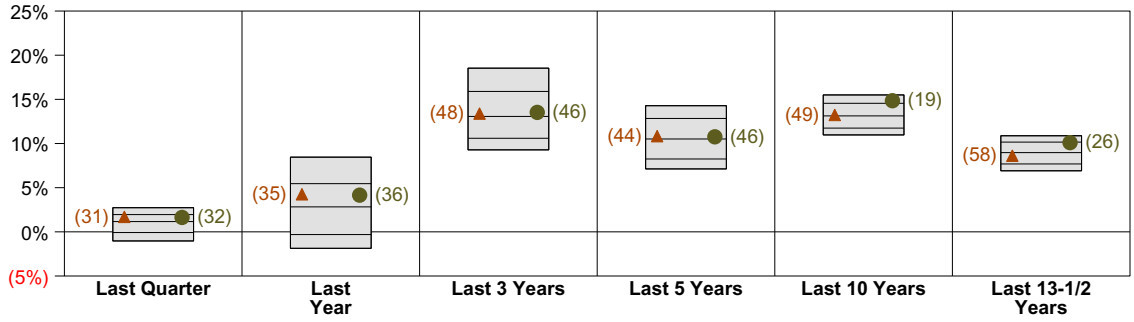
Investment Philosophy

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

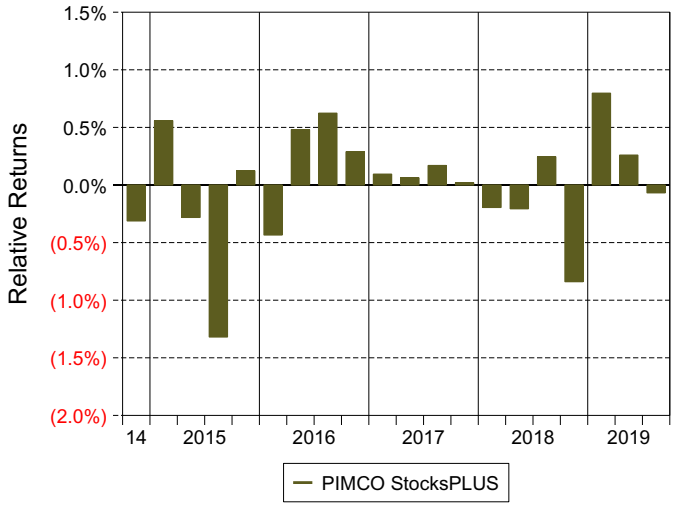
- PIMCO StocksPLUS's portfolio posted a 1.63% return for the quarter placing it in the 32 percentile of the Callan Large Capitalization group for the quarter and in the 36 percentile for the last year.
- PIMCO StocksPLUS's portfolio underperformed the S&P 500 Index by 0.07% for the quarter and underperformed the S&P 500 Index for the year by 0.10%.

Performance vs Callan Large Capitalization (Gross)

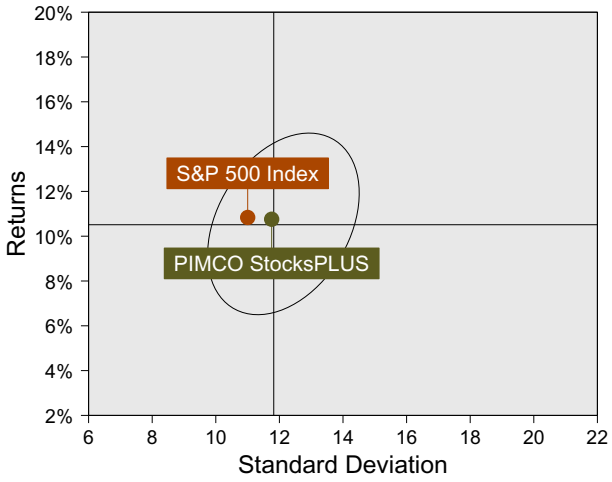


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 13-1/2 Years
10th Percentile	2.73	8.46	18.53	14.28	15.50	10.88
25th Percentile	1.95	5.46	15.90	12.84	14.55	10.16
Median	1.16	2.83	13.07	10.51	13.13	8.97
75th Percentile	(0.08)	(0.31)	10.59	8.25	11.75	7.69
90th Percentile	(1.03)	(1.87)	9.28	7.12	10.97	6.91
PIMCO StocksPLUS ●	1.63	4.15	13.52	10.76	14.85	10.10
S&P 500 Index ▲	1.70	4.25	13.39	10.84	13.24	8.62

Relative Return vs S&P 500 Index



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

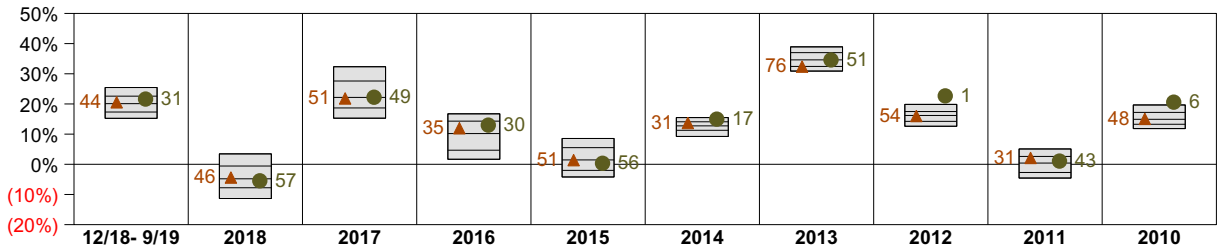


PIMCO StocksPLUS
Return Analysis Summary

Return Analysis

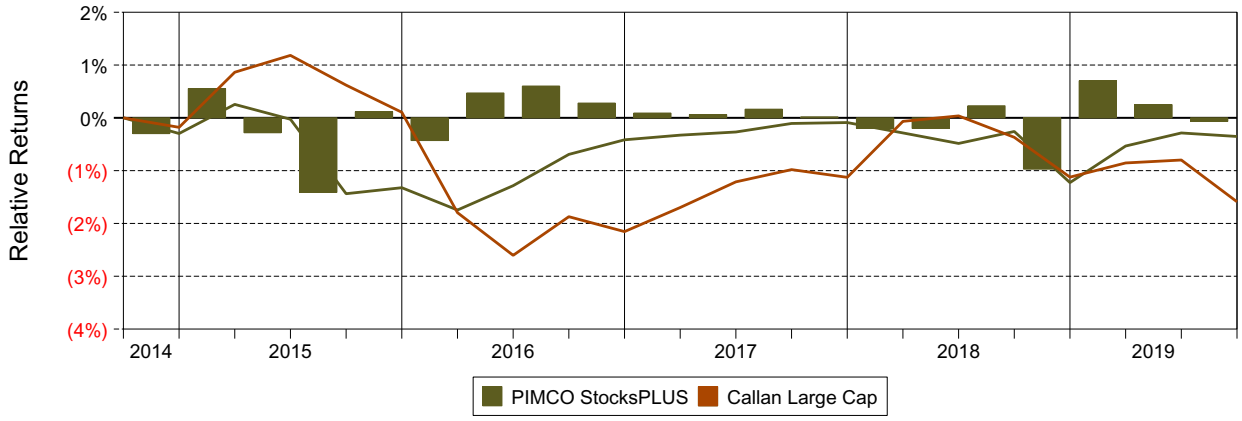
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

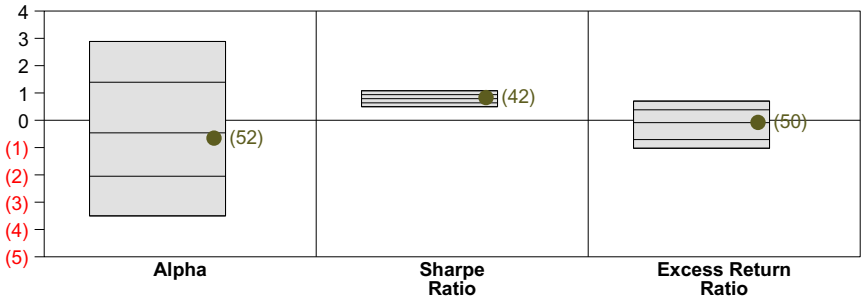


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	25.45	3.46	32.34	16.73	8.56	15.49	38.93	19.85	5.09	19.67
25th Percentile	22.58	(0.57)	27.61	14.30	5.52	14.09	37.01	17.48	2.61	17.20
Median	20.10	(4.80)	22.17	10.18	1.45	12.73	34.61	16.18	0.40	14.92
75th Percentile	17.33	(7.78)	18.68	4.67	(2.01)	11.27	32.43	14.23	(2.71)	13.26
90th Percentile	15.23	(11.33)	15.28	1.67	(4.21)	9.23	30.89	12.61	(4.56)	11.84
PIMCO StocksPLUS ●	21.62	(5.47)	22.23	12.99	0.34	14.97	34.59	22.68	1.07	20.60
S&P 500 Index ▲	20.55	(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 September 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.89	1.08	0.70
25th Percentile	1.39	0.94	0.38
Median	(0.46)	0.79	(0.09)
75th Percentile	(2.05)	0.64	(0.71)
90th Percentile	(3.50)	0.50	(1.02)
PIMCO StocksPLUS ●	(0.65)	0.83	(0.08)

BlackRock Russell 1000 Value
Period Ended September 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.

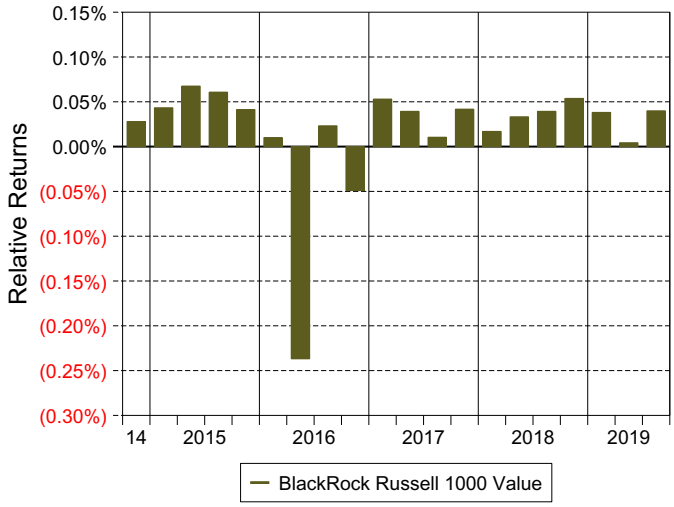
Quarterly Summary and Highlights

- BlackRock Russell 1000 Value's portfolio posted a 1.40% return for the quarter placing it in the 55 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 0.04% for the quarter and outperformed the Russell 1000 Value Index for the year by 0.14%.

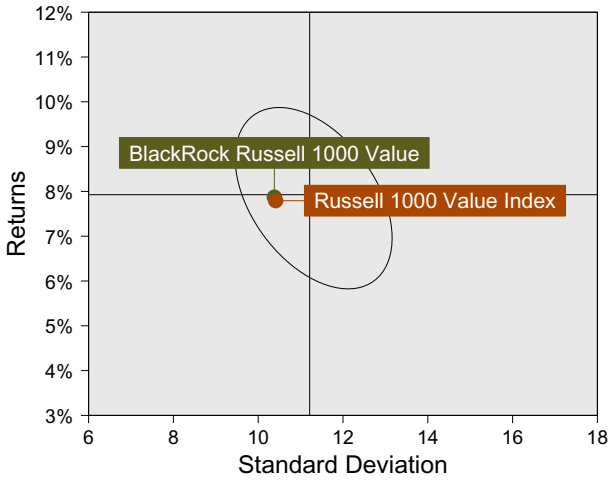
Performance vs Callan Large Cap Value (Gross)

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 18-1/4 Years
10th Percentile	3.11	6.69	12.74	9.71	12.88	8.92
25th Percentile	2.23	4.60	11.22	8.66	12.31	8.35
Median	1.49	1.02	10.02	7.93	11.56	7.79
75th Percentile	0.78	(1.31)	9.26	7.06	10.93	7.16
90th Percentile	(0.37)	(2.54)	8.51	6.14	10.16	6.57
BlackRock Russell 1000 Value ●	1.40	4.14	9.55	7.87	11.56	7.09
Russell 1000 Value Index ▲	1.36	4.00	9.43	7.79	11.46	6.99

Relative Return vs Russell 1000 Value Index



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

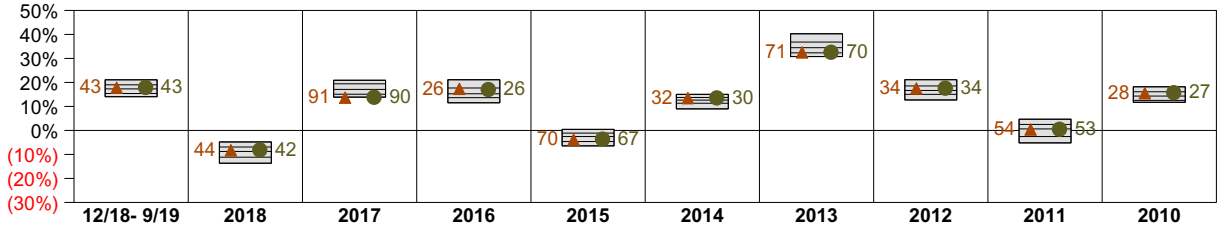


BlackRock Russell 1000 Value
Return Analysis Summary

Return Analysis

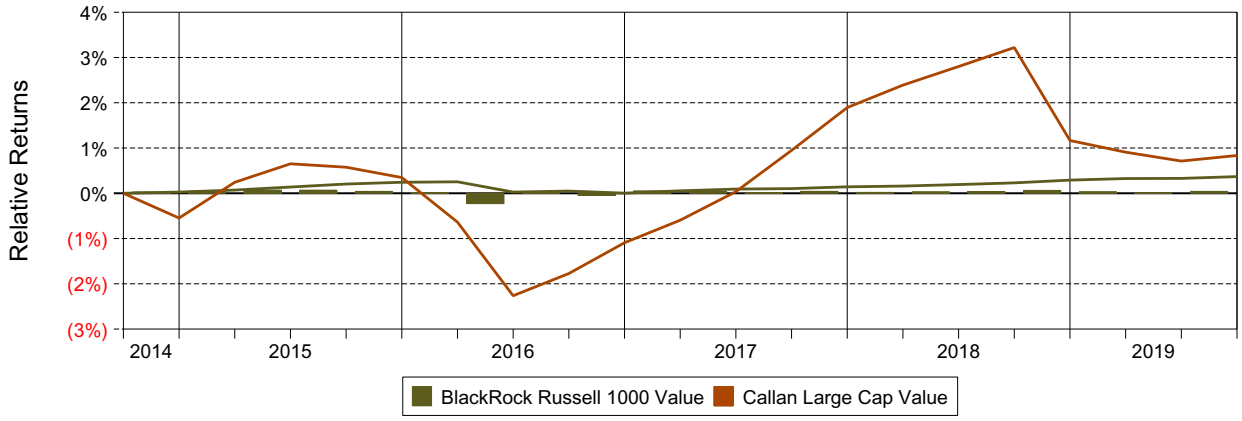
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

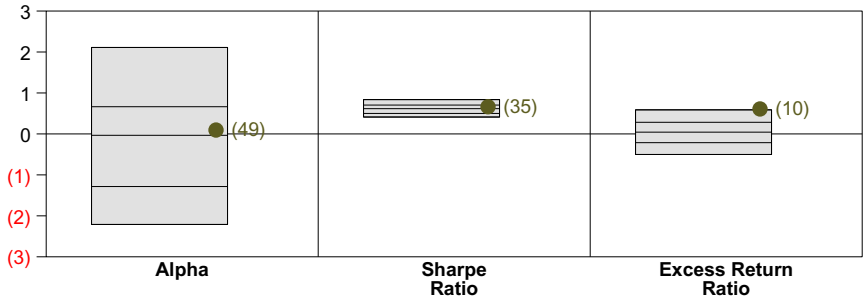


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	21.10	(4.79)	20.91	21.12	0.44	15.04	40.28	21.14	4.68	18.18
25th Percentile	19.01	(6.90)	19.44	17.69	(1.11)	13.74	36.82	18.54	2.50	16.11
Median	17.31	(8.76)	17.10	15.27	(2.53)	12.63	34.48	16.66	0.64	14.32
75th Percentile	15.39	(11.14)	15.09	13.66	(4.62)	11.33	32.34	15.04	(2.54)	12.53
90th Percentile	14.05	(13.67)	13.87	11.52	(6.43)	8.98	30.78	12.70	(5.19)	11.72
BlackRock Russell 1000 Value ●	17.90	(8.13)	13.82	17.06	(3.62)	13.56	32.57	17.60	0.49	15.73
Russell 1000 Value Index ▲	17.81	(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 September 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.11	0.84	0.59
25th Percentile	0.66	0.70	0.28
Median	(0.03)	0.62	0.04
75th Percentile	(1.28)	0.50	(0.21)
90th Percentile	(2.21)	0.41	(0.50)
BlackRock Russell 1000 Value ●	0.09	0.66	0.61

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

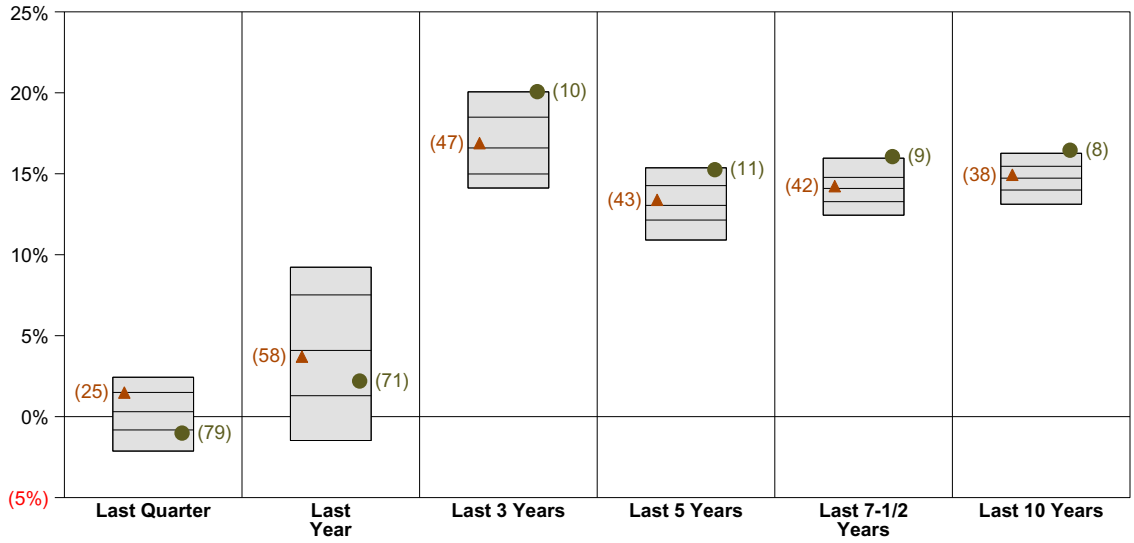
Investment Philosophy

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

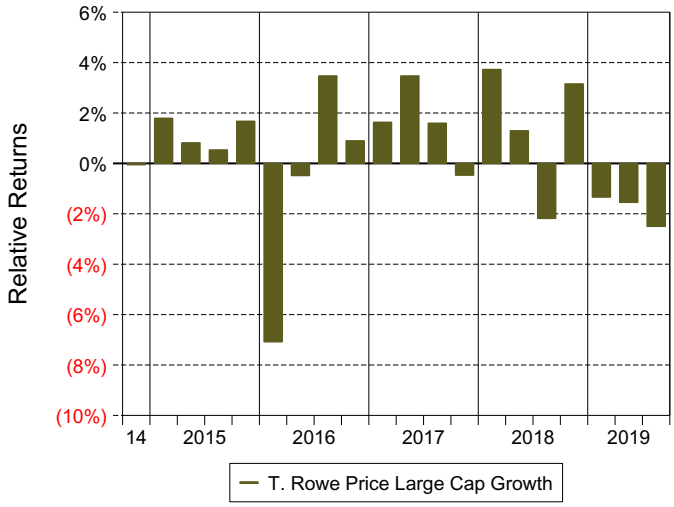
- T. Rowe Price Large Cap Growth's portfolio posted a (1.02)% return for the quarter placing it in the 79 percentile of the Callan Large Cap Growth group for the quarter and in the 71 percentile for the last year.
- T. Rowe Price Large Cap Growth's portfolio underperformed the Russell 1000 Growth Index by 2.50% for the quarter and underperformed the Russell 1000 Growth Index for the year by 1.51%.

Performance vs Callan Large Cap Growth (Gross)

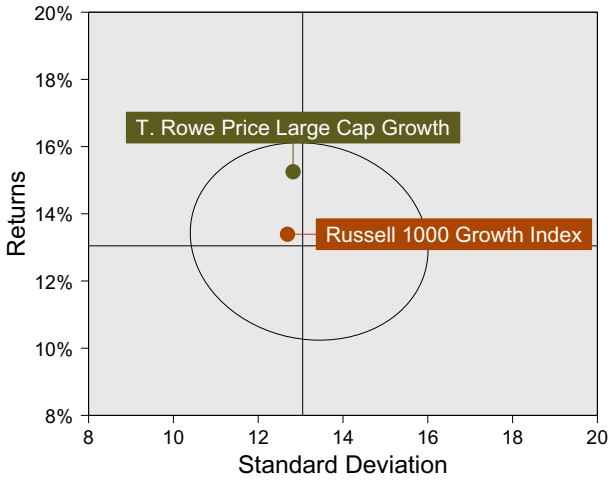


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7-1/2 Years	Last 10 Years
10th Percentile	2.43	9.23	20.06	15.37	15.96	16.26
25th Percentile	1.50	7.52	18.49	14.27	14.78	15.46
Median	0.30	4.09	16.59	13.05	14.09	14.73
75th Percentile	(0.82)	1.29	14.99	12.14	13.28	13.99
90th Percentile	(2.13)	(1.47)	14.12	10.91	12.44	13.12
T. Rowe Price Large Cap Growth ●	(1.02)	2.20	20.07	15.25	16.06	16.45
Russell 1000 Growth Index ▲	1.49	3.71	16.89	13.39	14.23	14.94

Relative Return vs Russell 1000 Growth Index



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

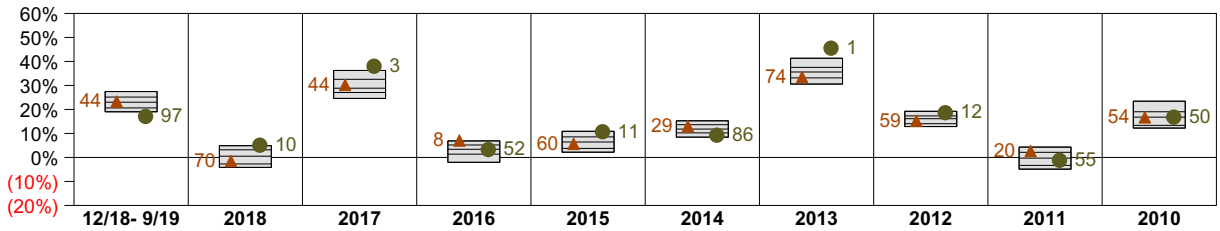


T. Rowe Price Large Cap Growth
Return Analysis Summary

Return Analysis

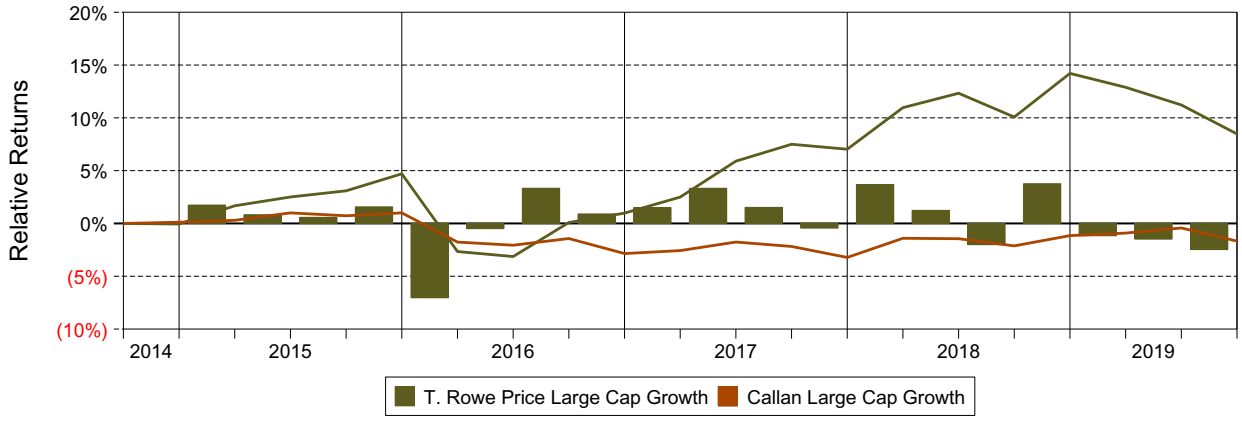
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

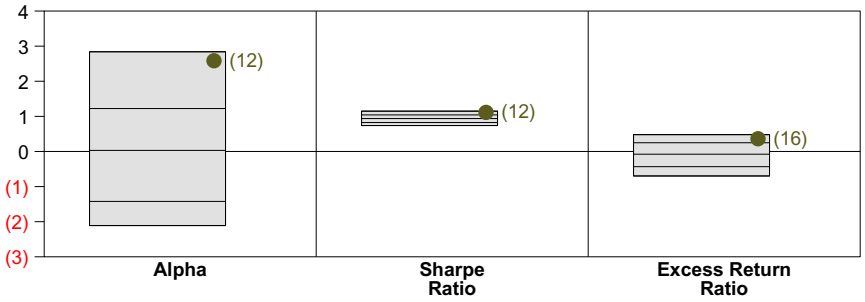


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	27.46	4.90	36.25	6.89	10.89	15.27	41.32	19.23	4.31	23.43
25th Percentile	25.16	3.18	32.56	5.19	8.56	13.65	37.53	17.30	2.13	19.03
Median	23.01	0.51	28.84	3.39	6.43	11.82	35.60	16.14	(0.28)	16.79
75th Percentile	20.63	(2.72)	27.06	1.37	3.77	10.23	33.14	14.05	(3.31)	13.37
90th Percentile	19.02	(4.16)	24.59	(2.03)	2.18	8.44	30.56	12.87	(4.87)	12.24
T. Rowe Price Large Cap Growth ●	17.10	5.10	38.01	3.27	10.69	9.27	45.54	18.63	(1.19)	16.79
Russell 1000 Growth Index ▲	23.30	(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 September 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.84	1.15	0.48
25th Percentile	1.22	1.04	0.25
Median	0.03	0.94	(0.08)
75th Percentile	(1.42)	0.82	(0.43)
90th Percentile	(2.11)	0.74	(0.70)
T. Rowe Price Large Cap Growth ●	2.58	1.11	0.36

Champlain Mid Cap
Period Ended September 30, 2019

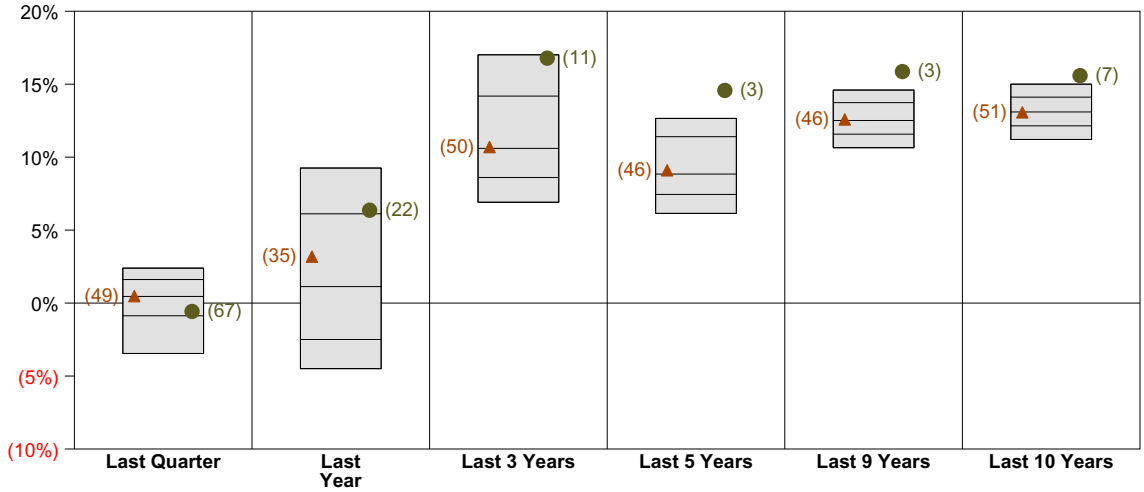
Investment Philosophy

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

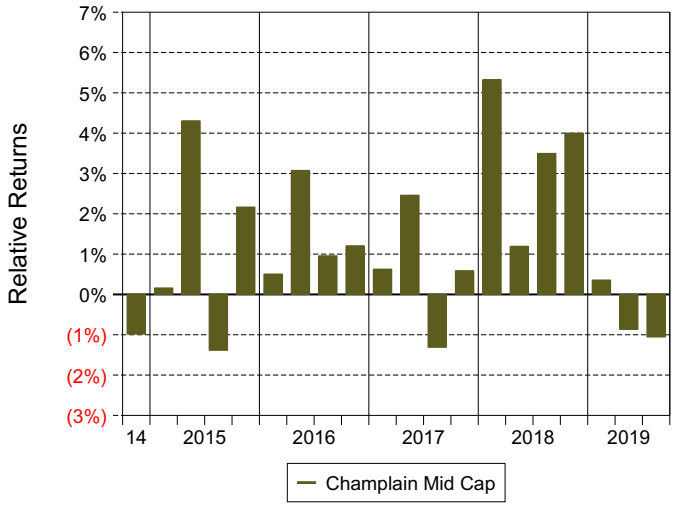
- Champlain Mid Cap's portfolio posted a (0.57)% return for the quarter placing it in the 67 percentile of the Callan Mid Capitalization group for the quarter and in the 22 percentile for the last year.
- Champlain Mid Cap's portfolio underperformed the Russell MidCap Index by 1.05% for the quarter and outperformed the Russell MidCap Index for the year by 3.18%.

Performance vs Callan Mid Capitalization (Gross)

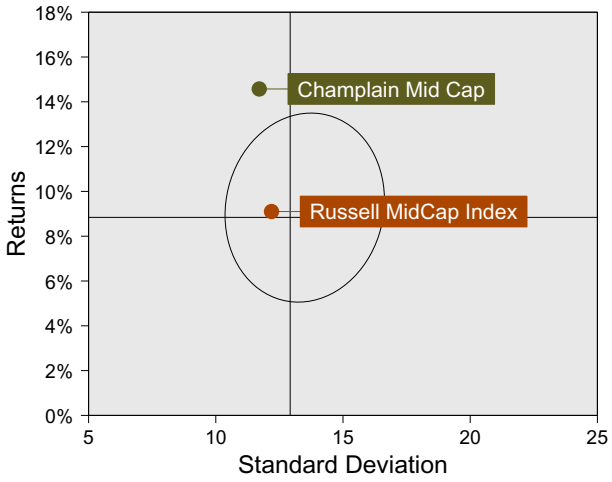


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 9 Years	Last 10 Years
10th Percentile	2.40	9.25	17.02	12.65	14.60	15.00
25th Percentile	1.61	6.12	14.18	11.40	13.74	14.11
Median	0.45	1.13	10.60	8.84	12.51	13.10
75th Percentile	(0.87)	(2.50)	8.61	7.45	11.58	12.15
90th Percentile	(3.45)	(4.49)	6.91	6.15	10.65	11.21
Champlain Mid Cap ●	(0.57)	6.36	16.79	14.57	15.86	15.59
Russell MidCap Index ▲	0.48	3.19	10.69	9.10	12.59	13.07

Relative Return vs Russell MidCap Index



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

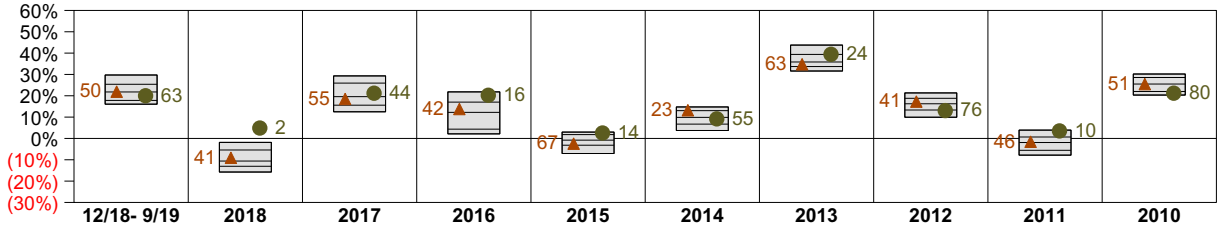


Champlain Mid Cap
Return Analysis Summary

Return Analysis

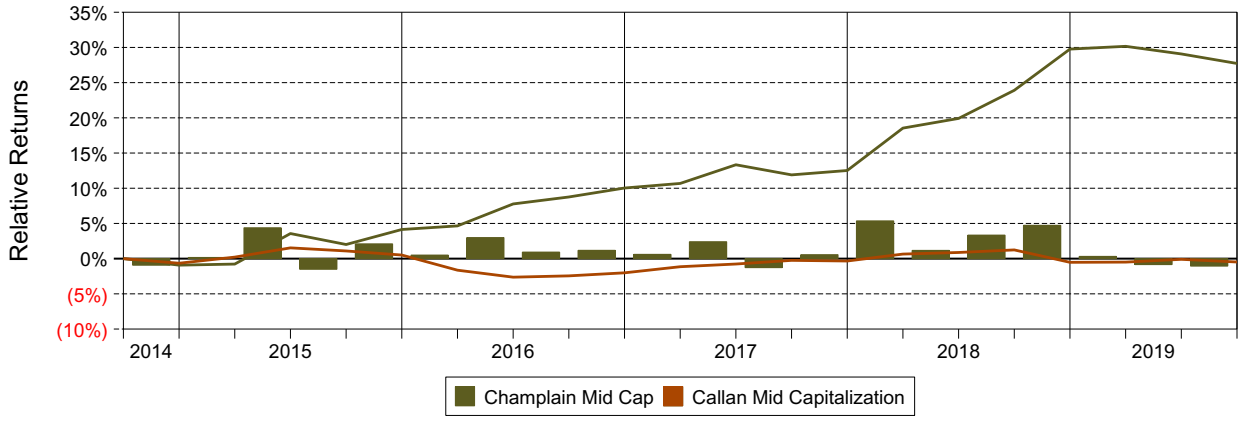
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

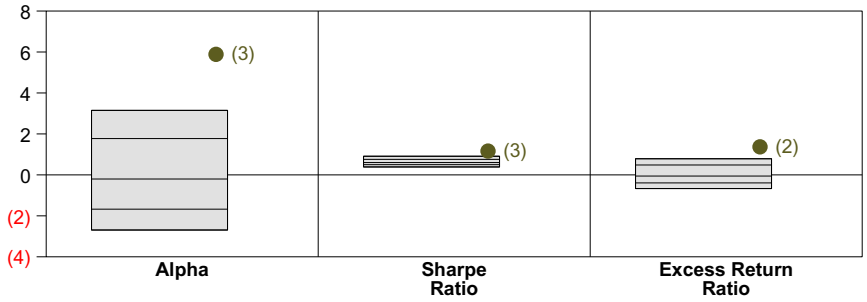


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	29.73	(1.85)	29.31	21.83	2.97	14.76	43.76	21.34	3.90	30.19
25th Percentile	25.39	(5.41)	25.93	17.03	1.80	13.03	39.39	18.82	0.68	28.56
Median	21.79	(10.60)	19.58	12.23	(0.80)	9.88	35.84	16.26	(1.92)	25.49
75th Percentile	17.82	(13.05)	15.59	4.35	(3.18)	6.72	33.70	13.33	(5.57)	22.01
90th Percentile	16.06	(15.75)	12.48	2.13	(7.07)	3.72	31.60	9.94	(7.83)	20.33
Champlain Mid Cap ●	20.01	4.88	21.20	20.24	2.55	9.17	39.44	13.05	3.53	21.21
Russell MidCap Index ▲	21.93	(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 September 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	3.15	0.91	0.79
25th Percentile	1.77	0.76	0.48
Median	(0.20)	0.60	(0.06)
75th Percentile	(1.68)	0.50	(0.39)
90th Percentile	(2.69)	0.39	(0.67)
Champlain Mid Cap ●	5.89	1.16	1.37

Pyramis Small Cap
Period Ended September 30, 2019

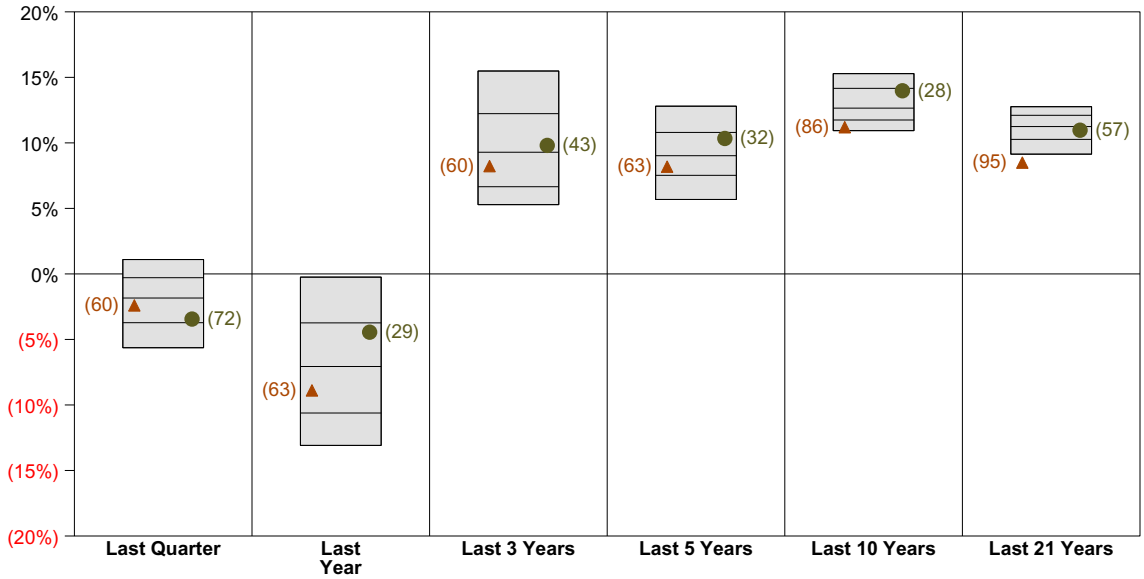
Investment Philosophy

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

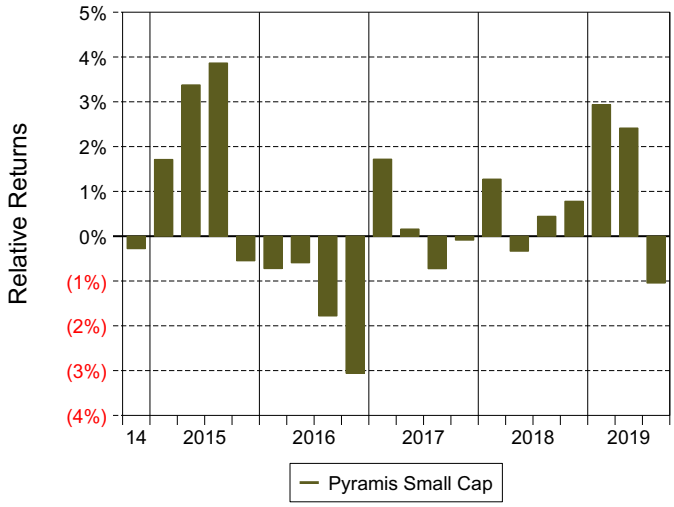
- Pyramis Small Cap's portfolio posted a (3.45)% return for the quarter placing it in the 72 percentile of the Callan Small Capitalization group for the quarter and in the 29 percentile for the last year.
- Pyramis Small Cap's portfolio underperformed the Russell 2000 Index by 1.04% for the quarter and outperformed the Russell 2000 Index for the year by 4.44%.

Performance vs Callan Small Capitalization (Gross)

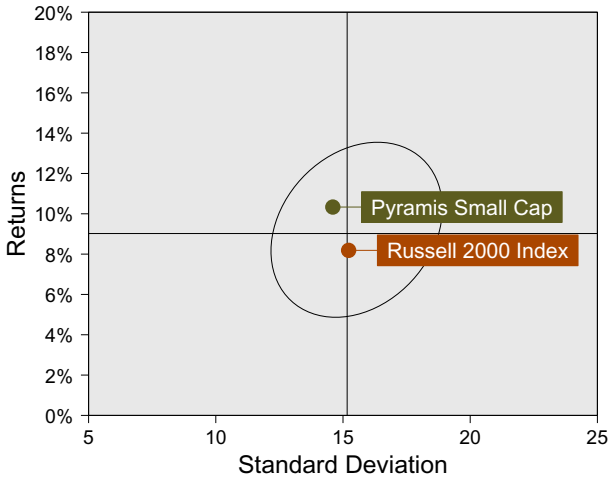


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 21 Years
10th Percentile	1.10	(0.24)	15.48	12.80	15.28	12.76
25th Percentile	(0.29)	(3.74)	12.23	10.80	14.16	12.10
Median	(1.84)	(7.07)	9.29	9.02	12.65	11.24
75th Percentile	(3.72)	(10.61)	6.65	7.52	11.75	10.27
90th Percentile	(5.63)	(13.09)	5.29	5.68	10.93	9.14
Pyramis Small Cap ●	(3.45)	(4.45)	9.81	10.33	13.98	10.97
Russell 2000 Index ▲	(2.40)	(8.89)	8.23	8.19	11.19	8.50

Relative Return vs Russell 2000 Index



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

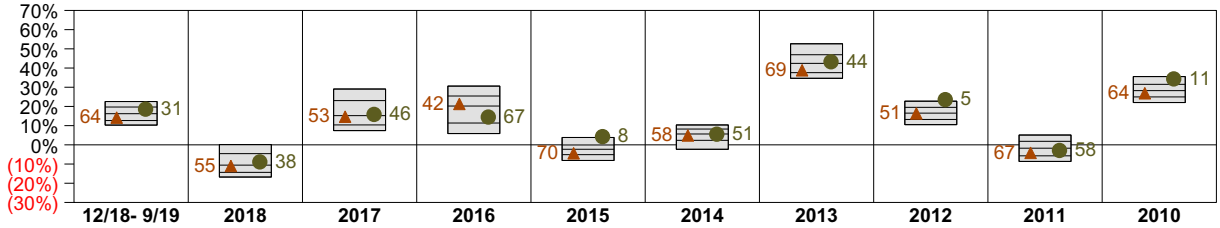


Pyramis Small Cap
Return Analysis Summary

Return Analysis

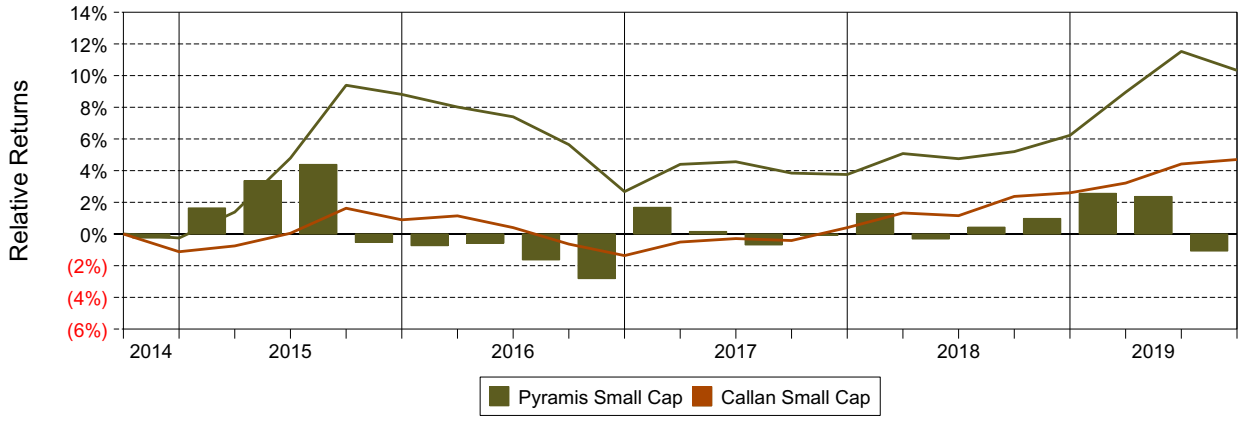
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

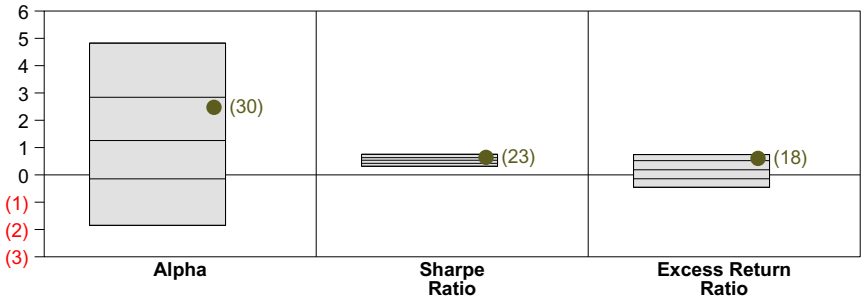


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	22.55	0.12	29.07	30.60	3.84	10.36	52.64	22.74	5.11	35.55
25th Percentile	19.70	(4.58)	23.04	25.44	(0.06)	8.23	46.93	19.53	1.84	31.52
Median	16.22	(10.56)	15.21	20.21	(2.30)	5.66	42.44	16.51	(1.75)	28.24
75th Percentile	12.65	(14.34)	10.37	11.37	(5.11)	2.35	37.59	13.22	(5.72)	24.96
90th Percentile	10.28	(16.78)	7.42	5.88	(8.14)	(2.32)	34.65	10.51	(8.64)	22.03
Pyramis Small Cap ●	18.59	(8.89)	15.85	14.47	4.27	5.54	43.26	23.54	(2.91)	34.34
Russell 2000 Index ▲	14.18	(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 September 30, 2019



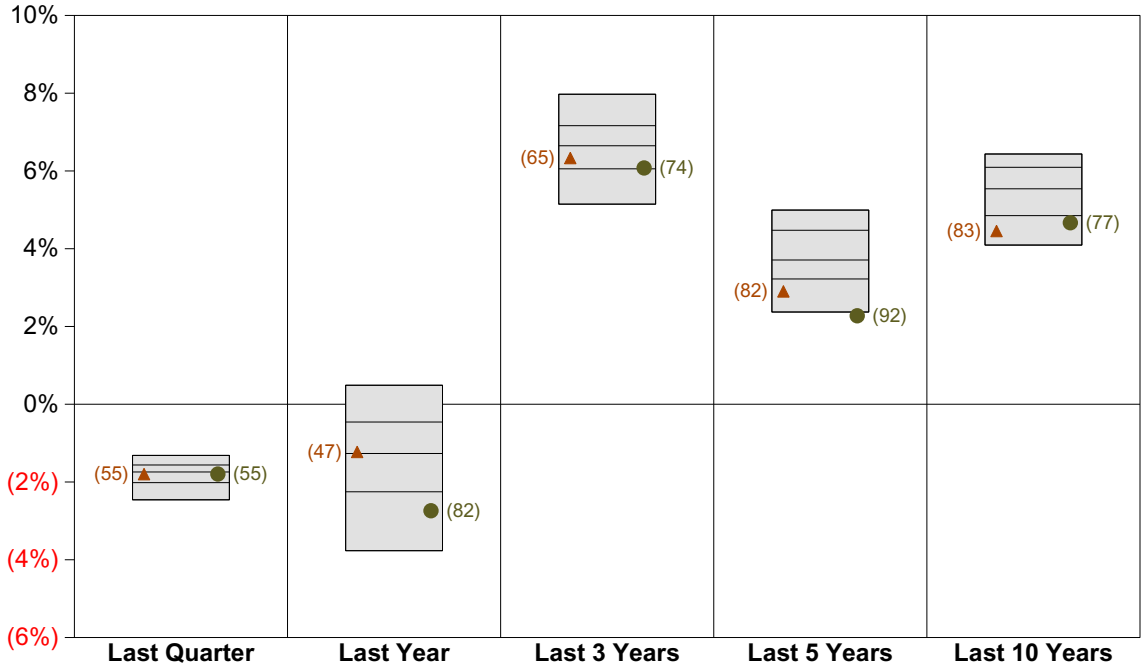
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	4.83	0.75	0.74
25th Percentile	2.84	0.63	0.52
Median	1.26	0.54	0.19
75th Percentile	(0.15)	0.42	(0.14)
90th Percentile	(1.85)	0.32	(0.45)
Pyramis Small Cap ●	2.47	0.64	0.60

International Equity
Period Ended September 30, 2019

Quarterly Summary and Highlights

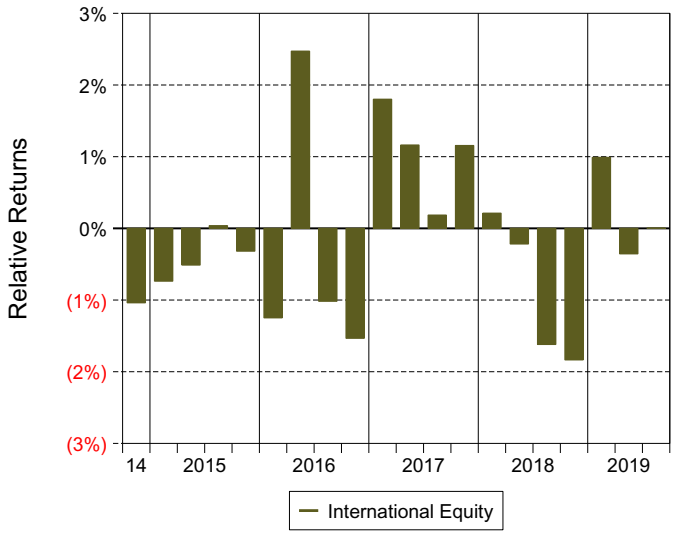
- International Equity's portfolio posted a (1.80)% return for the quarter placing it in the 55 percentile of the Public Fund - International Equity group for the quarter and in the 82 percentile for the last year.
- International Equity's portfolio outperformed the MSCI ACWI ex US by 0.00% for the quarter and underperformed the MSCI ACWI ex US for the year by 1.51%.

Performance vs Public Fund - International Equity (Gross)

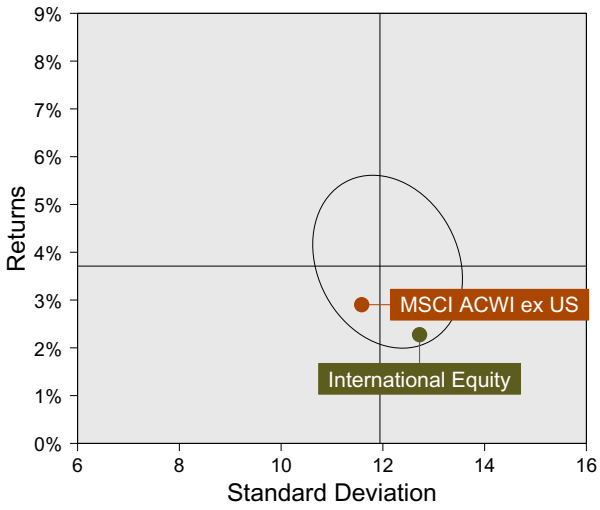


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	(1.32)	0.49	7.97	4.99	6.44
25th Percentile	(1.56)	(0.46)	7.16	4.47	6.09
Median	(1.74)	(1.27)	6.65	3.71	5.54
75th Percentile	(2.02)	(2.25)	6.06	3.22	4.85
90th Percentile	(2.46)	(3.77)	5.15	2.37	4.09
International Equity ●	(1.80)	(2.74)	6.08	2.28	4.67
MSCI ACWI ex US ▲	(1.80)	(1.23)	6.33	2.90	4.46

Relative Return vs MSCI ACWI ex US



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

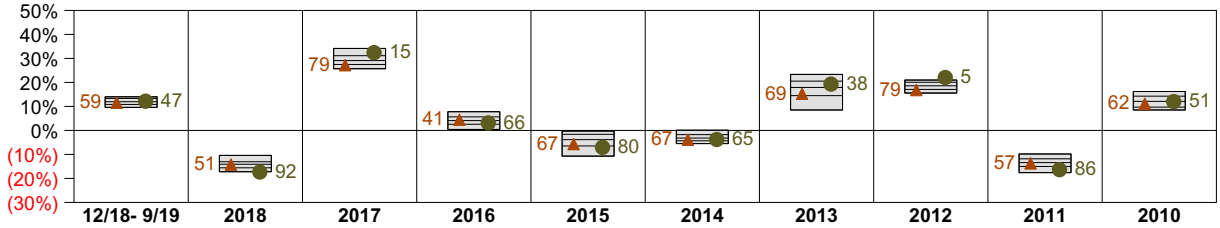


International Equity
Return Analysis Summary

Return Analysis

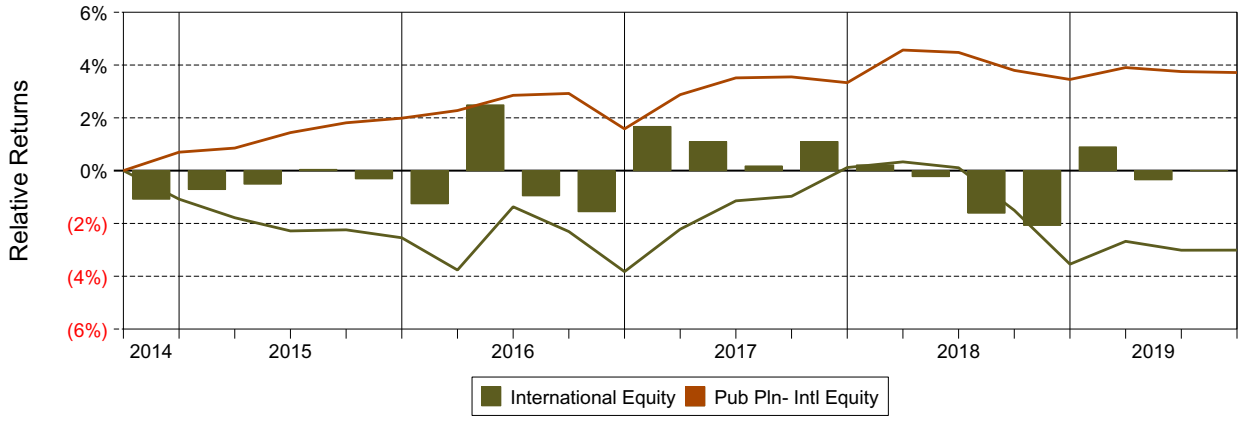
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

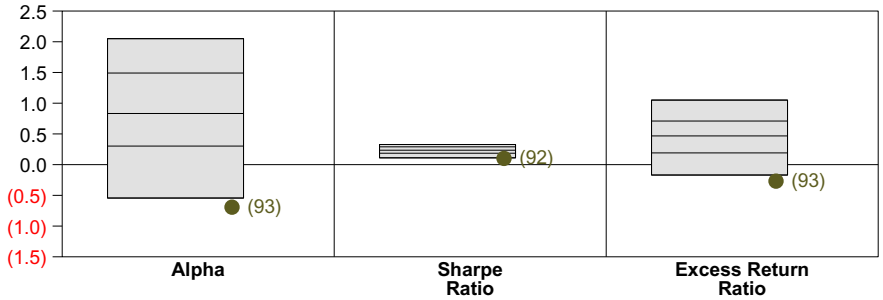


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	14.01	(10.40)	34.17	7.81	(0.26)	0.08	23.34	21.00	(9.81)	16.23
25th Percentile	13.34	(13.05)	31.15	5.65	(1.61)	(1.75)	20.55	20.07	(11.83)	14.28
Median	11.96	(14.09)	29.11	4.10	(3.83)	(3.17)	17.91	18.60	(13.40)	12.11
75th Percentile	10.83	(15.57)	27.49	2.58	(6.46)	(4.32)	14.50	17.09	(15.01)	9.72
90th Percentile	9.60	(17.19)	25.71	0.41	(10.70)	(5.48)	8.51	15.58	(17.58)	8.52
International Equity ●	12.18	(17.33)	32.41	3.12	(7.06)	(3.78)	19.30	22.05	(16.34)	12.02
MSCI ACWI ex US ▲	11.56	(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 September 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.05	0.33	1.05
25th Percentile	1.49	0.29	0.71
Median	0.83	0.23	0.47
75th Percentile	0.30	0.19	0.19
90th Percentile	(0.54)	0.11	(0.17)
International Equity ●	(0.69)	0.10	(0.27)

Causeway International Opportunities
Period Ended September 30, 2019

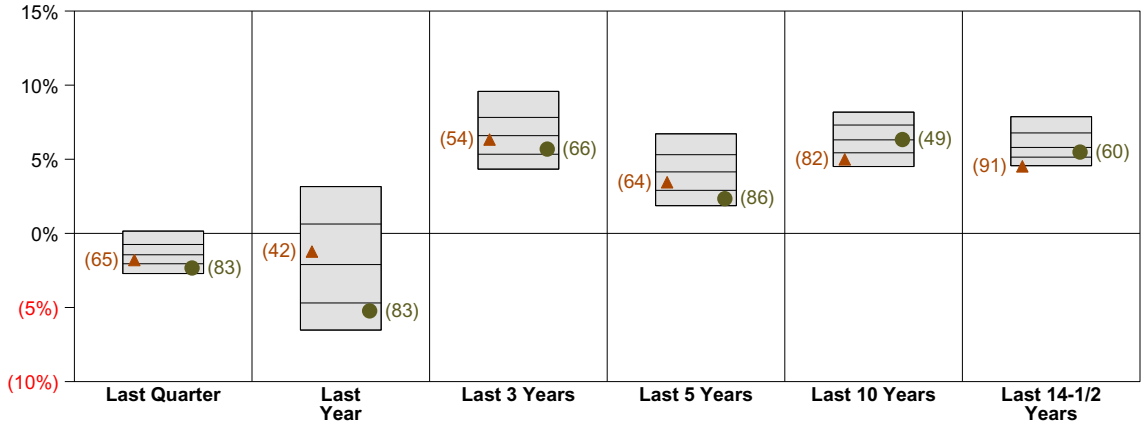
Investment Philosophy

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

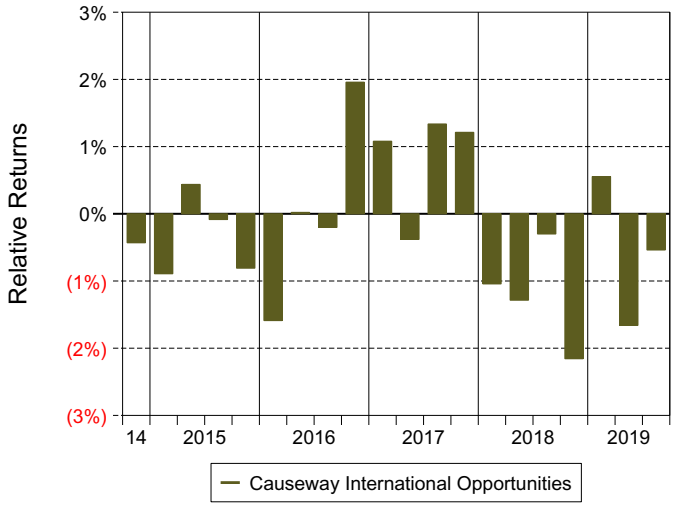
- Causeway International Opportunities's portfolio posted a (2.34)% return for the quarter placing it in the 83 percentile of the Callan Non-US Equity group for the quarter and in the 83 percentile for the last year.
- Causeway International Opportunities's portfolio underperformed the Causeway Linked Index by 0.54% for the quarter and underperformed the Causeway Linked Index for the year by 4.00%.

Performance vs Callan Non-US Equity (Gross)

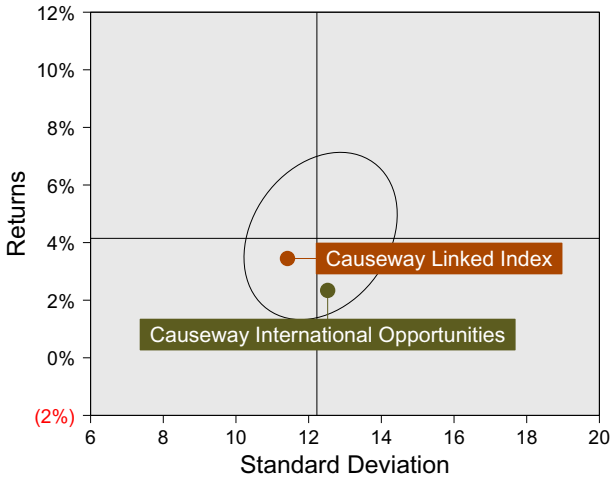


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 14-1/2 Years
10th Percentile	0.15	3.16	9.58	6.72	8.18	7.87
25th Percentile	(0.75)	0.63	7.82	5.31	7.31	6.78
Median	(1.44)	(2.10)	6.59	4.15	6.31	5.80
75th Percentile	(2.05)	(4.70)	5.34	2.90	5.44	5.14
90th Percentile	(2.71)	(6.52)	4.33	1.87	4.51	4.56
Causeway International Opportunities ●	(2.34)	(5.23)	5.69	2.34	6.33	5.48
Causeway Linked Index ▲	(1.80)	(1.23)	6.33	3.45	4.99	4.52

Relative Return vs Causeway Linked Index



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

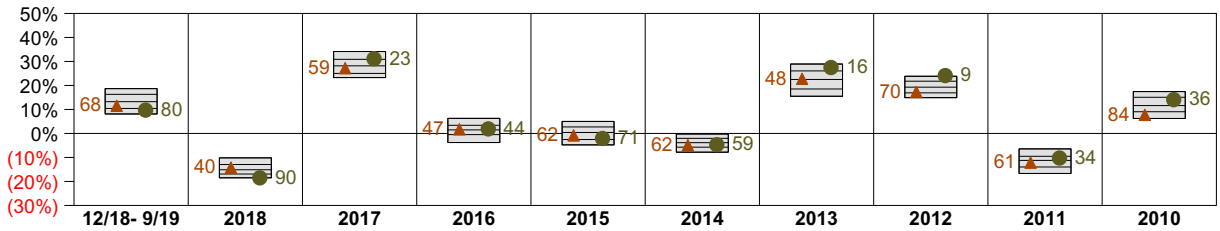


Causeway International Opportunities
Return Analysis Summary

Return Analysis

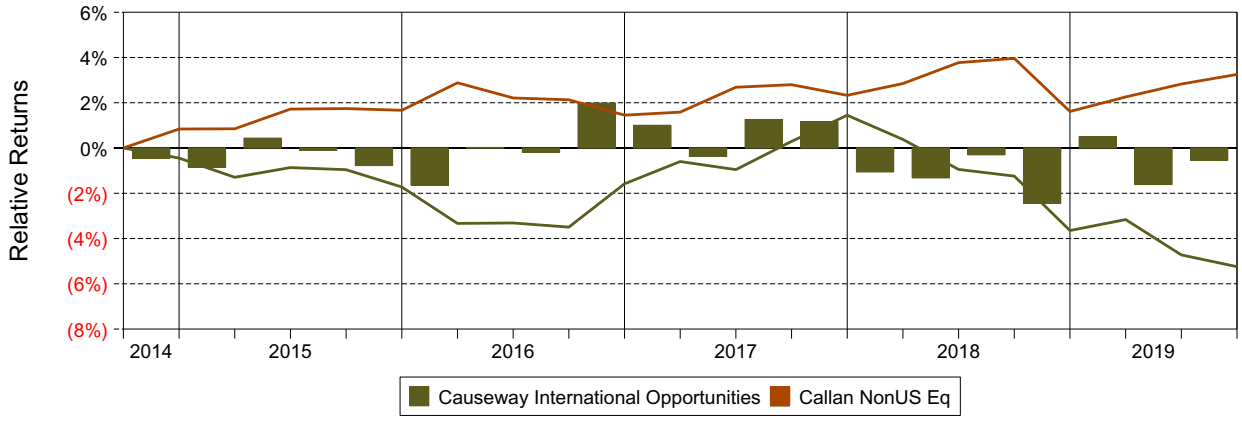
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

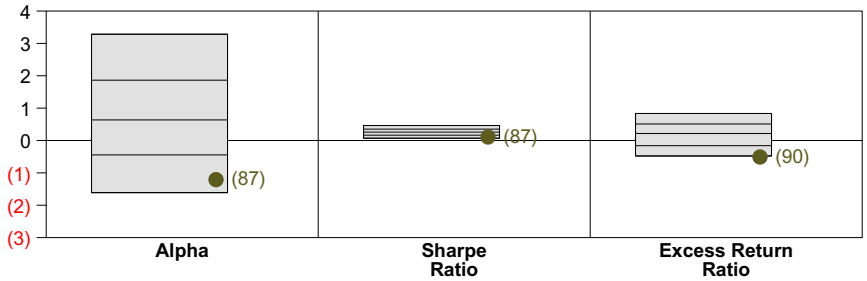


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	18.67	(10.17)	34.14	6.28	5.00	(0.22)	28.92	23.83	(6.44)	17.45
25th Percentile	16.28	(12.94)	30.88	3.39	2.71	(2.04)	26.05	21.76	(9.53)	15.07
Median	13.23	(15.13)	28.16	1.48	0.40	(3.85)	22.49	19.28	(11.24)	11.62
75th Percentile	10.41	(16.91)	25.01	(0.49)	(2.53)	(5.73)	18.53	16.91	(13.97)	9.05
90th Percentile	8.11	(18.49)	23.28	(3.79)	(4.77)	(7.82)	15.49	14.91	(16.68)	6.24
Causeway International Opportunities ●	9.71	(18.50)	31.11	1.88	(2.09)	(4.70)	27.47	24.10	(10.24)	14.06
Causeway Linked Index ▲	11.56	(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 September 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	3.28	0.46	0.83
25th Percentile	1.86	0.35	0.51
Median	0.64	0.26	0.22
75th Percentile	(0.45)	0.16	(0.16)
90th Percentile	(1.61)	0.07	(0.48)
Causeway International Opportunities ●	(1.21)	0.11	(0.51)

Aberdeen EAFE Plus
Period Ended September 30, 2019

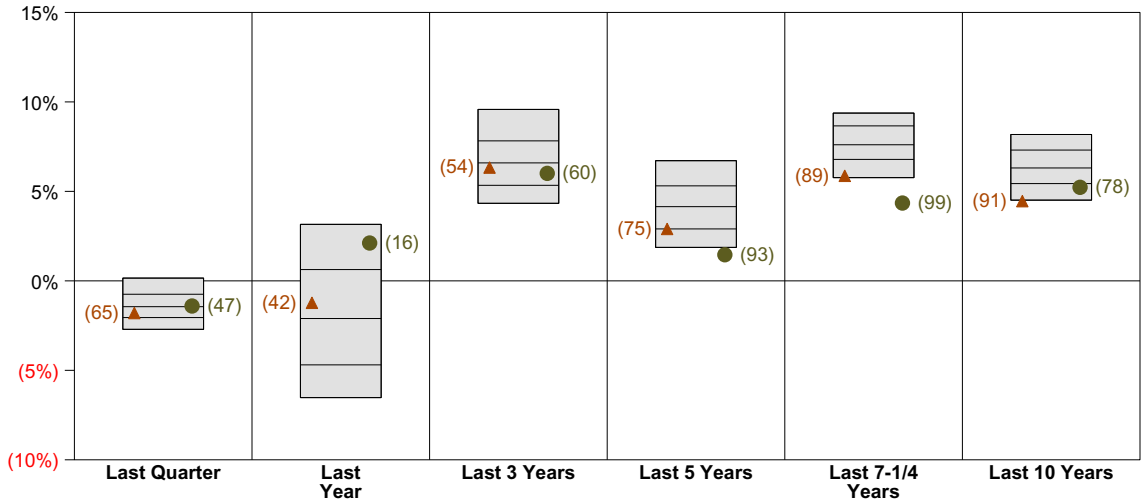
Investment Philosophy

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

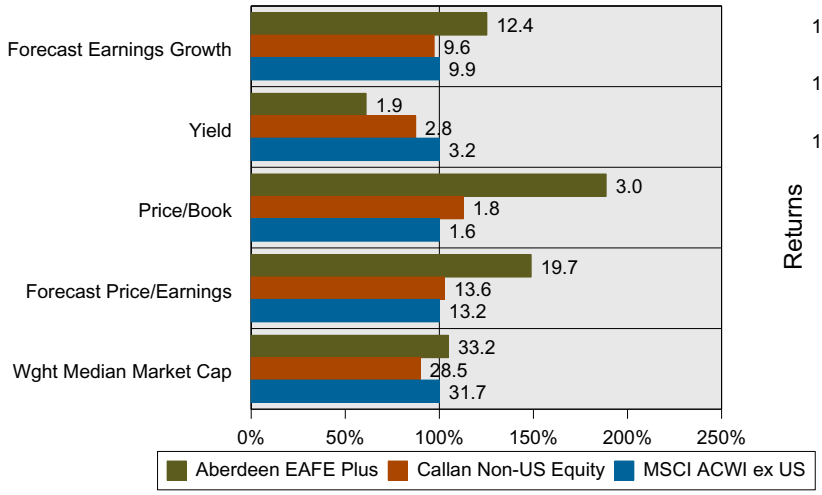
- Aberdeen EAFE Plus's portfolio posted a (1.41)% return for the quarter placing it in the 47 percentile of the Callan Non-US Equity group for the quarter and in the 16 percentile for the last year.
- Aberdeen EAFE Plus's portfolio outperformed the MSCI ACWI ex US by 0.39% for the quarter and outperformed the MSCI ACWI ex US for the year by 3.34%.

Performance vs Callan Non-US Equity (Gross)

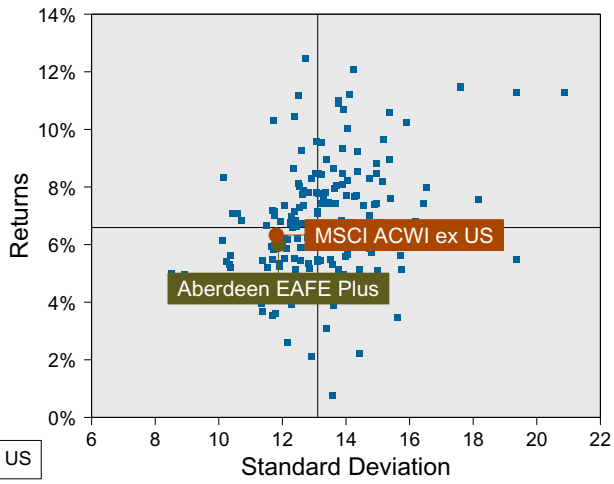


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7-1/4 Years	Last 10 Years
10th Percentile	0.15	3.16	9.58	6.72	9.38	8.18
25th Percentile	(0.75)	0.63	7.82	5.31	8.66	7.31
Median	(1.44)	(2.10)	6.59	4.15	7.61	6.31
75th Percentile	(2.05)	(4.70)	5.34	2.90	6.79	5.44
90th Percentile	(2.71)	(6.52)	4.33	1.87	5.77	4.51
Aberdeen EAFE Plus ●	(1.41)	2.11	6.01	1.46	4.35	5.23
MSCI ACWI ex US ▲	(1.80)	(1.23)	6.33	2.90	5.87	4.46

Portfolio Characteristics as a Percentage of the MSCI ACWI ex US



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

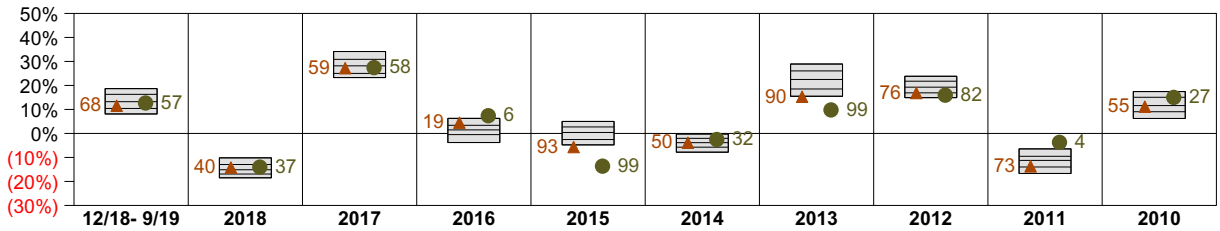


Aberdeen EAFE Plus
Return Analysis Summary

Return Analysis

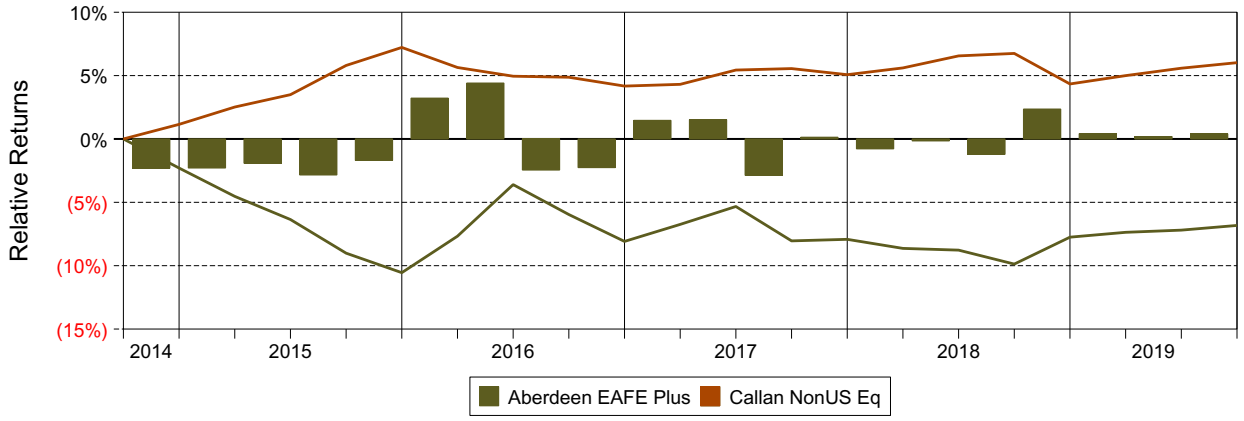
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

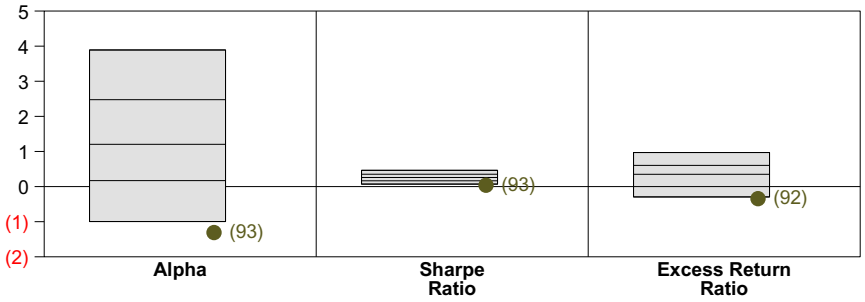


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	18.67	(10.17)	34.14	6.28	5.00	(0.22)	28.92	23.83	(6.44)	17.45
25th Percentile	16.28	(12.94)	30.88	3.39	2.71	(2.04)	26.05	21.76	(9.53)	15.07
Median	13.23	(15.13)	28.16	1.48	0.40	(3.85)	22.49	19.28	(11.24)	11.62
75th Percentile	10.41	(16.91)	25.01	(0.49)	(2.53)	(5.73)	18.53	16.91	(13.97)	9.05
90th Percentile	8.11	(18.49)	23.28	(3.79)	(4.77)	(7.82)	15.49	14.91	(16.68)	6.24
Aberdeen EAFE Plus ●	12.68	(14.04)	27.42	7.37	(13.63)	(2.53)	9.79	15.94	(3.72)	15.02
MSCI ACWI ex US ▲	11.56	(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 September 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	3.89	0.46	0.97
25th Percentile	2.48	0.35	0.60
Median	1.20	0.26	0.35
75th Percentile	0.17	0.16	0.00
90th Percentile	(1.00)	0.07	(0.30)
Aberdeen EAFE Plus ●	(1.31)	0.04	(0.34)

American Century Non-US SC
Period Ended September 30, 2019

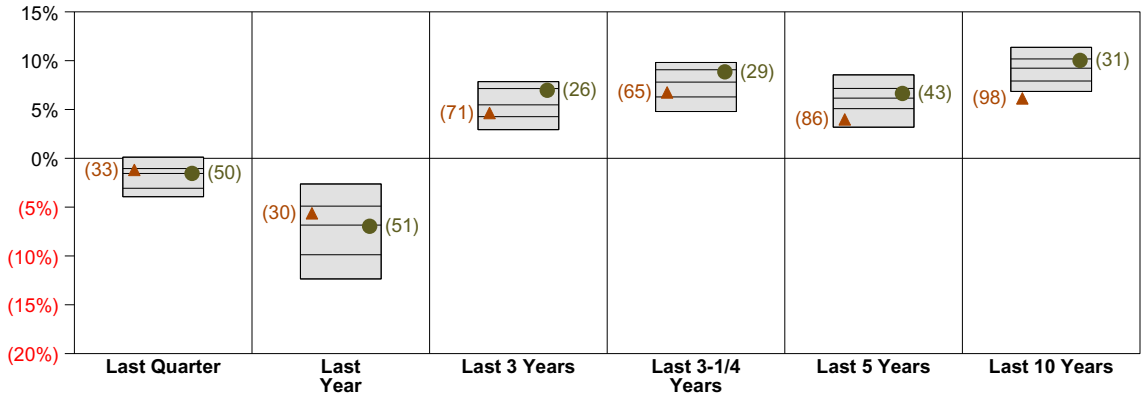
Investment Philosophy

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

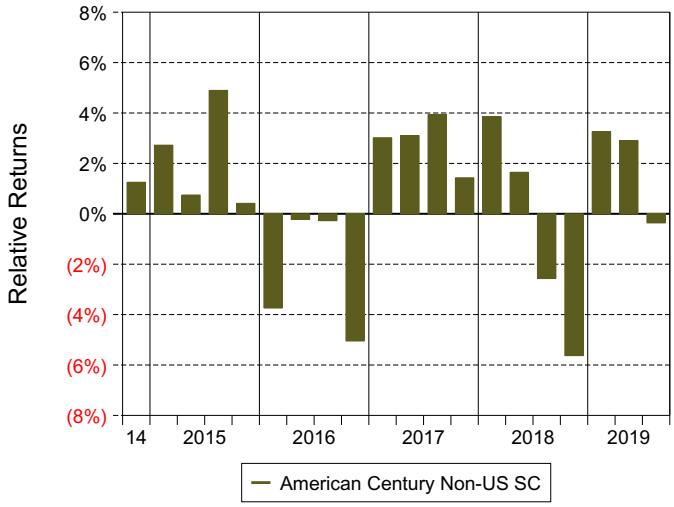
- American Century Non-US SC's portfolio posted a (1.55)% return for the quarter placing it in the 50 percentile of the Callan International Small Cap group for the quarter and in the 51 percentile for the last year.
- American Century Non-US SC's portfolio underperformed the MSCI ACWI ex US Small Cap by 0.36% for the quarter and underperformed the MSCI ACWI ex US Small Cap for the year by 1.33%.

Performance vs Callan International Small Cap (Gross)

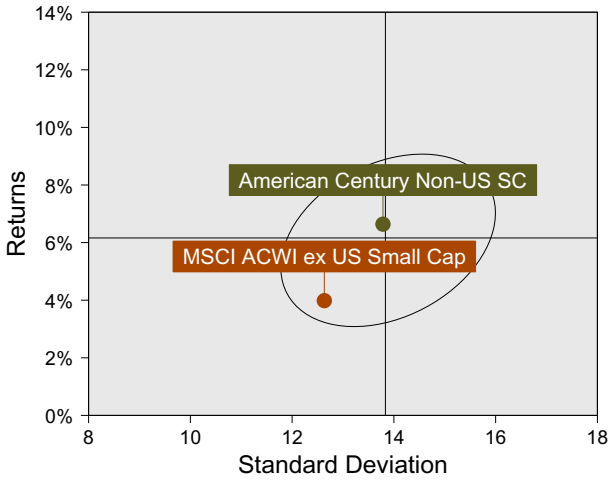


	Last Quarter	Last Year	Last 3 Years	Last 3-1/4 Years	Last 5 Years	Last 10 Years
10th Percentile	0.12	(2.63)	7.85	9.81	8.55	11.36
25th Percentile	(1.05)	(4.90)	7.14	9.07	7.16	10.18
Median	(1.55)	(6.84)	5.48	7.80	6.16	9.23
75th Percentile	(3.07)	(9.88)	4.26	6.29	5.09	7.92
90th Percentile	(3.93)	(12.35)	2.93	4.79	3.19	6.85
American Century Non-US SC ●	(1.55)	(6.96)	6.97	8.85	6.64	10.03
MSCI ACWI ex US Small Cap ▲	(1.19)	(5.63)	4.64	6.75	3.98	6.13

Relative Returns vs MSCI ACWI ex US Small Cap



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

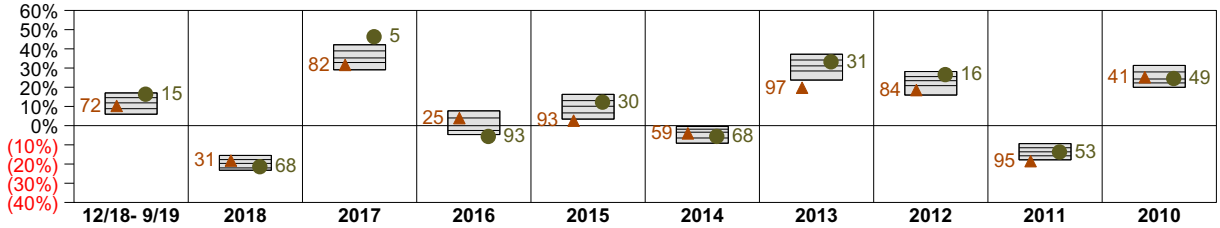


American Century Non-US SC
Return Analysis Summary

Return Analysis

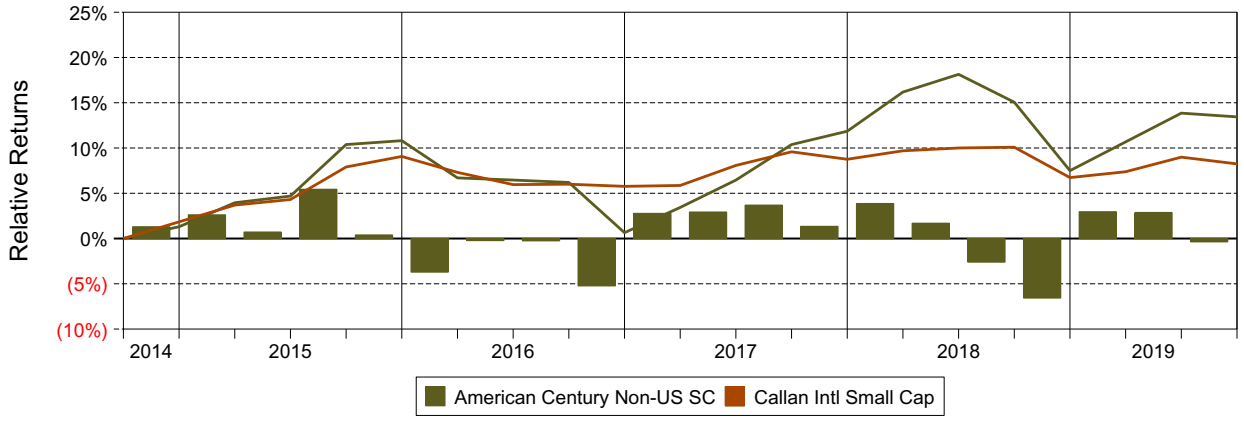
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

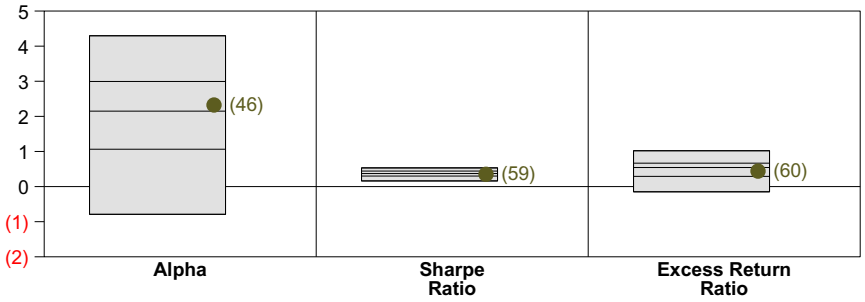


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	17.05	(15.51)	42.12	7.72	16.29	(0.42)	37.19	28.18	(9.37)	31.36
25th Percentile	14.57	(17.68)	38.93	4.00	13.03	(1.85)	34.19	25.54	(11.52)	27.97
Median	11.86	(19.66)	35.27	(0.03)	10.09	(3.42)	31.13	23.41	(13.65)	24.29
75th Percentile	8.84	(22.02)	32.87	(2.51)	6.62	(6.43)	28.47	20.84	(15.71)	22.25
90th Percentile	5.96	(23.23)	29.08	(4.66)	3.40	(9.15)	23.74	15.92	(17.80)	19.96
American Century Non-US SC ●	16.37	(21.39)	46.31	(5.63)	12.24	(5.61)	33.23	26.58	(13.72)	24.55
MSCI ACWI ex US Small Cap ▲	10.28	(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 September 30, 2019



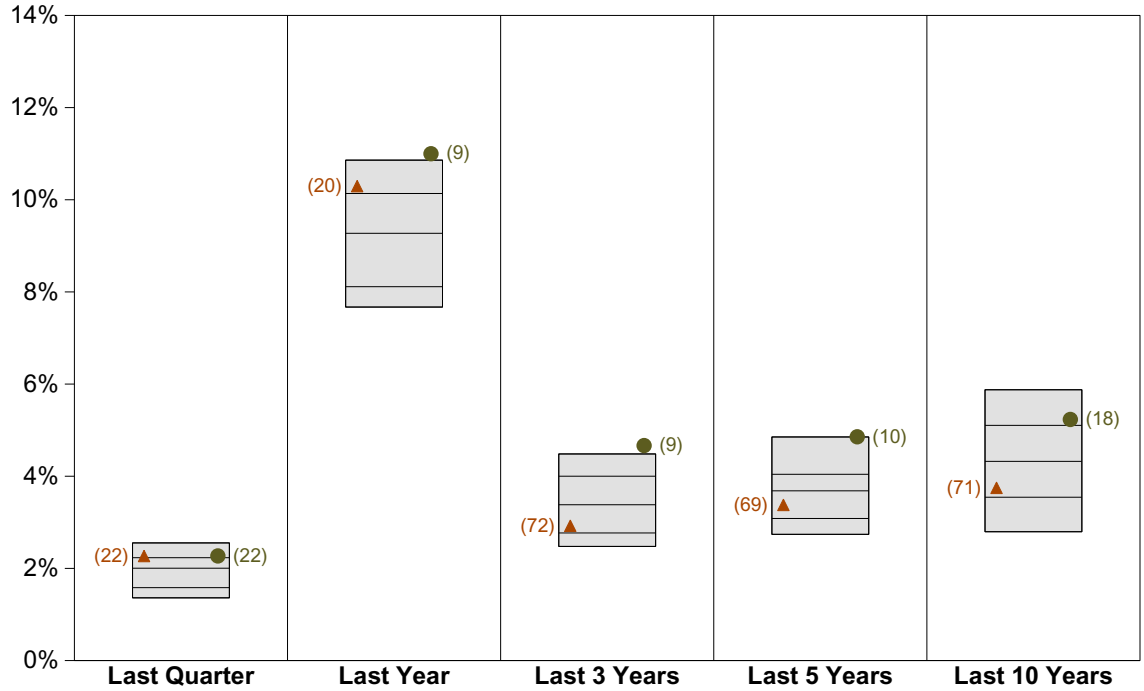
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	4.30	0.53	1.02
25th Percentile	2.99	0.44	0.67
Median	2.15	0.37	0.54
75th Percentile	1.06	0.30	0.29
90th Percentile	(0.79)	0.16	(0.15)
American Century Non-US SC ●	2.32	0.35	0.44

Fixed Income
Period Ended September 30, 2019

Quarterly Summary and Highlights

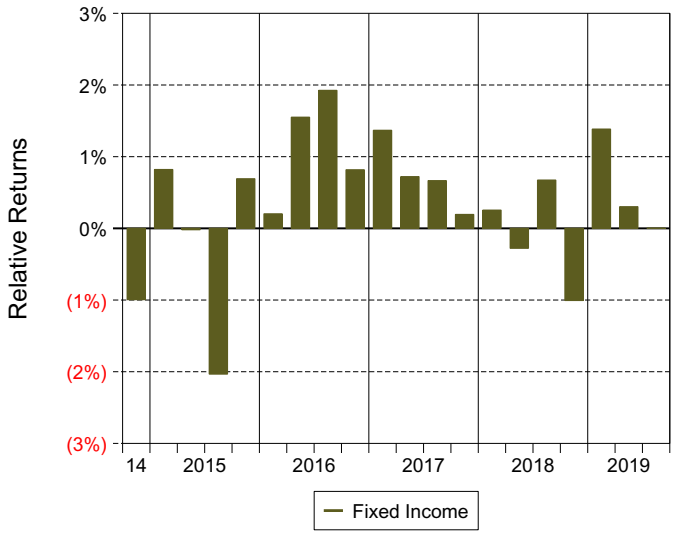
- Fixed Income's portfolio posted a 2.27% return for the quarter placing it in the 22 percentile of the Public Fund - Domestic Fixed group for the quarter and in the 9 percentile for the last year.
- Fixed Income's portfolio outperformed the Blmbg Aggregate Index by 0.00% for the quarter and outperformed the Blmbg Aggregate Index for the year by 0.70%.

Performance vs Public Fund - Domestic Fixed (Gross)

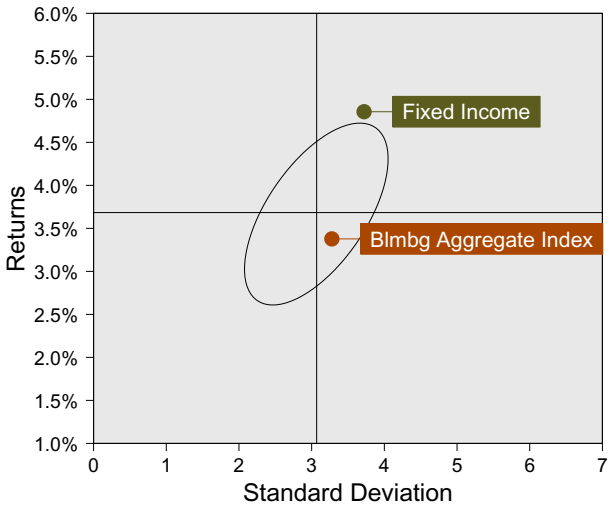


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	2.55	10.86	4.48	4.85	5.88
25th Percentile	2.23	10.14	4.00	4.04	5.10
Median	2.00	9.27	3.38	3.68	4.32
75th Percentile	1.58	8.11	2.77	3.08	3.54
90th Percentile	1.36	7.67	2.48	2.74	2.80
Fixed Income ●	2.27	11.00	4.67	4.86	5.23
Blmbg Aggregate Index ▲	2.27	10.30	2.92	3.38	3.75

Relative Return vs Blmbg Aggregate Index



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

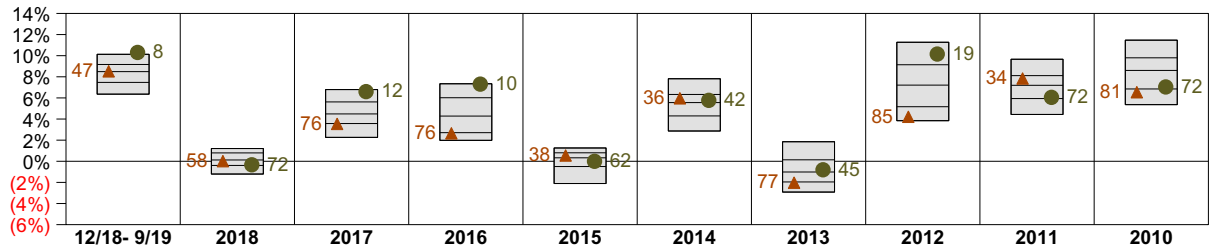


Fixed Income
Return Analysis Summary

Return Analysis

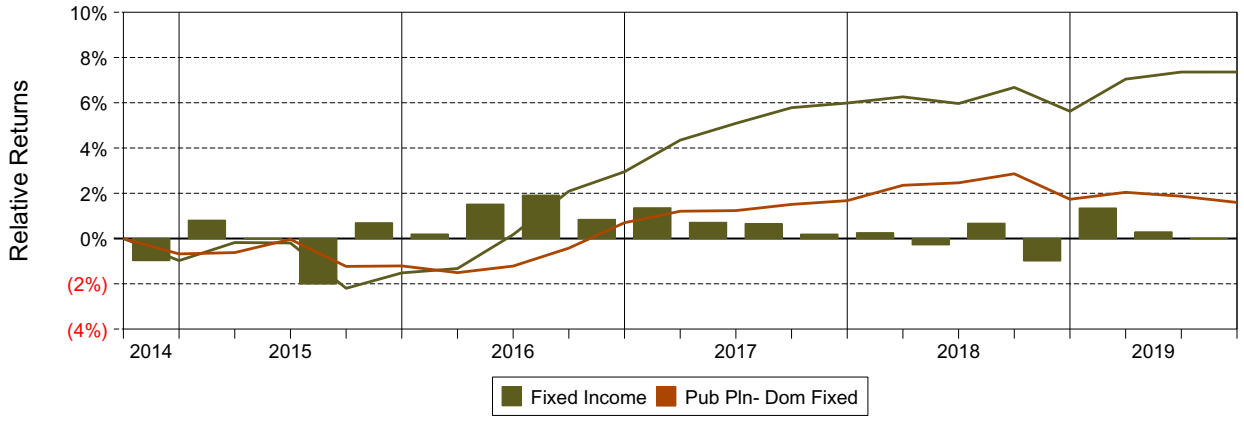
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

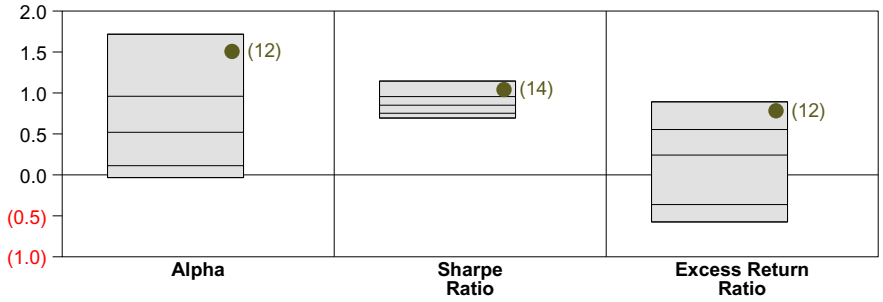


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	10.13	1.21	6.79	7.34	1.26	7.82	1.85	11.27	9.66	11.47
25th Percentile	9.17	0.79	5.62	6.02	0.80	6.33	0.14	9.14	8.11	9.80
Median	8.49	0.12	4.49	4.28	0.33	5.56	(1.02)	7.21	7.19	8.60
75th Percentile	7.47	(0.40)	3.57	2.71	(0.50)	4.30	(1.96)	5.17	5.94	6.85
90th Percentile	6.36	(1.21)	2.26	1.98	(2.11)	2.87	(2.92)	3.84	4.44	5.36
Fixed Income ●	10.30	(0.33)	6.60	7.31	(0.00)	5.77	(0.81)	10.15	6.05	7.04
Blmbg Aggregate Index ▲	8.52	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 September 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	1.72	1.15	0.89
25th Percentile	0.96	0.96	0.55
Median	0.52	0.85	0.24
75th Percentile	0.11	0.75	(0.36)
90th Percentile	(0.03)	0.69	(0.57)
Fixed Income ●	1.51	1.04	0.78

BlackRock U.S. Debt Fund
Period Ended September 30, 2019

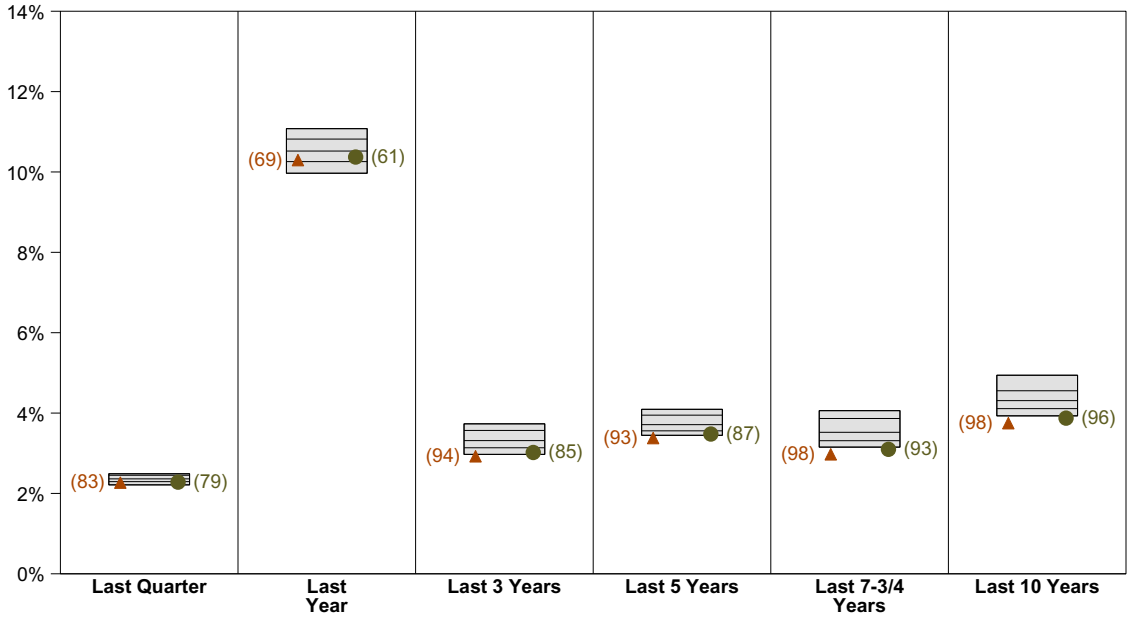
Investment Philosophy

The product was funded during the fourth quarter of 2011. Performance prior is that of the composite.

Quarterly Summary and Highlights

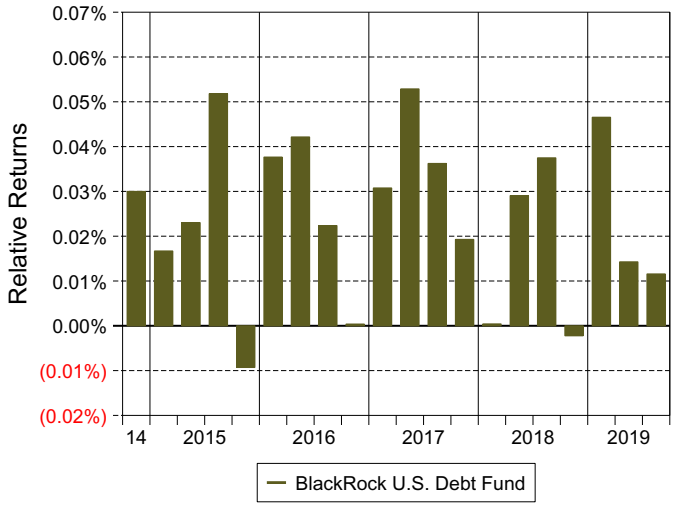
- BlackRock U.S. Debt Fund's portfolio posted a 2.28% return for the quarter placing it in the 79 percentile of the Callan Core Bond Fixed Income group for the quarter and in the 61 percentile for the last year.
- BlackRock U.S. Debt Fund's portfolio outperformed the Blmbg Aggregate by 0.01% for the quarter and outperformed the Blmbg Aggregate for the year by 0.08%.

Performance vs Callan Core Bond Fixed Income (Gross)

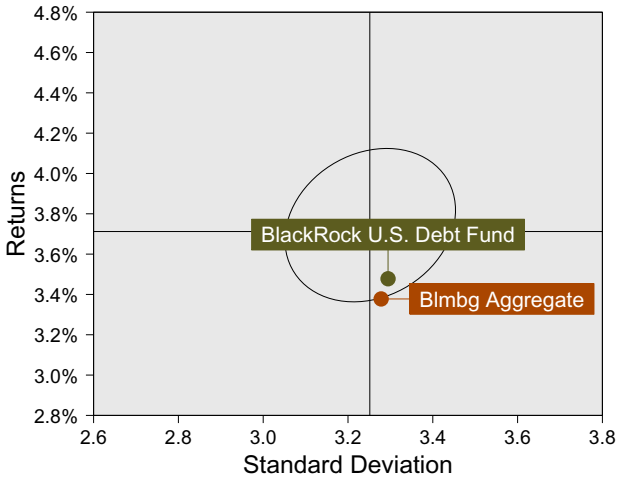


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7-3/4 Years	Last 10 Years
10th Percentile	2.49	11.08	3.73	4.09	4.06	4.94
25th Percentile	2.45	10.82	3.57	3.95	3.87	4.56
Median	2.36	10.52	3.32	3.71	3.52	4.31
75th Percentile	2.29	10.26	3.14	3.56	3.31	4.11
90th Percentile	2.21	9.97	2.97	3.45	3.15	3.93
BlackRock U.S. Debt Fund ●	2.28	10.37	3.02	3.48	3.10	3.87
Blmbg Aggregate ▲	2.27	10.30	2.92	3.38	2.97	3.75

Relative Return vs Blmbg Aggregate



Callan Core Bond Fixed Income (Gross) Annualized Five Year Risk vs Return

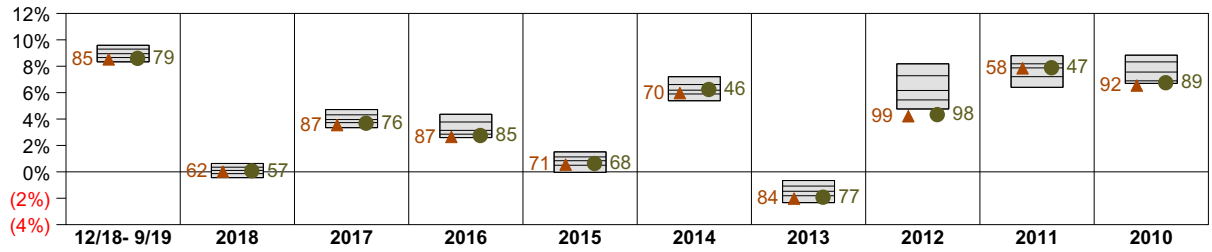


BlackRock U.S. Debt Fund
Return Analysis Summary

Return Analysis

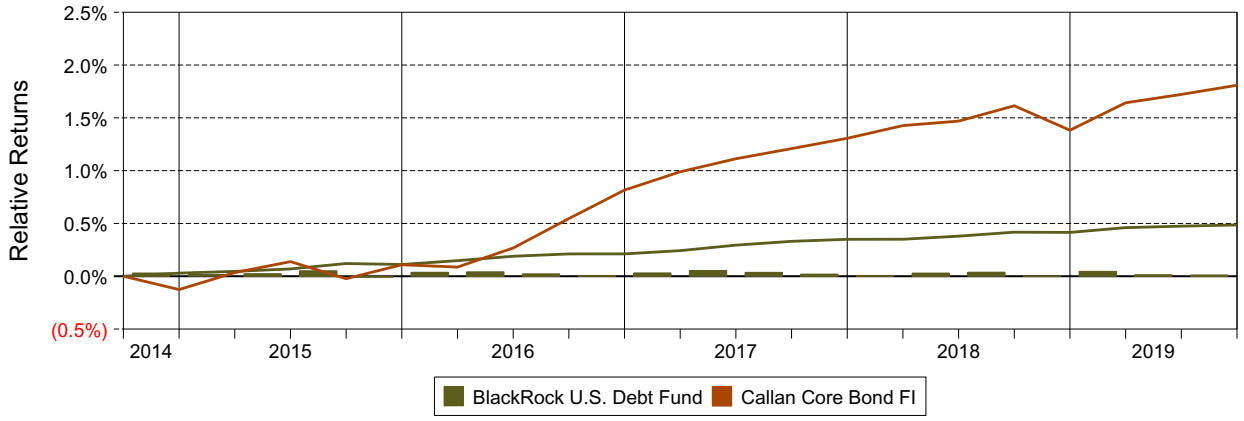
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

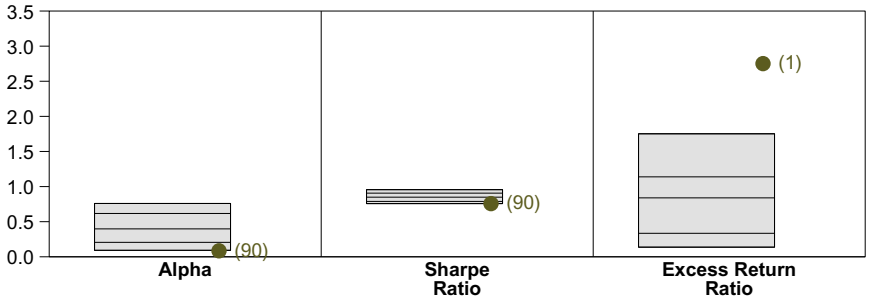


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	9.59	0.64	4.72	4.36	1.51	7.21	(0.66)	8.18	8.80	8.84
25th Percentile	9.30	0.35	4.32	3.78	1.13	6.61	(1.08)	7.28	8.18	8.33
Median	8.95	0.11	3.96	3.14	0.84	6.19	(1.47)	6.16	7.87	7.56
75th Percentile	8.66	(0.14)	3.73	2.85	0.50	5.90	(1.81)	5.45	7.21	6.89
90th Percentile	8.33	(0.44)	3.34	2.59	(0.04)	5.39	(2.33)	4.76	6.40	6.70
BlackRock U.S. Debt Fund ●	8.60	0.08	3.68	2.75	0.63	6.24	(1.92)	4.34	7.89	6.75
Blmbg Aggregate ▲	8.52	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 September 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	0.76	0.96	1.75
25th Percentile	0.62	0.91	1.14
Median	0.40	0.85	0.84
75th Percentile	0.21	0.79	0.33
90th Percentile	0.09	0.76	0.14
BlackRock U.S. Debt Fund ●	0.09	0.76	2.75

PIMCO Fixed Income
Period Ended September 30, 2019

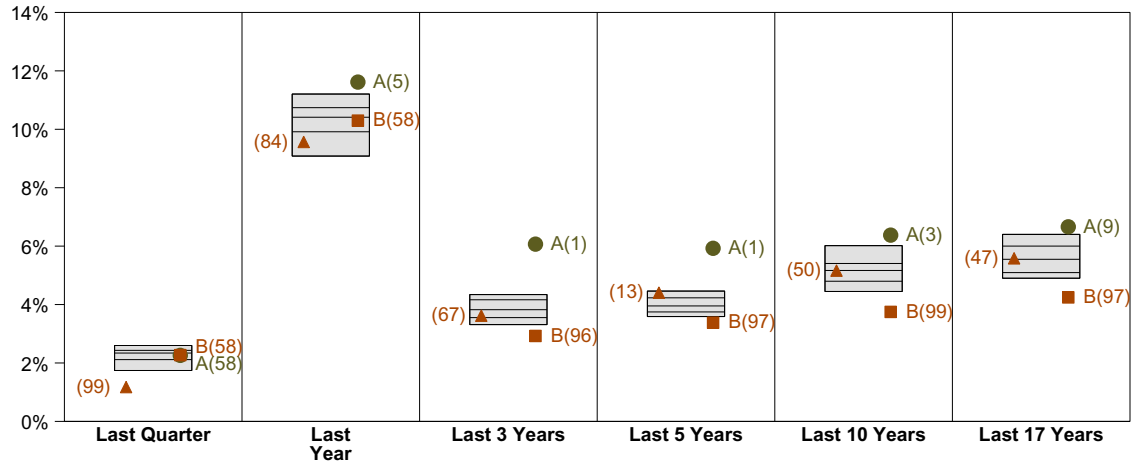
Investment Philosophy

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

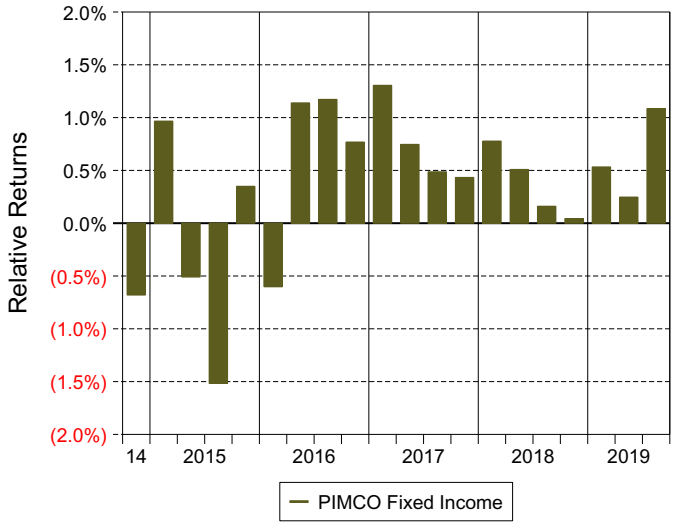
- PIMCO Fixed Income's portfolio posted a 2.26% return for the quarter placing it in the 58 percentile of the Callan Core Plus Fixed Income group for the quarter and in the 5 percentile for the last year.
- PIMCO Fixed Income's portfolio outperformed the Custom Index by 1.08% for the quarter and outperformed the Custom Index for the year by 2.05%.

Performance vs Callan Core Plus Fixed Income (Gross)

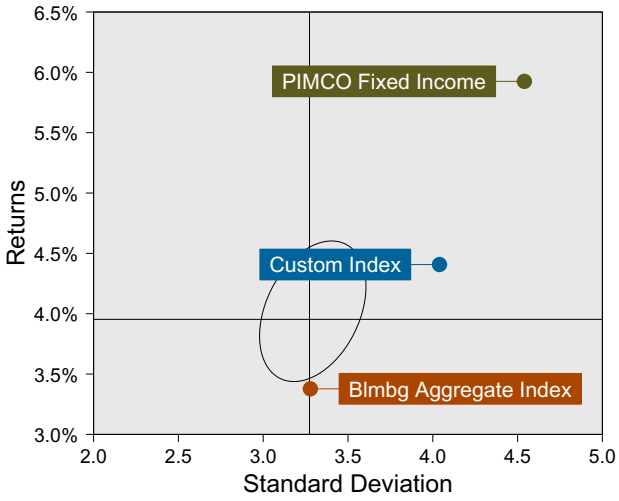


		Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 17 Years
10th Percentile		2.60	11.21	4.34	4.46	6.02	6.40
25th Percentile		2.43	10.74	4.16	4.23	5.41	6.00
Median		2.34	10.41	3.82	3.95	5.17	5.55
75th Percentile		2.11	9.91	3.55	3.75	4.80	5.09
90th Percentile		1.74	9.08	3.31	3.59	4.45	4.90
PIMCO Fixed Income	● A	2.26	11.62	6.07	5.93	6.38	6.66
Blmbg Aggregate Index	■ B	2.27	10.30	2.92	3.38	3.75	4.24
Custom Index	▲	1.18	9.57	3.62	4.41	5.16	5.58

Relative Return vs Custom Index



Callan Core Plus Fixed Income (Gross) Annualized Five Year Risk vs Return

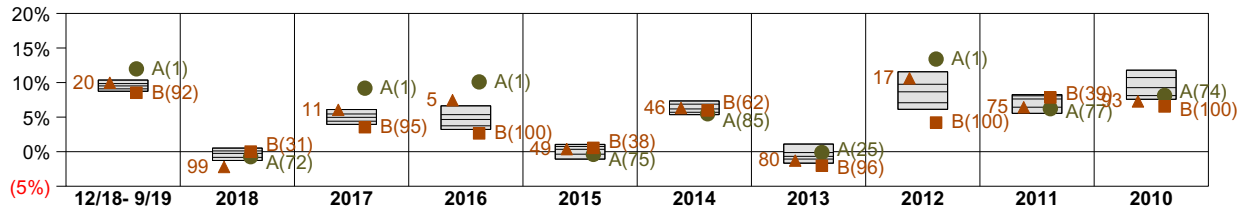


PIMCO Fixed Income
Return Analysis Summary

Return Analysis

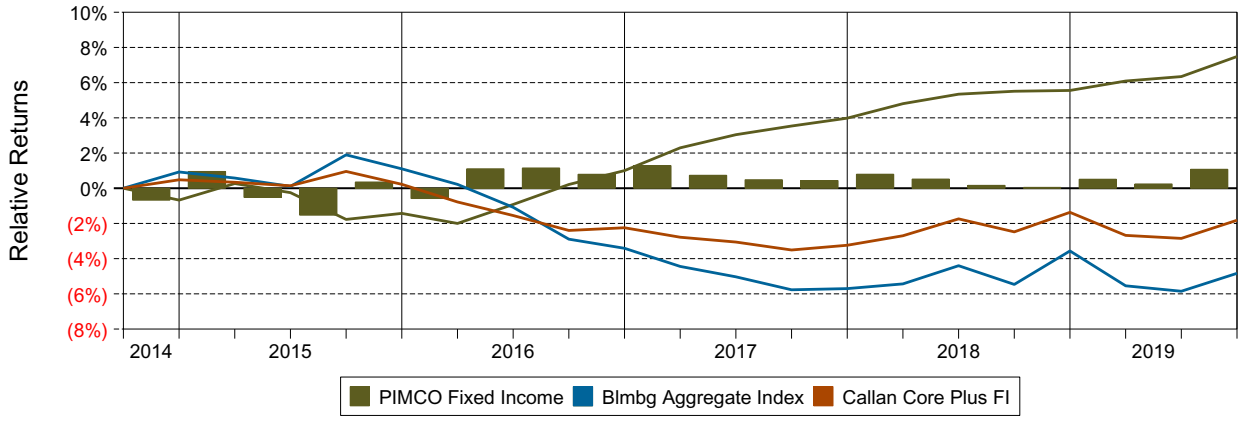
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

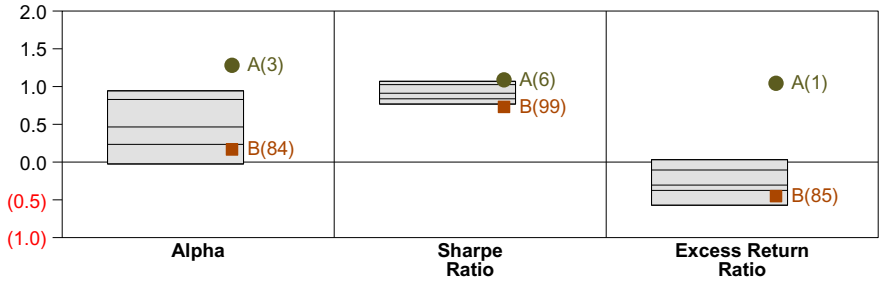


		12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile		10.36	0.52	6.10	6.64	1.05	7.34	1.10	11.56	8.25	11.79
25th Percentile		9.86	0.11	5.45	5.36	0.76	6.88	(0.13)	9.75	8.08	10.72
Median		9.51	(0.25)	4.97	4.66	0.34	6.18	(0.67)	8.66	7.62	9.26
75th Percentile		9.09	(0.82)	4.41	3.74	(0.36)	5.70	(1.07)	7.08	6.44	8.11
90th Percentile		8.74	(1.27)	3.94	3.22	(1.08)	5.36	(1.66)	6.13	5.54	7.58
PIMCO Fixed Income	● A	11.98	(0.73)	9.19	10.09	(0.39)	5.48	(0.12)	13.40	6.22	8.14
Blmbg Aggregate Index	■ B	8.52	0.01	3.54	2.65	0.55	5.97	(2.02)	4.21	7.84	6.54
Custom Index	▲	9.97	(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 September 30, 2019



		Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile		0.94	1.07	0.03
25th Percentile		0.83	1.03	(0.10)
Median		0.47	0.91	(0.30)
75th Percentile		0.23	0.84	(0.37)
90th Percentile		(0.03)	0.77	(0.57)
PIMCO Fixed Income	● A	1.28	1.09	1.04
Blmbg Aggregate Index	■ B	0.17	0.73	(0.45)

Real Estate

Real Estate
Period Ended September 30, 2019

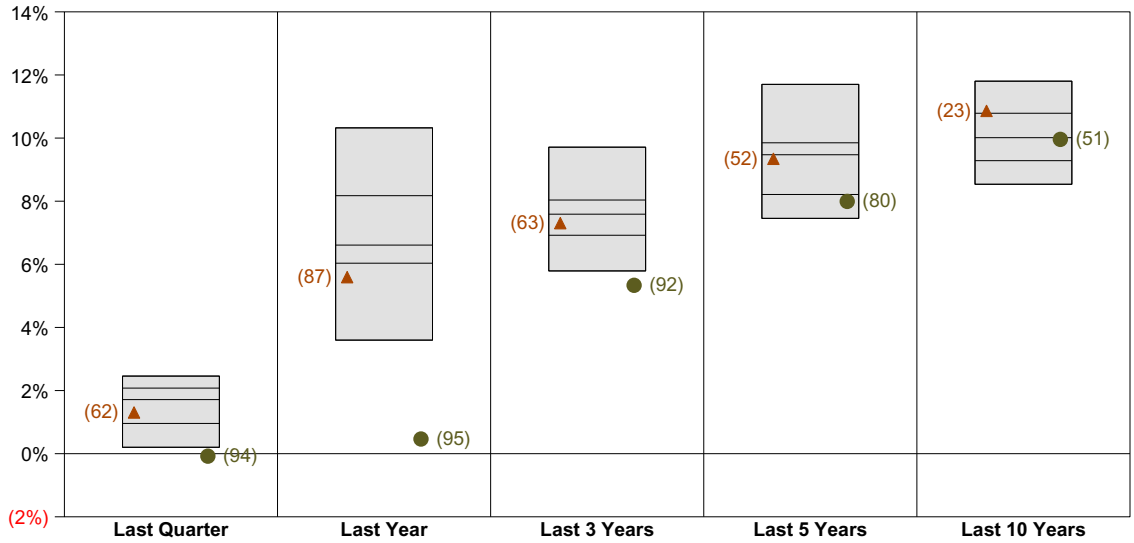
Investment Philosophy

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

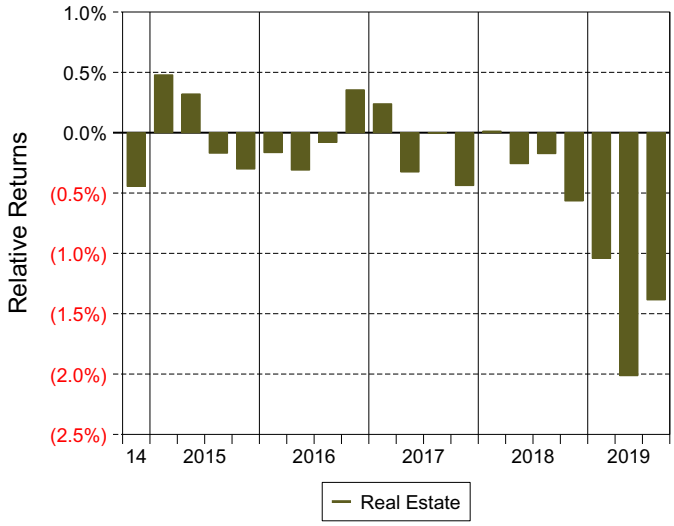
- Real Estate's portfolio posted a (0.08)% return for the quarter placing it in the 94 percentile of the Public Fund - Real Estate group for the quarter and in the 95 percentile for the last year.
- Real Estate's portfolio underperformed the NFI-ODCE Value Weight Gr by 1.39% for the quarter and underperformed the NFI-ODCE Value Weight Gr for the year by 5.13%.

Performance vs Public Fund - Real Estate (Gross)

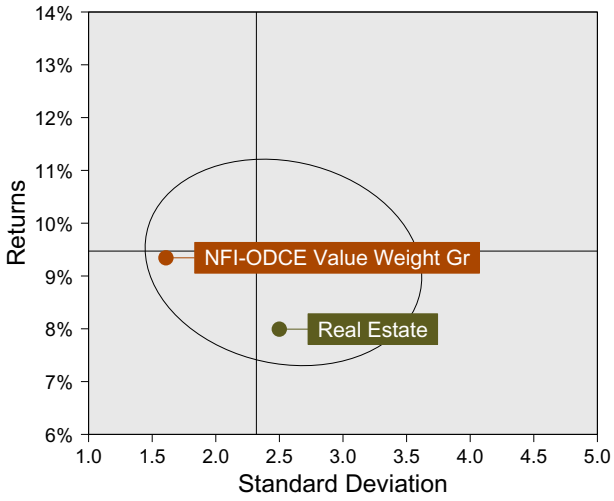


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	2.46	10.32	9.71	11.70	11.80
25th Percentile	2.08	8.17	8.04	9.85	10.79
Median	1.71	6.61	7.59	9.47	10.01
75th Percentile	0.96	6.04	6.92	8.21	9.28
90th Percentile	0.20	3.60	5.79	7.46	8.54
Real Estate ●	(0.08)	0.46	5.33	7.99	9.96
NFI-ODCE Value Weight Gr ▲	1.31	5.59	7.30	9.34	10.86

Relative Return vs NFI-ODCE Value Weight Gr



Public Fund - Real Estate (Gross) Annualized Five Year Risk vs Return

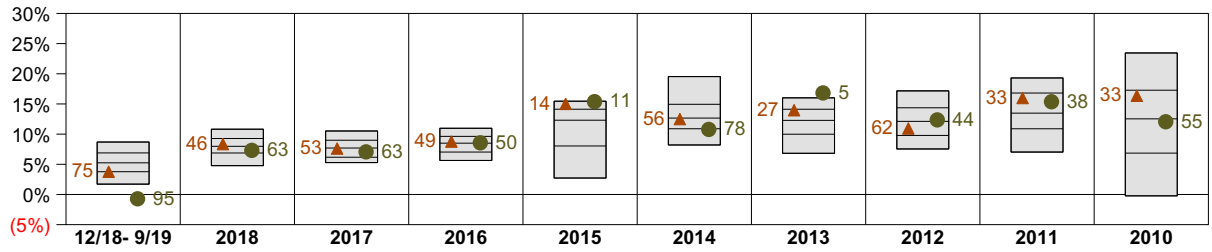


Real Estate
Return Analysis Summary

Return Analysis

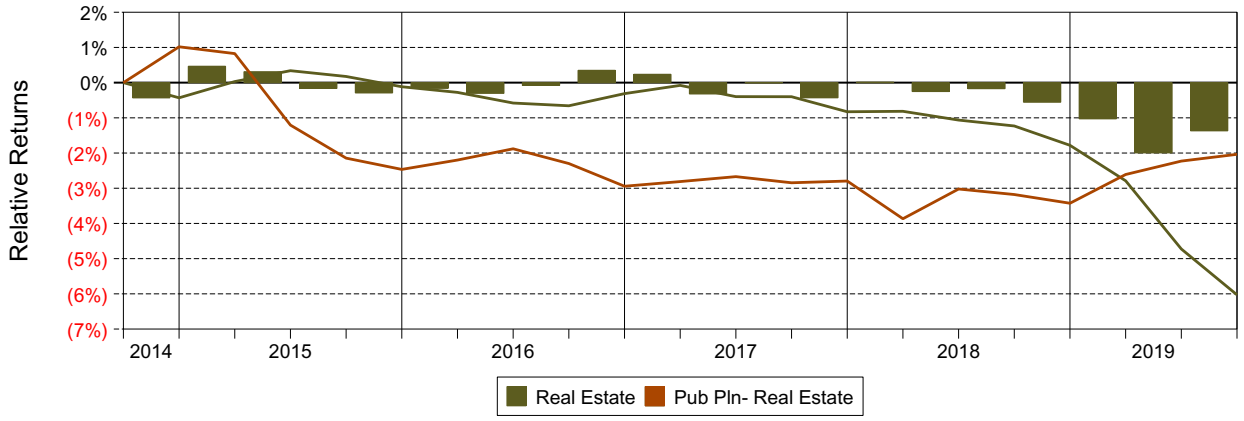
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

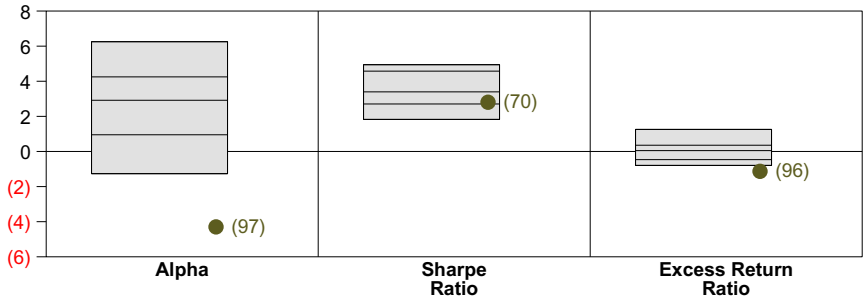


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	8.69	10.81	10.52	10.97	15.46	19.54	16.01	17.17	19.31	23.45
25th Percentile	6.89	9.28	8.99	9.63	14.13	14.94	14.12	14.36	16.81	17.28
Median	5.24	7.98	7.70	8.50	12.31	12.66	12.28	12.11	13.48	12.53
75th Percentile	3.77	6.87	6.17	7.03	8.04	10.89	9.99	9.78	10.89	6.85
90th Percentile	1.71	4.78	5.29	5.64	2.72	8.20	6.82	7.54	7.03	(0.23)
Real Estate ●	(0.72)	7.31	7.06	8.56	15.38	10.78	16.82	12.36	15.36	12.05
NCREIF NFI-ODCE Val Wt Gr ▲	3.77	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 September 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	6.25	4.94	1.26
25th Percentile	4.25	4.58	0.36
Median	2.92	3.39	0.05
75th Percentile	0.95	2.71	(0.46)
90th Percentile	(1.26)	1.83	(0.79)
Real Estate ●	(4.30)	2.81	(1.13)

JP Morgan Strategic Property Fund
Period Ended September 30, 2019

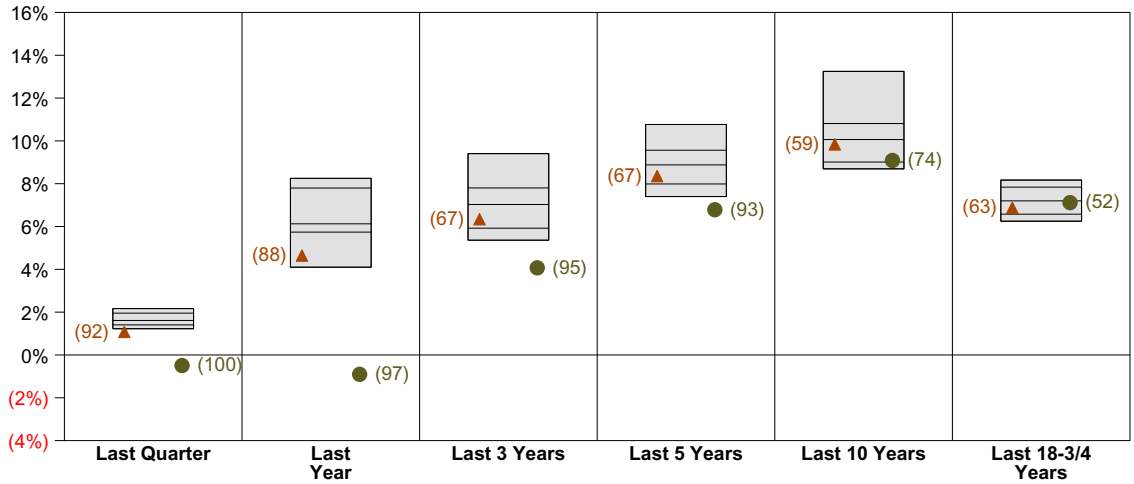
Investment Philosophy

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

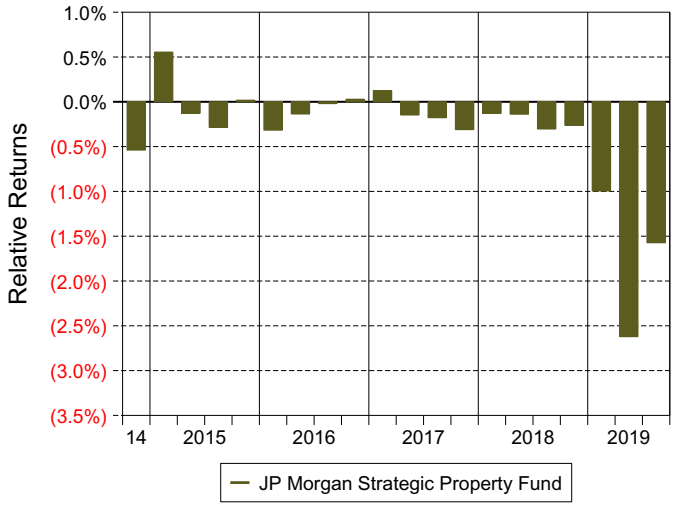
- JP Morgan Strategic Property Fund's portfolio posted a (0.49)% return for the quarter placing it in the 100 percentile of the Callan Open End Core Cmmingled Real Est group for the quarter and in the 97 percentile for the last year.
- JP Morgan Strategic Property Fund's portfolio underperformed the NCREIF NFI-ODCE Val Wt Nt by 1.57% for the quarter and underperformed the NCREIF NFI-ODCE Val Wt Nt for the year by 5.55%.

Performance vs Callan Open End Core Cmmingled Real Est (Net)

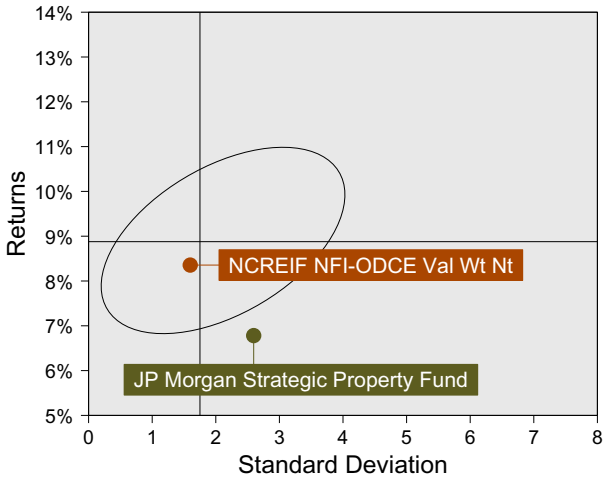


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 18-3/4 Years
10th Percentile	2.17	8.25	9.41	10.77	13.25	8.17
25th Percentile	1.95	7.80	7.80	9.56	10.81	7.84
Median	1.61	6.13	7.03	8.88	10.06	7.20
75th Percentile	1.41	5.74	5.92	7.99	9.01	6.58
90th Percentile	1.23	4.10	5.36	7.40	8.69	6.25
JP Morgan Strategic Property Fund ●	(0.49)	(0.90)	4.07	6.78	9.09	7.12
NCREIF NFI-ODCE Val Wt Nt ▲	1.08	4.64	6.34	8.36	9.84	6.88

Relative Returns vs NCREIF NFI-ODCE Val Wt Nt



Callan Open End Core Cmmingled Real Est (Net) Annualized Five Year Risk vs Return

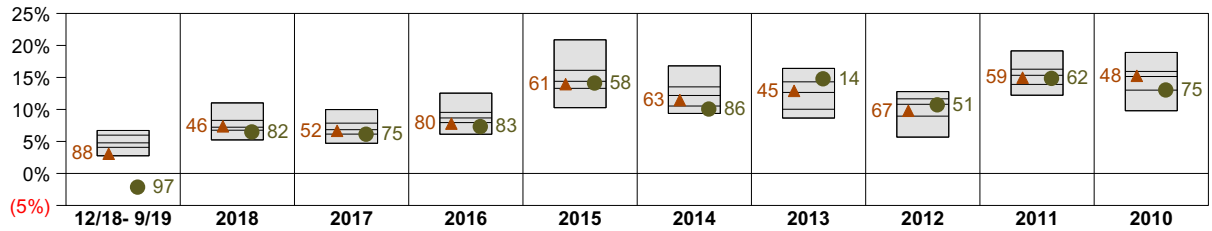


JP Morgan Strategic Property Fund
Return Analysis Summary

Return Analysis

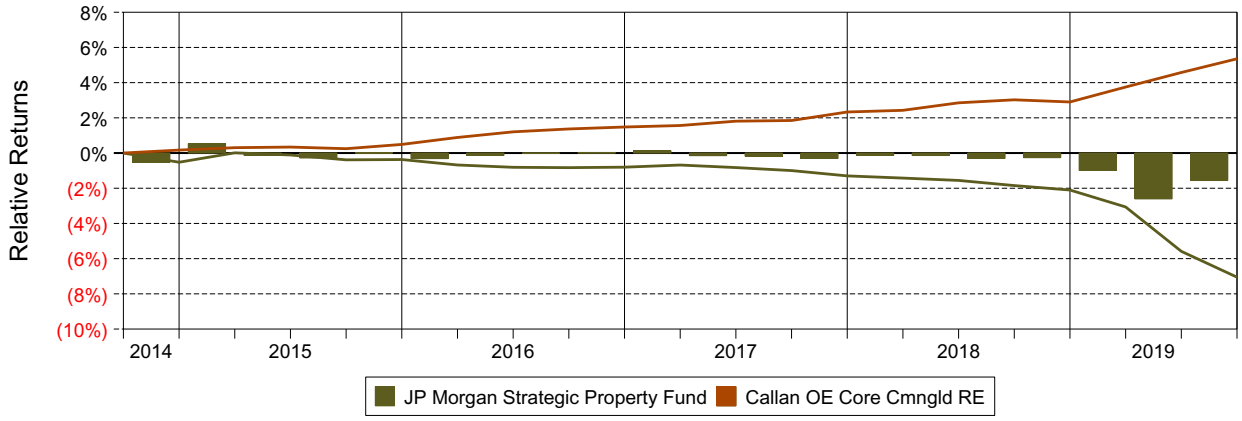
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

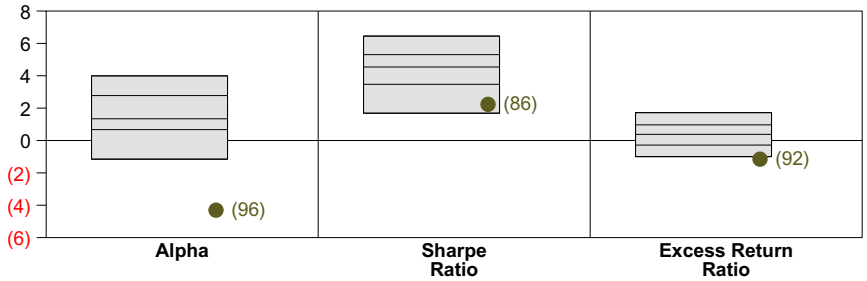


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	6.71	11.02	9.98	12.55	20.88	16.81	16.41	12.79	19.15	18.90
25th Percentile	5.98	8.29	7.86	9.54	16.11	13.53	14.31	11.66	16.29	15.94
Median	4.78	7.22	6.84	8.67	14.40	12.18	12.66	10.80	15.33	15.14
75th Percentile	4.08	6.75	6.15	7.95	13.29	10.53	10.03	8.95	13.91	13.02
90th Percentile	2.76	5.24	4.71	6.13	10.28	9.38	8.65	5.67	12.22	9.80
JP Morgan Strategic Property Fund ●	(2.14)	6.49	6.13	7.32	14.12	10.06	14.79	10.72	14.86	13.04
NCREIF NFI-ODCE Val Wt Nt ▲	3.08	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 September 30, 2019



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	4.00	6.45	1.72
25th Percentile	2.78	5.31	0.97
Median	1.34	4.54	0.38
75th Percentile	0.67	3.47	(0.28)
90th Percentile	(1.15)	1.69	(1.00)
JP Morgan Strategic Property Fund ●	(4.31)	2.23	(1.16)

JP Morgan Income and Growth Fund
Period Ended September 30, 2019

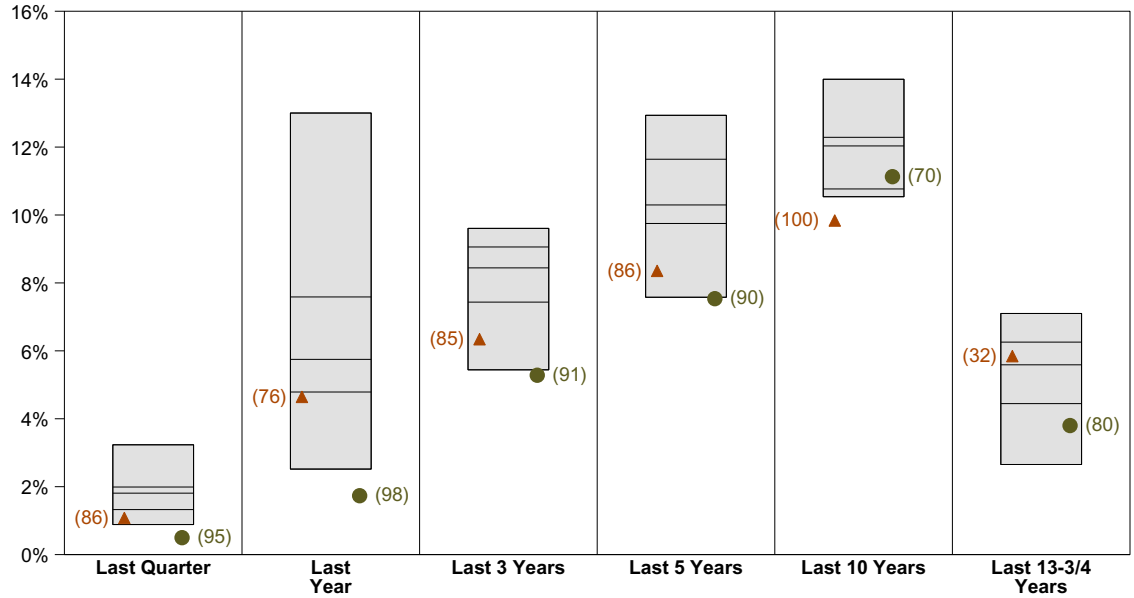
Investment Philosophy

The product was funded in the fourth quarter of 2005.

Quarterly Summary and Highlights

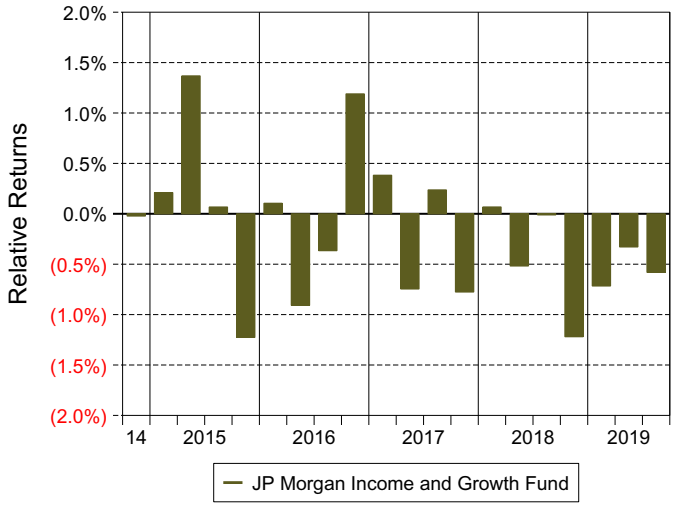
- JP Morgan Income and Growth Fund's portfolio posted a 0.50% return for the quarter placing it in the 95 percentile of the Callan Real Estate Val Add Open End Fds group for the quarter and in the 98 percentile for the last year.
- JP Morgan Income and Growth Fund's portfolio underperformed the NCREIF NFI-ODCE Val Wt Nt by 0.58% for the quarter and underperformed the NCREIF NFI-ODCE Val Wt Nt for the year by 2.91%.

Performance vs Callan Real Estate Val Add Open End Fds (Net)

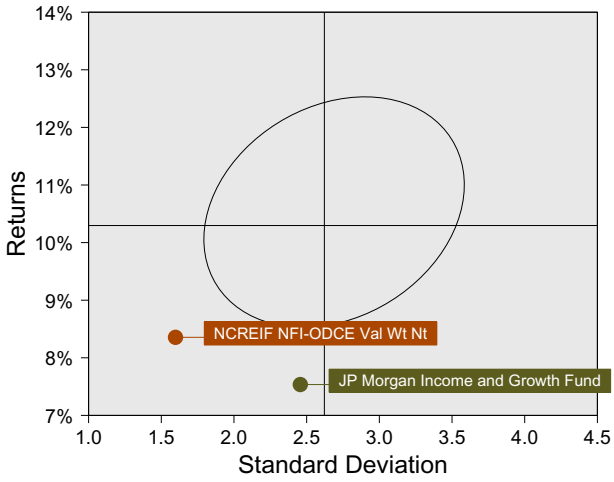


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 13-3/4 Years
10th Percentile	3.23	13.00	9.61	12.94	14.00	7.10
25th Percentile	1.99	7.59	9.06	11.64	12.29	6.26
Median	1.81	5.75	8.44	10.30	12.03	5.59
75th Percentile	1.33	4.79	7.43	9.75	10.77	4.45
90th Percentile	0.89	2.52	5.44	7.58	10.54	2.65
JP Morgan Income and Growth Fund ●	0.50	1.73	5.28	7.54	11.13	3.80
NCREIF NFI-ODCE Val Wt Nt ▲	1.08	4.64	6.34	8.36	9.84	5.84

Relative Returns vs NCREIF NFI-ODCE Val Wt Nt



Callan Real Estate Val Add Open End Fds (Net) Annualized Five Year Risk vs Return

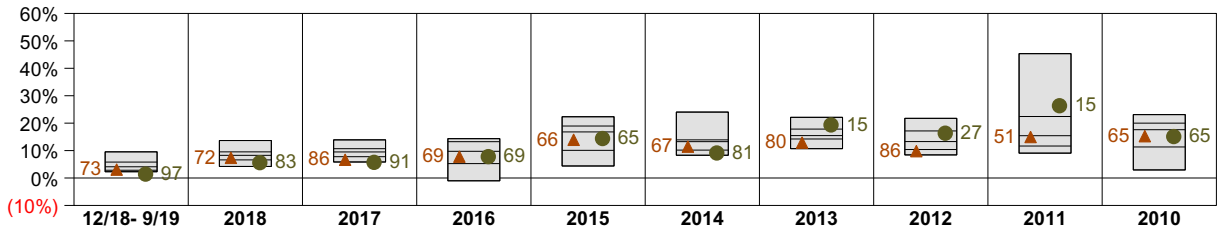


JPM Income and Growth Fund
Return Analysis Summary

Return Analysis

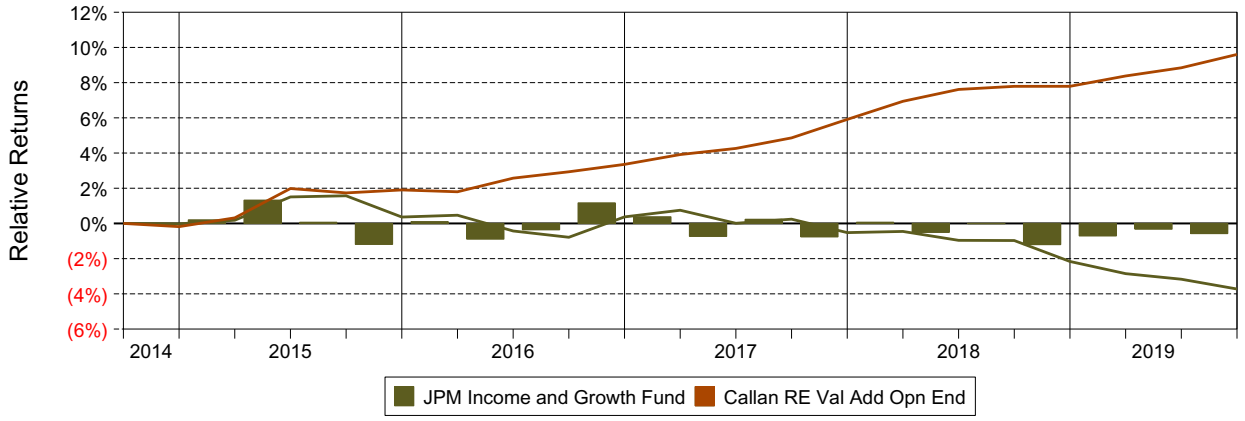
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

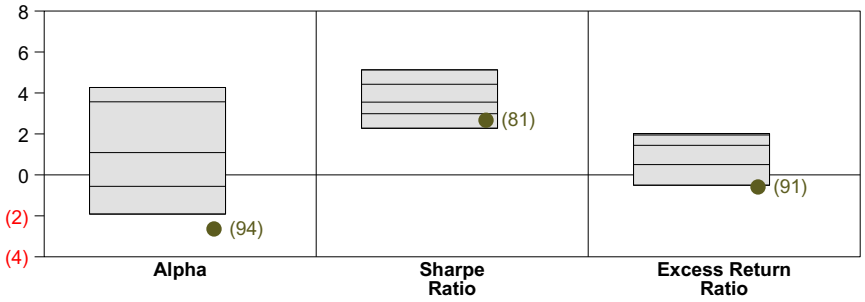


	12/18- 9/19	2018	2017	2016	2015	2014	2013	2012	2011	2010
10th Percentile	9.54	13.67	13.90	14.34	22.33	24.03	22.12	21.75	45.34	23.11
25th Percentile	5.81	9.54	10.69	13.24	18.95	13.91	17.84	17.17	22.42	20.00
Median	4.10	8.26	9.50	9.74	16.80	13.25	15.46	13.28	15.42	17.62
75th Percentile	2.83	6.60	7.78	5.25	10.09	10.18	14.23	10.39	11.66	11.32
90th Percentile	2.29	4.21	5.84	(1.02)	4.38	8.30	10.70	8.43	9.06	2.94
JPM Income and Growth Fund ●	1.43	5.59	5.71	7.80	14.39	9.13	19.35	16.33	26.36	15.12
NCREIF NFI-ODCE Val Wt Nt ▲	3.08	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 September 30, 2019



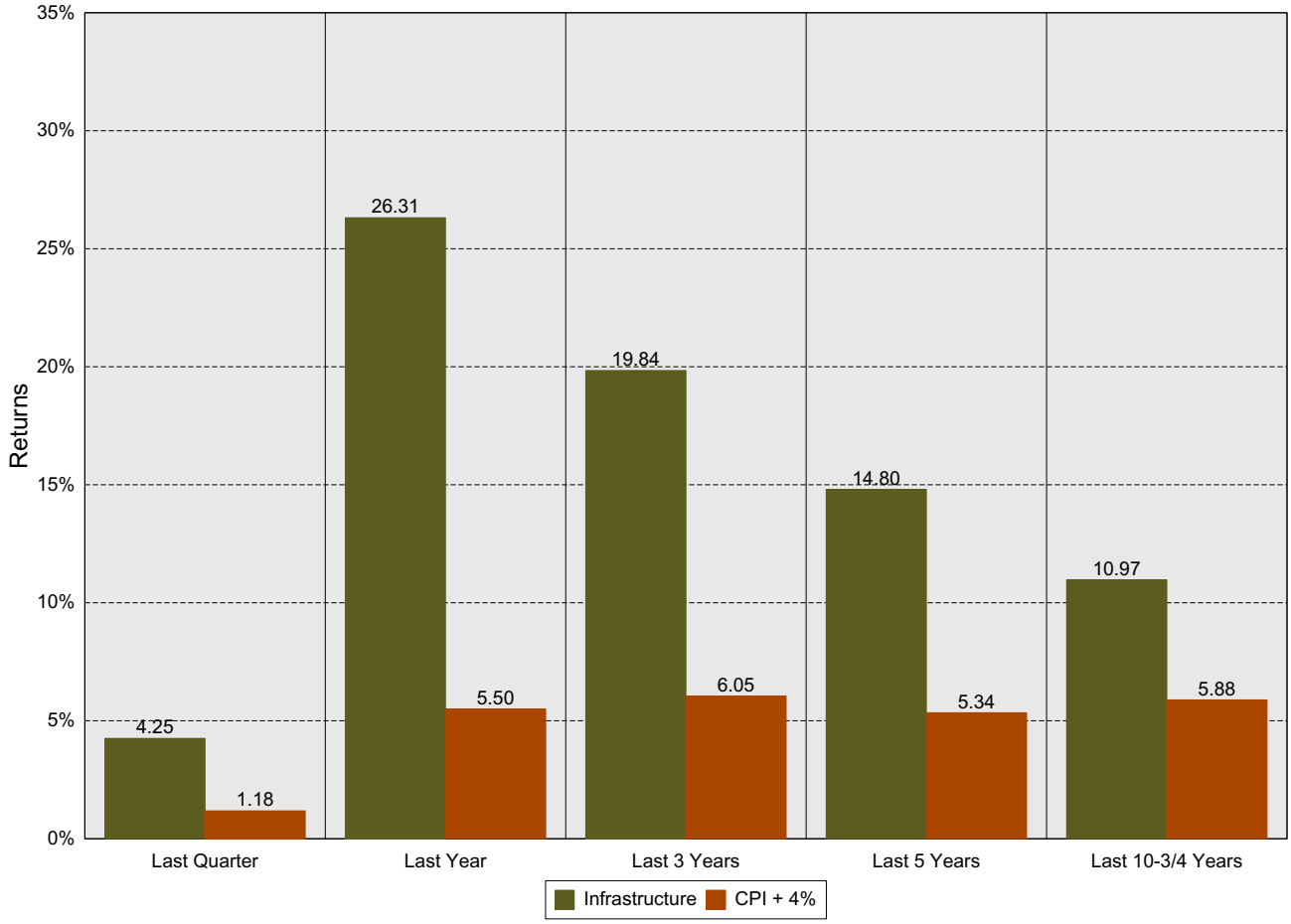
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	4.27	5.13	2.02
25th Percentile	3.57	4.42	1.95
Median	1.09	3.55	1.44
75th Percentile	(0.56)	2.99	0.50
90th Percentile	(1.91)	2.28	(0.51)
JPM Income and Growth Fund ●	(2.64)	2.67	(0.59)

Infrastructure

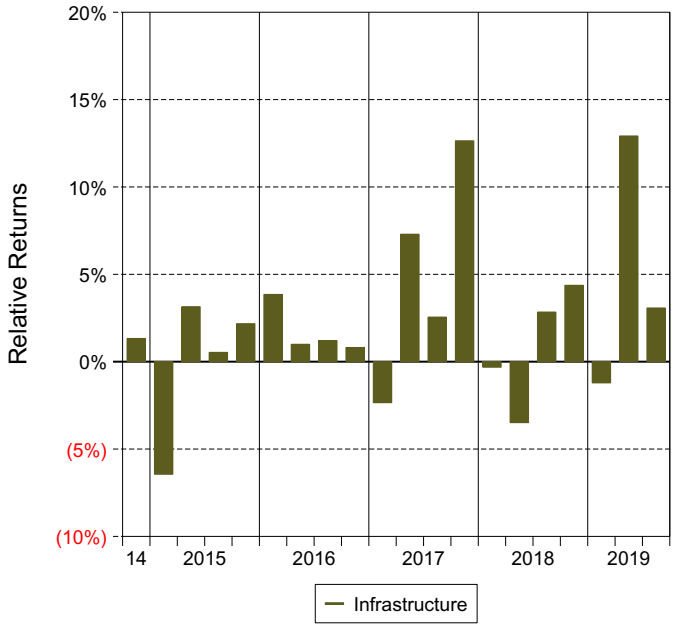
Infrastructure
Period Ended September 30, 2019

Quarterly Summary and Highlights

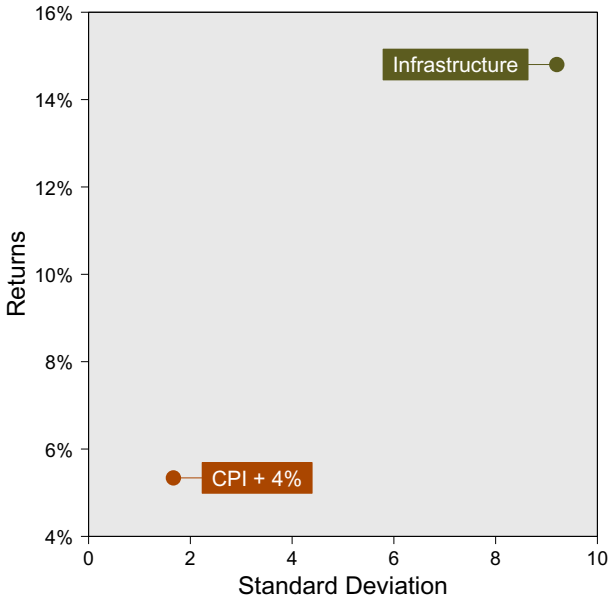
- Infrastructure's portfolio outperformed the CPI + 4% by 3.07% for the quarter and outperformed the CPI + 4% for the year by 20.82%.



Relative Return vs CPI + 4%



Annualized Five Year Risk vs Return



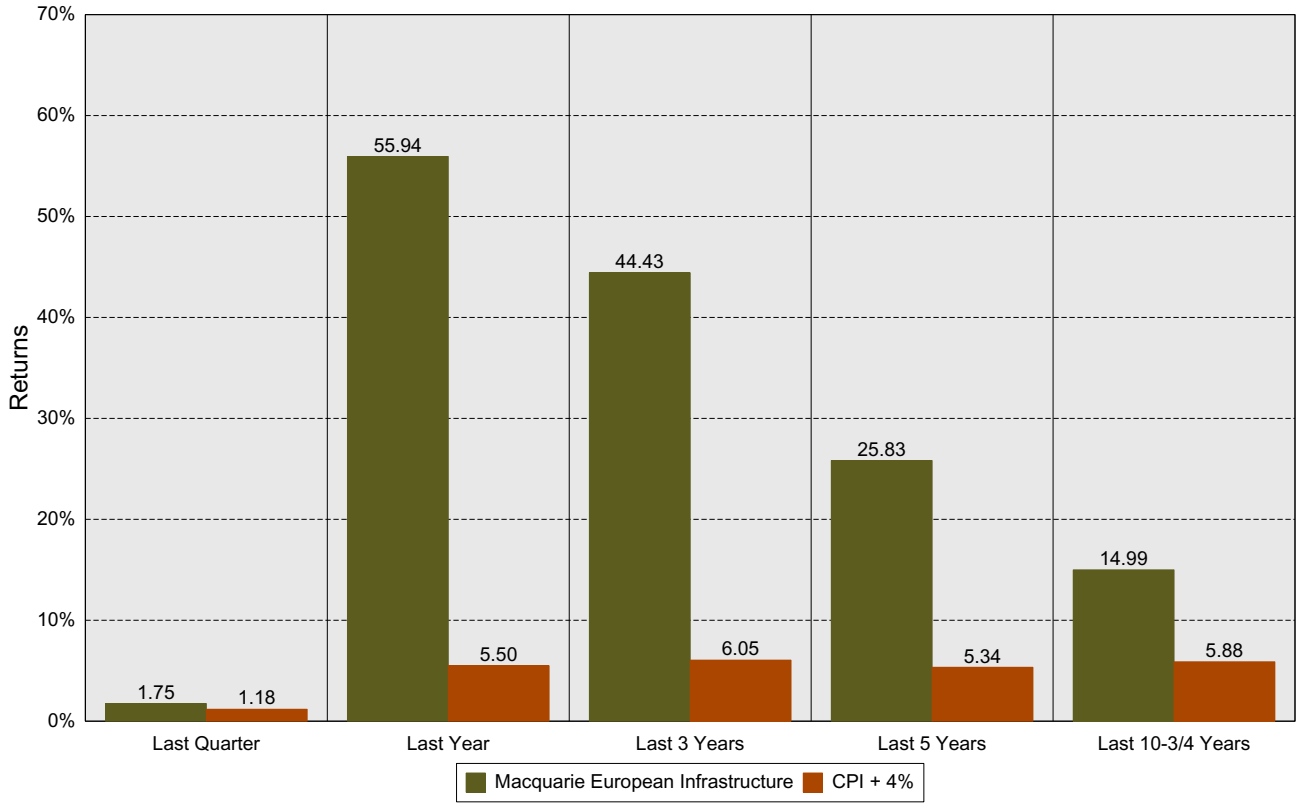
Macquarie European Infrastructure
Period Ended September 30, 2019

Investment Philosophy

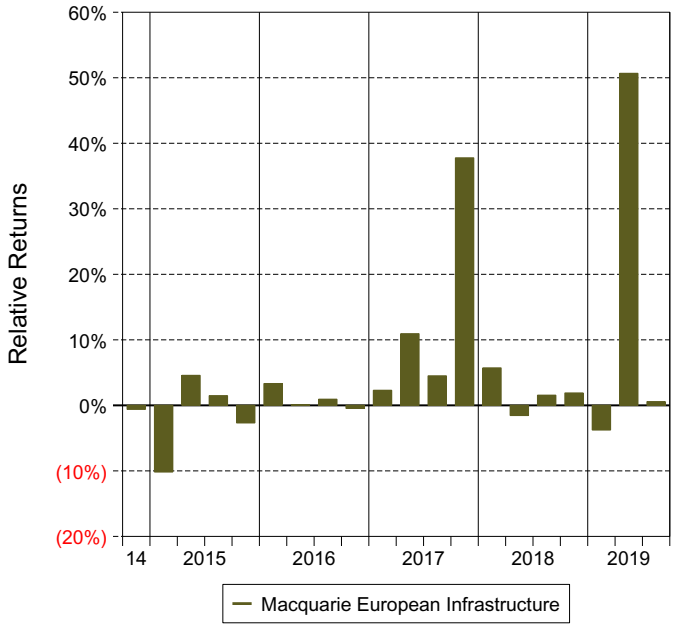
The product was funded in the fourth quarter of 2008.

Quarterly Summary and Highlights

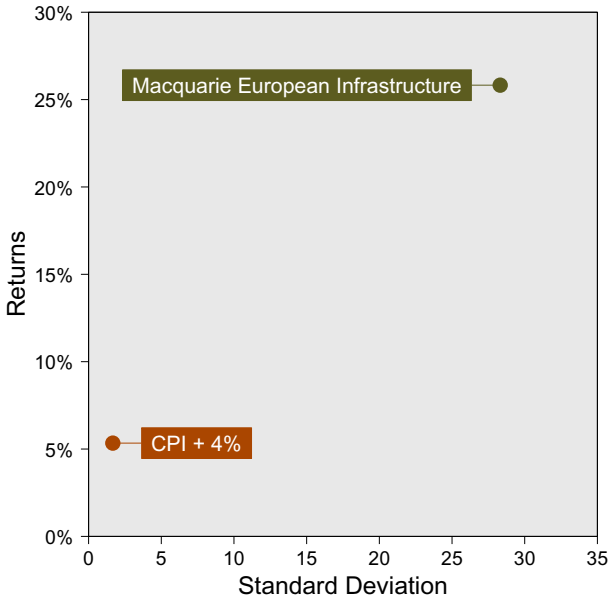
- Macquarie European Infrastructure's portfolio outperformed the CPI + 4% by 0.57% for the quarter and outperformed the CPI + 4% for the year by 50.45%.



Relative Return vs CPI + 4%



Annualized Five Year Risk vs Return



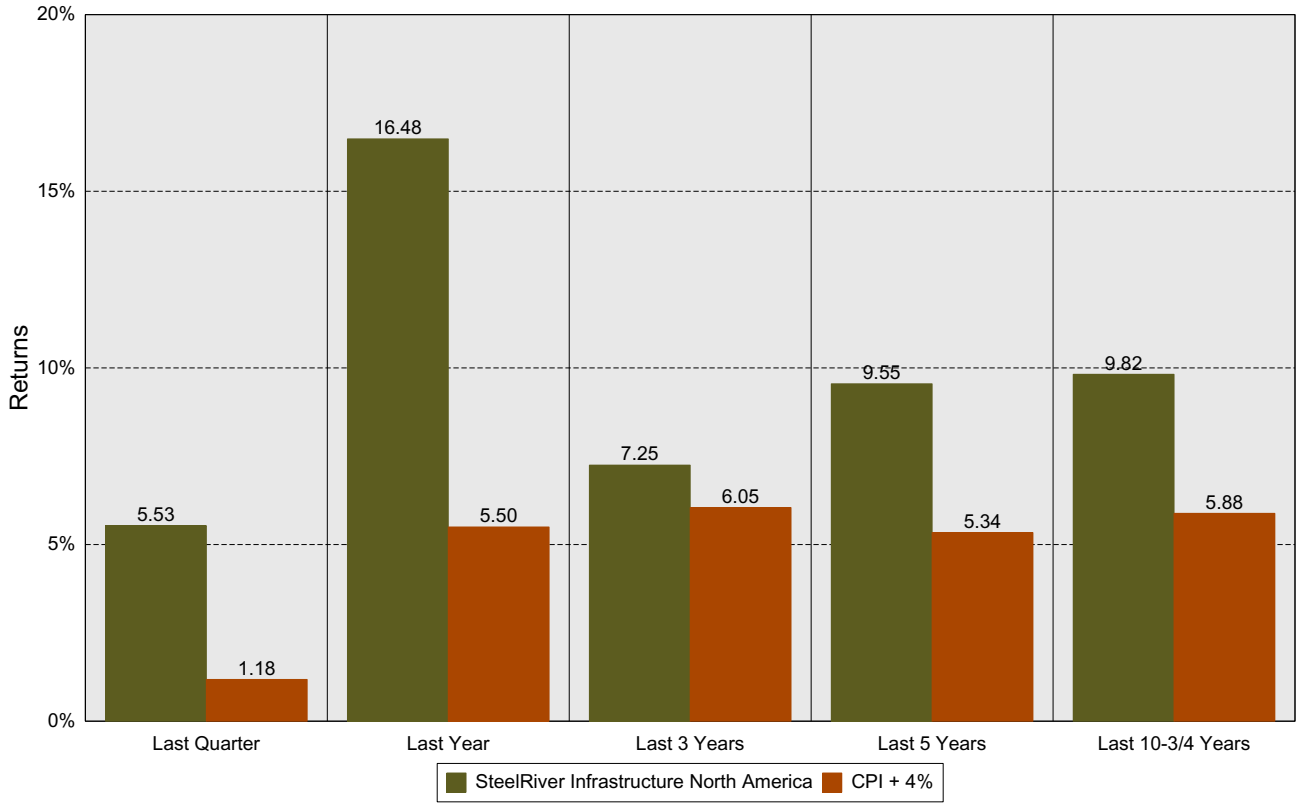
SteelRiver Infrastructure North America
Period Ended September 30, 2019

Investment Philosophy

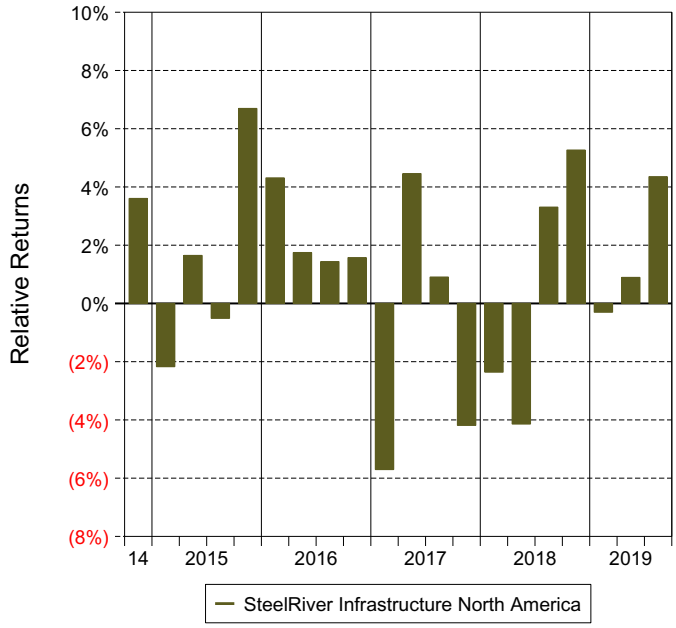
The product was funded in the fourth quarter of 2008.

Quarterly Summary and Highlights

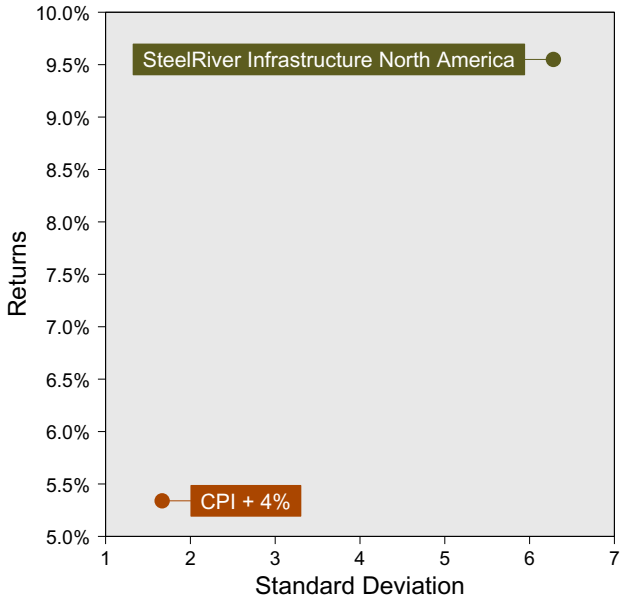
- SteelRiver Infrastructure North America's portfolio outperformed the CPI + 4% by 4.35% for the quarter and outperformed the CPI + 4% for the year by 10.99%.



Relative Return vs CPI + 4%



Annualized Five Year Risk vs Return



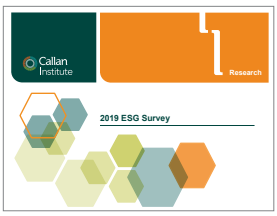
Callan Research/Education

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

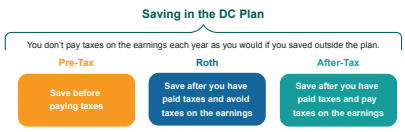
DTS Offers Some Key Advantages for Evaluating Fixed Income Portfolios | This paper describes duration times spread (DTS), which measures systematic credit-spread risk exposure. DTS estimates the return of any bond, by percentage, if its spread were to change from the current level, all else equal. DTS offers several advantages for monitoring risk in credit portfolios over other methods.



2019 ESG Survey | Callan's seventh annual survey assessing the status of environmental, social, and governance (ESG) investing in the U.S. institutional investment market.

Callan's DC Index in Detail | A video about the Callan DC Index™: why we started it, what it measures, and how it can benefit defined contribution plan sponsors.

DC Plan Hacks: Tips for an Efficient Design | Defined contribution plan sponsors should regularly evaluate their plans to make sure they serve the organization's benefits philosophy. When evaluating changes, the sponsor should consider its demographics, cost of benefits, vendor capabilities, impact on nondiscrimination testing, communication capabilities, and legal requirements.



2019 June Workshop Summary: In the Age of Illiquidity | For many nonprofits and defined benefit plans, the shift to higher-returning but less liquid asset classes has myriad implications. This summary discusses how consultants, institutional investors, and investment managers can work together to identify solutions tailored to each plan.

The Keys to Unlocking Private Equity Portfolio Assessment Private equity performance evaluation has some unique considerations, so return calculations and benchmarking methodologies differ from public securities. Closed-end private equity vehicles are assessed using ratio analyses and internal rate of return (IRR) measures. Using performance metrics, private equity portfolios can be evaluated at the partnership level, at the vintage year level, and then at the total portfolio level.

Survivorship Bias and the Walking Dead | Survivorship bias, the predisposition to evaluate a data set by focusing on the "survivors" rather than also examining the record of non-survivors, is important to understand for hedge fund peer groups, which tend to have a relatively large number of constituents that disappear. Using a proprietary approach, Callan is able to adjust peer group comparisons for survivorship bias. This better-informed perspective enables a more honest assessment in considering performance relative to other opportunities.

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 institutional investors, 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.

2020 National Conference
Celebrating the 40th anniversary of the Callan Institute
January 27-29, 2020 – San Francisco

Please also keep your eye out for upcoming Webinars in 2019! We will be sending invitations to register for these events and will also have registration links on our website at www.callan.com/webinarsupcoming.

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.

Introduction to Investments
April 21-22, 2020
July 21-22, 2020
This program familiarizes institutional investor trustees and 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.

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

Callan

Quarterly List as of September 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 an 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 Inc.
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
Aurelius Capital Management
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 LLC
Chartwell Investment Partners

Manager Name
ClearBridge Investments, LLC
Cohen & Steers Capital Management, Inc.
Columbia Threadneedle Investments
Columbus Circle Investors
Corbin Capital Partners, L.P.
Cooke & Bieler, L.P.
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 Advisors, LLC
Guggenheim Investments
GW&K Investment Management
Harbor Capital Group Trust
Hartford Investment Management Co.

Manager Name
Heitman LLC
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 North America, Inc.
Ivy Investments
J.P. Morgan
Janus
Jarislowsky Fraser Global Investment Management
Jennison Associates LLC
Jobs Peak Advisors
KeyCorp
Lazard Asset Management
Legal & General Investment Management America
Lincoln National Corporation
LMCG Investments, LLC
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 Investment Management
Marathon Asset Management, L.P.
McKinley Capital Management, LLC
Mellon
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

Manager Name
Osterweis Capital Management, LLC
P/E Investments
Pacific Investment Management Company
Pathway Capital Management
Peregrine Capital Management, LLC.
Perkins Investment Management
PGIM Fixed Income
PineBridge Investments
PNC Capital Advisors, LLC
Polen Capital Management
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.
South Texas Money Management, Ltd.
State Street Global Advisors
Strategic Global Advisors
Stone Harbor Investment Partners, L.P.
Sun Life Investment Management
T. Rowe Price Associates, Inc.
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

CLIENT: Tucson Supplemental Retirement System		REPORT TYPE: SUM
ORGID: 10170	REPORT ID: 408	REPORT DATE: Sep 30, 2019

CONSULTANT	OFFICE	MAILING DUE DATE
Gordie Weightman	CO	Nov 8 2019

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CLIENT: Tucson Supplemental Retirement System

Ms. Tina Gamez
Administrative Assistant
Tucson Supplemental Retirement System
255 W. Alameda Street, 5th Floor West
Tucson, AZ 85701

Number of Reports
15

D8

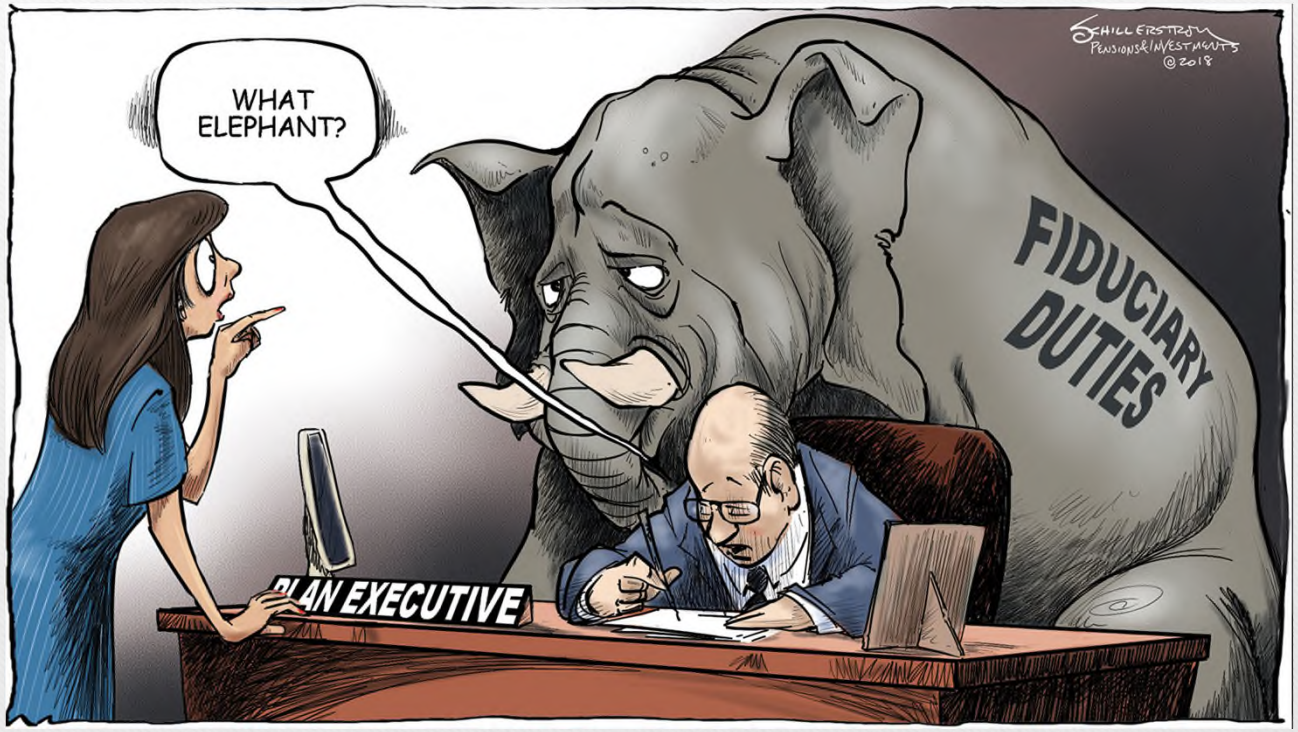
Fiduciary Training

Tucson Supplemental Retirement System

Board of Trustees

November 15, 2019

What We Want to Prevent



What Law Governs TSRS and BOARD Actions?

- Tucson City Code
- Arizona State Law & Arizona Constitution
- Arizona Common Law
- Internal Revenue Code
- Courts may consider:
  - Uniform Management of Public Employee Retirement Systems Act
  - ERISA (Employee Retirement Income Security Act of 1974)
  - Uniform Prudent Investor Act

Knowing the Fiduciary Role and Obligations

- The Fiduciary Role can be summarized as the obligation
  - To administer the plan and
  - To invest the plan assets --

With the same care, skill and diligence
under the circumstances then prevailing
which a prudent person
acting in a like capacity and familiar with those matters
would use in the conduct of an activity of like character and purpose.

- Fiduciaries must act as an experienced or knowledgeable expert might act

How Arizona Courts Define Fiduciaries and Fiduciary Duties

- AZ Supreme Court in *Sky Harbor v. Patel*, 443 P.3d 21 (2019):

> We have characterized a fiduciary duty as imposing "the obligation of loyalty," Ghiz v. Millett, 71 Ariz. 4, 8 (1950), "the obligation of the utmost good faith in their dealings," DeSantis v. Dixon, 72 Ariz. 345, 350 (1951), and "requiring a high degree of care," Master Records, Inc. v. Backman, 133 Ariz. 494, 497 (1982) (quotations omitted). Thus, the nature of the fiduciary relationship for agents includes a duty of loyalty, a duty of good faith, and a duty of care (emphasis added)

Who is a Fiduciary: Settlor, Fiduciary, Ministerial Functions

- A Settlor is a "person" who establishes a trust
  - Settlor functions in the retirement context include establishing, designing, amending and terminating the pension plan
- A Fiduciary is the "person" who is entrusted with the management of the Settlor's trust
  - Fiduciary functions are administration and investment
  - Discretionary control is key
- Fiduciaries have no control over Settlor functions, and vice versa
- Ministerial functions do not involve discretion, and typically do not rise to the level of Settlor or Fiduciary functions

Principal Fiduciary Duties

- Duty of Prudence and Duty to Exercise Due Care
- Duty of Loyalty and Duty to Act Impartially, in Good Faith
- Duty to Comply with Applicable Law

Key Areas of Fiduciary Concern

- System Governance
- Actuarial Management
- Investment Selection/Monitoring
- Administrative Oversight
- Communication

The Duty of Prudence

- Must exercise care and diligence in following governing terms, making investment selections, hiring providers
- Prudent process includes ascertaining relevant facts, investigating other options and, if needed, obtaining expert advice
- Prudence encompasses Investments and Administration

Prudent Investments

- Productively invest assets
- Diversify investments, to minimize the risk of large losses
- Prudent selection, monitoring and replacement of investments is required, but -
  - Board is not required to guarantee investment results
- Pay only reasonable and appropriate fees
- Evaluate on portfolio basis and on individual investment basis
- Prudent investments maximize return without incurring undue or inappropriate levels of risk
- Investment returns directly impact required contributions

Prudent Administration

- Annual review of funded status and future projections
- Prudence in setting actuarial and valuation factors is required
- Ongoing monitoring and adjustment of administrative policies and procedures is required as circumstances evolve
- Documentation of decisions, policies, procedures

Delegations to and Monitoring of System Administrator

- Board is responsible for investments and administration – more work than the Board can possibly perform
- Proper delegations to Administrator and Staff require examination of experience, knowledge and capacity
- Delegations must be clear and understood
- Work performed under delegation must be supervised
- Fiduciary responsibility can be shared, but it cannot be delegated

Fiduciary Duties and Outside Service Providers

Selection, Monitoring and Oversight of Service Providers

- Service providers should be engaged when Board does not possess necessary expertise or work capacity
  - Selection process is key – must obtain all relevant and reasonably available information on candidates
  - Current service providers must be monitored for quality of service and reasonable fees on ongoing basis
- Board has fiduciary responsibility for engagement of service providers, and may have responsibility for their actions

The Duty of Loyalty

- Board owes duty of loyalty to TSRS members and beneficiaries
- Internal Revenue Code - "exclusive benefit" rule:
  - It must be impossible, under the governing instruments, for the plan assets and income to be used for, or diverted to, purposes other than for the exclusive benefit of employees and beneficiaries, or to pay reasonable plan expenses
- TCC Section 22-32 exclusive benefit rule for TSRS:
  - The Tucson Supplemental Retirement System shall operate for the exclusive purpose of providing benefits to the members and their beneficiaries. It is prohibited for any part of the corpus or income of the trust fund to be used for, or diverted to, purposes other than for the exclusive benefit of the members or their beneficiaries

Loyalty (continued)

- Loyalty prohibits self-dealing
- Loyalty prohibits conflicts of interest
- Loyalty requires:
  - Acting on behalf of TSRS, not the City
  - No personal (or political) stake in the outcome of a Board decision
  - Impartiality is required

Loyalty Issues in the News

- CalPERS, CalSTRS and NYCERS have divested large holdings in private prison companies
- Pressure to liquidate the investments began with political debate regarding holding and housing migrants crossing the border
- State legislatures weighed into the debate with legislative proposals
- Unions weighed in on how their pensions assets should be invested
- Pension boards and investment managers are careful to characterize the divestitures as prudent investment decisions vs. political statements

Conflicts of Interest

- Most Board members wear at least two hats
- Board members often serve as result of position with City or as elected representative of TSRS group
- During Board service, members must avoid conflicts between their dual roles and conflicts relating to personal interest in TSRS
- Some conflicts cannot be eliminated
- Board member may have to abstain from voting and/or recuse self from deliberations

Duty to Comply with Applicable Law: Public Pension Protections in AZ Constitution

- Arizona Constitution protects public pensions in two ways: contract clause and pension clause
- "Membership in a public retirement system is a contractual relationship that is subject to [the Constitution's contract clause] and public retirement system benefits shall not be diminished or impaired." Ariz. Const. Art. XXIX, §1
- Together, the Constitutional provisions create a rule that a public employee's interest in his retirement pension is a contractual right that vests at the beginning of employment
- The employee has a vested right to continued membership in the pension plan, under the same rules and regulations existing at the beginning of his employment

Summary of Constitutional Status

- The pension clause reigns supreme over the contracts clause, which provides a very high level of protection for public pension benefits
- Employee contribution rates are protected pension benefits
- COLAs and the related COLA formulas are protected pension benefits
- Funded status arguments regarding the actuarial soundness of a plan are not likely to justify benefit reductions
- Cost related arguments regarding excessive taxpayer burden or extraordinary impact on governmental services are not likely to justify benefit reductions
- Flexible language in the governing documents, such as the contribution rate language for the TSRS variable tiers, is likely to be respected by the Courts

Avoiding Prohibited Transactions

- A prohibited transaction is a transaction between the pension plan and a "disqualified person" that is prohibited by law
- Prohibited transactions generally include the following transactions:
  - transfer of plan income or assets to, or use of them by or for the benefit of, a disqualified person
  - any act of a fiduciary by which plan income or assets are used for his or her own interest
  - the receipt of consideration by a fiduciary for his or her own account from any party dealing with the plan in a transaction that involves plan income or assets
  - the sale, exchange, or lease of property between a plan and a disqualified person
  - lending money or extending credit between a plan and a disqualified person
  - furnishing goods, services, or facilities between a plan and a disqualified person
- Certain transactions are exempt from being treated as prohibited transactions, such as a fiduciary receiving a pension as a participant, provided that the pension is calculated and paid under the same terms as for all other participants

Prohibited Transactions Continued

- A "disqualified person" includes:
  - a fiduciary of the plan
  - a person providing services to the plan
  - an employer, any of whose employees are covered by the plan
  - an employee organization, any of whose members are covered by the plan
  - a member of the family of any individual described above
- The most common prohibited transactions in pension plan administration involve the improper use of plan assets by the employer
- Prohibited transactions are corrected by reversing the transaction, disgorging any profits, paying excise taxes and confessing to the IRS

Attorney-Client Privilege Issues

- Generally speaking, an attorney may not reveal information relating to the representation of a client unless the client specifically authorizes the disclosure of the information
- Several exceptions to the attorney-client privilege exist
- The "fiduciary exception" provides:
  - A trustee must share legal advice received on trust administration matters with trust beneficiaries who request the information
  - A trustee is not required to pass on legal advice the trustee received regarding the trustee's own protection
  - Arizona has adopted the fiduciary exception in the estate planning context

Attorney-Client Privilege Issues Continued

- ERISA fiduciaries are subject to the fiduciary exception on matters of Plan administration
  - Fiduciaries have a duty to disclose to participants on Plan administration matters
  - Plan participants are sometimes treated as the "true client" of an attorney advising on Plan administration matters
- This area is evolving in Arizona and other jurisdictions

Recommended Practices for Board Members

- Be familiar with TSRS Code and Board Policies
- Stay informed about key issues facing public retirement systems
- Stay up to date about compliance changes and industry trends
- Make a professional commitment to ongoing training and development
- Consider Board level strategic planning

Conclusion

- Effective plan governance improves plan performance and operations (NCPERS: 2.4% improvement)
- Poor plan governance will be identified in the event of any legal challenges
- Fiduciary training and good management improve administration, service to members and technical compliance; all of which reduce risk
- Communication regarding how the Board implements good governance policies and procedures increases confidence in the system

FTfm Pensions crisis

Falling interest rates wreak havoc in US pension system

The strains on US corporate defined benefit plans are likely to intensify

Chris Flood NOVEMBER 3 2019

General Electric's recent decision to freeze retirement benefits for 20,000 employees provides the latest unwelcome illustration of the problems confronting millions of US workers battling to secure a decent income in old age.

The pain felt by GE's employees is shared by more than half a million workers across multiple US industries that also face cuts to pension benefits, according to the Washington-based Pension Rights Center.

GE's pension obligations stood at $91.8bn at the end of last year, significantly higher than the industrial conglomerate's $66bn market value on December 31.

It faces a funding shortfall of $22.4bn across its US and international pension funds. GE aims to reduce this by up to $8bn by cutting benefits and moving more staff into a defined contribution scheme, which places more responsibility on to individual workers for building a retirement saving pot.

Shifting workers out of generous salary-linked defined benefit pension schemes is a tactic widely adopted across US corporates. Just 16 per cent of Fortune 500 companies offered a salary-linked defined benefit retirement plan to new employees in 2017, down from 59 per cent in 1998, according to Willis Towers Watson, the pension scheme adviser.

The strains on US corporate defined benefit pension plans are likely to intensify, due in part to the steep decline in long-term interest rates that are used to measure (discount) the value of future obligations to employees.

With the Federal Reserve Board cutting interest rates this year, the yield on the US 30-year Treasury bond has sunk to an all-time low at 1.94 per cent in late August, down from 3.12 per cent at the start of March.

This dramatic fall has led pension plan sponsors to cut their discount rate to nearly 3 per cent compared with 4.2 per cent in 2018 and 7.2 per cent in 2001, according to Goldman Sachs Asset Management.

“The most notable and direct impact from falling interest rates is to exert upward pressure on [the value of] pension obligations and downward pressure on funded ratios,” says Michael Moran, a pensions strategist at GSAM.

Goldman estimates that the funded status of the US corporate defined benefit system has dropped to 86 per cent from a high of 91 per cent as recently as April 2019.

The deterioration has occurred in spite of strong gains for US equities with the S&P 500 hitting an all-time high this week, up 21.5 per cent this year.

Both UPS and FedEx have recently executed ‘borrow to fund’ pension transactions. We would not be surprised if more companies revisit this strategy if interest rates remain at these historically low levels

Michael Moran, a pensions strategist at GSAM

Declines in interest rates have also boosted the value of fixed income holdings for many pension funds but liabilities have risen even faster, resulting in the fall of funding levels.

Mr Moran says US corporate pension plans, particularly those at or near fully funded levels, should maintain or increase hedges that would protect them against unexpected shifts in interest rates.

This is a potentially expensive strategy because reductions in interest rates have driven up hedging costs. But GSAM says it is “prudent” given many companies have pension obligations that stretch far into the future beyond the duration of their bond portfolios.

GSAM also advises corporate clients to “make low interest rates work for them” by borrowing in the debt market and using those proceeds to bolster their pension plan.

“Both UPS and FedEx have recently executed ‘borrow to fund’ pension transactions. We would not be surprised if more companies revisit this strategy if interest rates remain at these historically low levels,” says Mr Moran.

Jay Love, a partner at Mercer, the investment consultant, says low rates have encouraged more companies to undertake pension risk transfer deals where they pay an insurance company to take on the responsibility for pension liabilities.

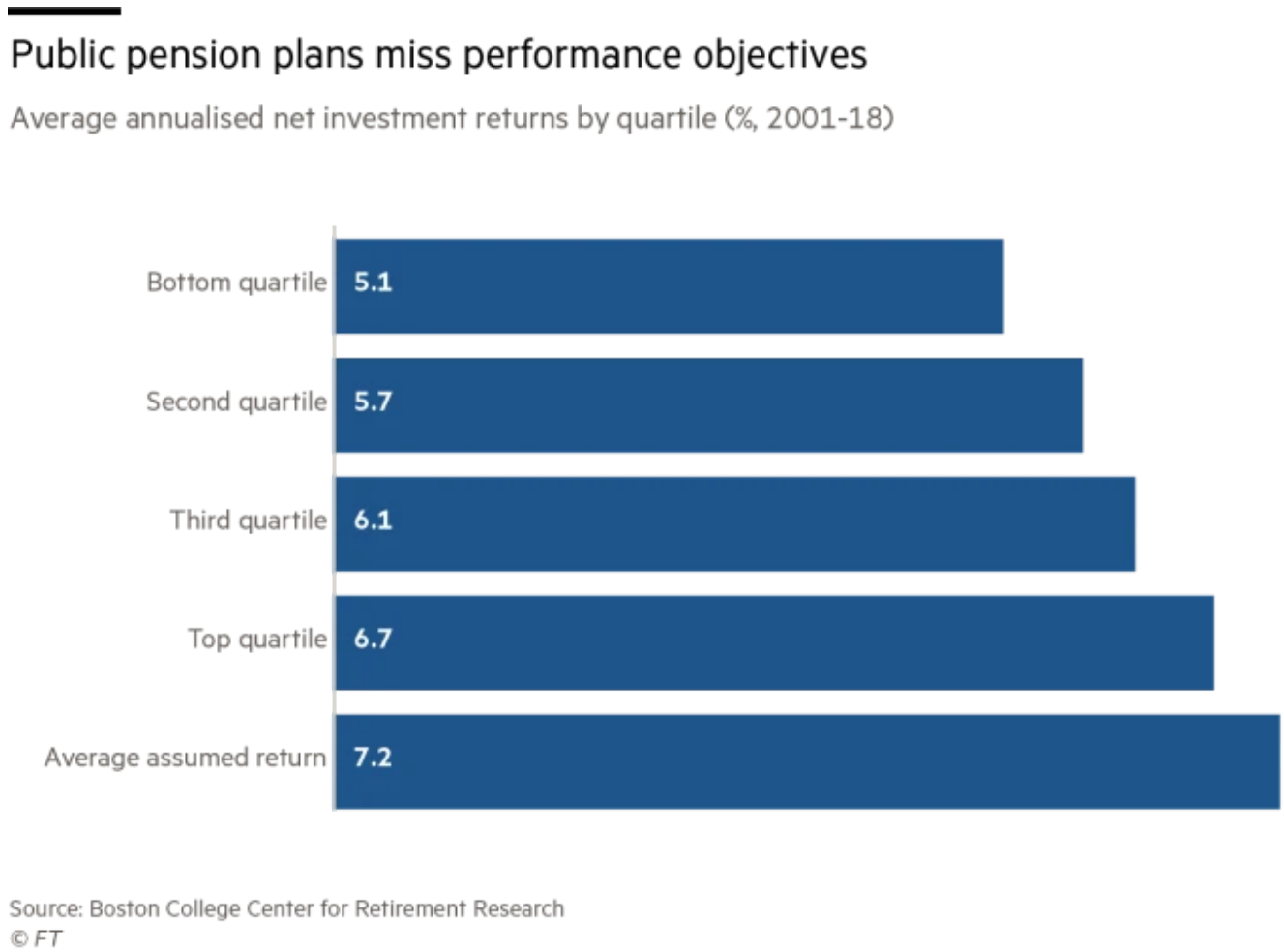
The value of these deals, also known as pension buyouts, reached $27bn in 2018, up more than a fifth on the previous year, according to LIMRA Secure Retirement Institute, a data provider. A further $9.5bn were completed in the first half of 2019.

“We expect high levels of activity to continue in the de-risking market,” says Mr Love.

Ultra-low rates also present a profound challenge to the health of the US public pension system which oversees more than $4tn in assets on behalf of 20m active and retired public sector workers.

Public pension plans use an assumed return based on their historic performance to calculate their future liabilities, instead of the discount rate used by corporate defined benefit plans.

Public pension plans have gradually reduced their assumed return from 8 per cent in 2001 to 7.2 per cent but they have consistently underperformed this objective, according to the Center for Retirement Research at Boston College.



The average annualised return for US public pension plans since 2001 was just 5.9 per cent. The top quartile of performers delivered 6.7 per cent over that period while the bottom quartile underperformed with an average annualised return of just 5.1 per cent.

“As the period of underperformance nears 20 years, pressure has increased for public pension plans to use assumed returns that are better aligned with the reduced expectations for future market performance,” says Jean-Pierre Aubry, assistant director of state and local research at the CRR.

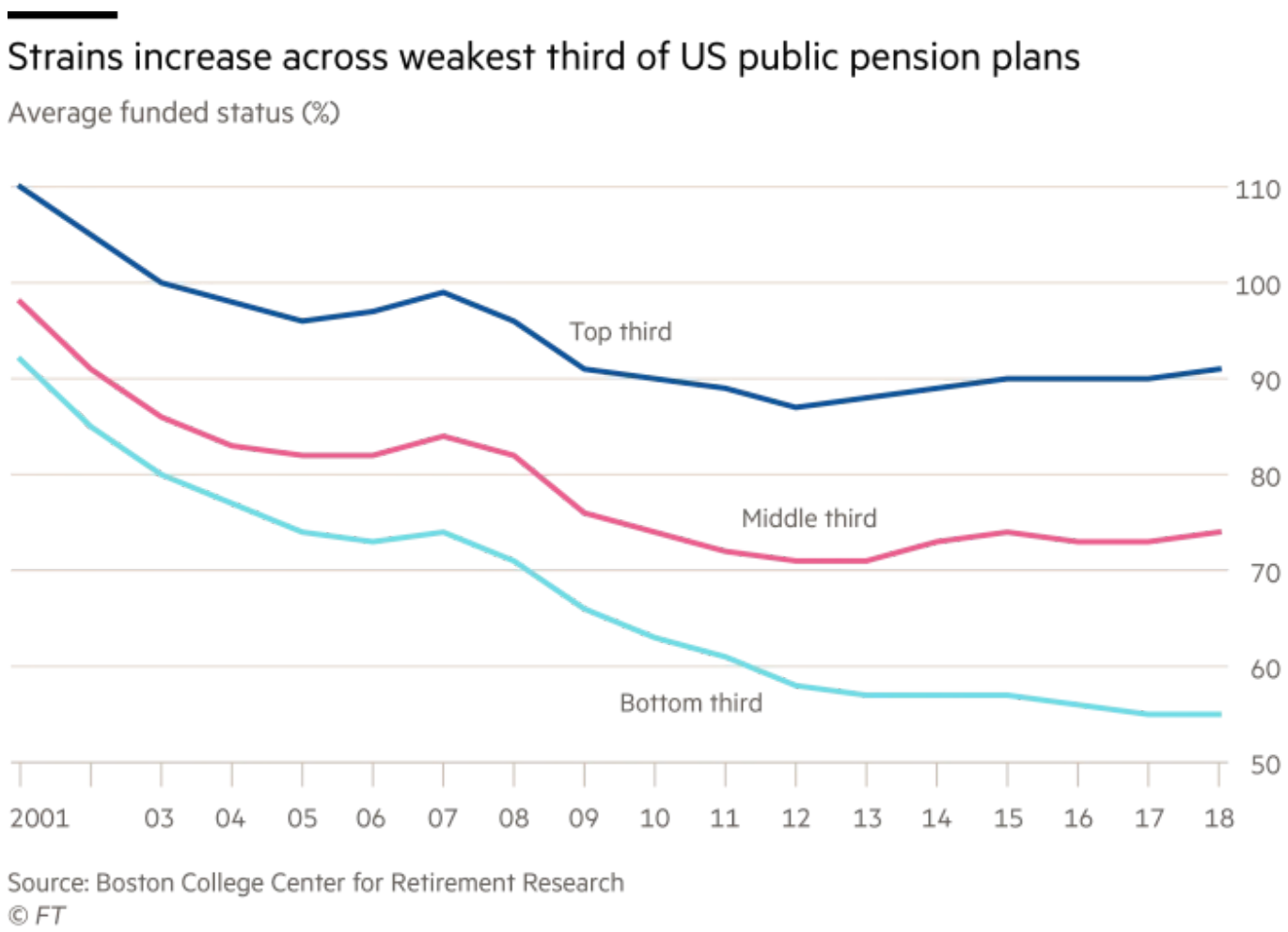
That pressure appears likely to increase given the subdued outlook for fixed income returns and the reduction in the discount rate which has already occurred across the US corporate defined benefit sector.

The failure to meet return expectations contributed to a clear deterioration in the aggregate funded ratio (assets as a share of liabilities) for US state and local pension plans which has sunk from a high of 102.7 per cent in 2000 to 72.8 per cent last year.

Although state and local governments have increased their cash contributions over the past decade to help plug the gap, the public pension system still faced a deficit of around $1.4tn in 2018.

The aggregate data obscures funding developments among individual state pension plans. Boston College split public pension funds into three groups based on how well they were funded.

The top third saw their funding ratio drop from 110 per cent in 2001 to 91 per cent last year. But the deterioration was much more significant for the weakest third which saw their average funded ratio sink from 92 per cent to just 55 per cent over the same period, suggesting the gap between the top and bottom has doubled.



“Much of the divergence has occurred since the financial crisis as the worst funded group has continued to deteriorate,” says Mr Aubry.

A study by economists at the Federal Reserve of Boston published in July found public pension funds tended to take on more risk when their funding ratios were weak and interest rates were low between 2002 and 2016.

“Public pension funds from states in worse fiscal condition (measured by higher debt levels or weaker credit ratings) took on more risk, especially during periods of low interest rates,” said the Boston Fed.

US interest rates have declined since 2016, suggesting that pension funds with weak funding ratios will have further increased their exposures to risky assets.

One explanation is that these public pension funds are “reaching for yield” and investing more in riskier assets such as private equity, hedge funds and real estate to drive up returns.

Another less innocent explanation highlighted by the Boston Fed is that public pension funds are attempting to mask the true extent of their underfunding by increasing their holdings of riskier assets. Holding riskier assets with higher expected returns allows public pension plans to reduce the reported value of their liabilities under US accounting rules. It also means that there is less pressure on state and local governments to increase their contribution to close funding gaps.

The Boston Fed says that the benefits promised to workers by public pension funds are nearly risk-free because they enjoy strong legal protections and so these liabilities should be valued using a much lower discount rate than the assumed return.

This, however, could force states to increase taxes or to cut pension benefits, exposing public sector employees to the same problems as workers at GE.

A health check for the US pension market

The US is the world’s largest pension market with assets of $27.5tn but it ranks as the 16th healthiest retirement system globally from 37 nations reviewed annually by the Melbourne Mercer Global Pension Index, the most comprehensive assessment of its kind.

Issues the index measures include the generosity of retirement benefits compared with average wages and whether pensions payments are adjusted regularly to reflect changes in inflation and living standards.

It also examines the sustainability of pension systems and whether they hold enough assets to continue to pay pensions given the challenges of increasing longevity, a measure that the US scores relatively well on.

“There has been an improvement in the overall health of the US pension since 2015, the year of the first MMGPI assessment,” says Peter Stewart, a principal with Mercer in New York.

Further improvements that could be made include raising the state pension age, increasing the minimum pension paid to low-income pensioners, boosting the level of mandatory savings contributions, limiting the access to savings pots before retirement and providing incentives to delay retirement.

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MARKETS

Public Pension Plans Continue to Shift Into U.S. Stocks

47% of plans' assets were in U.S. stocks in third quarter, the most since 2007

Workers at the Governor Hill Fish Hatchery in Augusta belong to the Maine Public Employees Retirement System, one of many state and local government pension funds around the U.S. **PHOTO:** YOON S. BYUN FOR THE WALL STREET JOURNAL

By Heather Gillers

Nov. 5, 2019 7:00 am ET

As the bull market enters its 11th year, state and local pension plans are piling on risk, as they try to make up shortfalls.

Public plans had a median 47.3% of their assets in U.S. equities at the end of the third quarter, according to database Wilshire Trust Universe Comparison Service. That is more than they have had since 2007 and up from 44.1% a year earlier.

Taking on more exposure to stocks is a riskier bet, especially as global economic growth is slowing and talk of a potential recession has grown louder. Those risks can translate to

consequences in a decline: Big hits to pension funds' stock portfolios during the financial crisis were followed by a wave of benefit cuts for government workers hired since then.

Retirement systems that manage money for firefighters, police officers, teachers and other public workers are banking on market returns of 7% or more to help cover shortfalls. State and local pension plans have about $4.4 trillion in assets, according to the Federal Reserve, $4.2 trillion less than the value of promised future benefits.

"They are looking for risk and finding it in the equity market, and historically they have been benefiting from that," said Robert J. Waid, managing director at Wilshire Associates. "The concern is going to be when and if that changes."

Many plans have also added new kinds of risk since the crisis. Alternative investments such as private equity made up a median 5.6% of public plan portfolios at the end of the third quarter, the most since Wilshire TUCS began collecting the data. Some plans have also shifted money out of more conservative investments such as bonds.

Total equity allocations, including international stocks, have risen as high as 59.4% in the past decade, according to the data, and stood at 57.4% of assets as of the end of the third quarter.

Pension-fund returns can have profound impacts on a city or state because when returns fall short, the amount the government must contribute increases, potentially diverting money from other public services.

SHARE YOUR THOUGHTS

What do you think pension funds should do about their shortfalls? Join the conversation below.

Keith Brainard, research director of the National Association of State Retirement Administrators, said public pension funds base their decisions about how to allocate on a variety of factors including a very long-term investment horizon. As equity allocations have grown, he said, "The question in the mind of some might be, 'Oh, shouldn't you pare that back?' And the response from a professional investor might be, 'No, we're looking at the next 20 or 30 years, and my models are telling me we should keep going with it.'"

The decadelong bull market has buoyed the holdings of public pensions, whose median returns averaged 8.57% a year for the 10 years ending in the third quarter, according to Wilshire TUCS.

These retirement funds still face significant shortfalls because many pension funds have relied on overly optimistic investment-return targets that kept annual contributions low.

Meanwhile, some state and local governments facing budget pressure repeatedly decided not to make the full contributions recommended by their actuaries. Courts have also blocked some government efforts to reduce benefits for existing workers.

The $25.3 billion Teachers' Retirement System of Alabama has spent the past decade with much of its investments in the stock market. It now has on hand nearly 72% of the assets it needs to cover future benefits.

As of Sept. 30, the fund has 50.33% of holdings in its domestic equity portfolio, up from 45.9% in 2007, though the fund now groups some private investments under domestic equity that it didn't in 2007, said Chief Investment Officer Marc Green. He said cash holdings now amount to about 8%, compared with 3.5% in 2007, insulating the fund from the risk of having to liquidate stocks at unappealing prices.

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"We have money sitting on the sidelines not exposed to risk assets," Mr. Green said.

Pension funds are also being somewhat more conservative than before the crisis when anticipating what they expect to earn on their investments. Major public plans projected average long-term investment returns of 7.2% a year in 2018, compared with 7.9% in 2007. If governments are able to meet their projections, public pension assets on hand will be enough to cover roughly 73% of promised future benefits, according to a study by the Center for Retirement Research at Boston College.

Write to Heather Gillers at heather.gillers@wsj.com

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