

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

DATE: Thursday, February 28, 2019
TIME: 8:30 a.m.
PLACE: Human Resource Conference Room, 3rd floor East
City Hall, 255 West Alameda
Tucson, Arizona 85701

A. Consent Agenda

1. Retirement Ratifications for February 2019
2. January 2019 TSRS Budget Vs. Actual Expenses
3. January 2019 Board Meeting Minutes ^{Note 1}
4. TSRS January Investment Measurement Service Monthly Review

B. Call to Audience

C. Investment Activity Report

1. TSRS Quarterly Performance Review for 12/30/18 – Callan LLC
2. Introduction to Asset/Liability Study Considerations

D. Administrative Discussions

1. TSRS FY 2020 Budget Discussion
2. TSRS Rules and Regulations – Investment Policy Statement
3. Board Member Term Limits
4. Addition of Elected Retiree Board Member
5. Update on TSRS Internal Audit
6. Consideration for TSRS to Hire External Legal Counsel

E. Articles & Readings for Board Member Education / Discussion

1. The Epic Clash Between Bonds and Stocks is Coming Back
2. LDI Strategies and Preparing DB Plans for Recessions
3. These 10 Emerging Markets Will Dominate the Global Economy In the Next Decade

F. Future Agenda Items

1. TSRS Rules and Regulations

G. Adjournment

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

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

Service & Disability Retirements, End of Service Entrants for TSRS Board of Trustees Ratification

01/11/18 - 02/10/19 - February 2019

Name of Applicant	Department	Type	Effective Date	Date of Birth	Age	Credited Service	Present Value	Member's Accumulated Contributions	AFC	Option	Pension
Nancy L McKay Hills	Police	Normal Retirement	1/12/2019	9/6/1964	54.35	25.7967	515,402.45	148,249.16	6,063.58	Single Life	3,519.47
Adam Smith	General Services	Normal Retirement	1/12/2019	7/5/1956	62.52	20.0236	242,039.98	80,407.90	4,312.71	J&S 100	1,578.72
Larry Lancaster	Police	Normal Retirement	1/24/2019	1/19/1955	64.01	17.5154 **		45,718.30	3,225.19	Single Life	1,271.04
Phyllis L Gasparro	Police	Normal Retirement	2/2/2019	2/1/1964	55.00	30.8225 **		250,823.23	6,605.48	Single Life	4,580.94
Lisa A Cortese	Parks & Recreation	Normal Retirement	2/2/2019	12/14/1961	57.13	22.8978 **		76,077.44	3,476.54	Single Life	1,791.12
Marlin T Price III	Water	Normal Retirement	2/2/2019	3/12/1963	55.89	34.6580 **		202,829.39	5,113.05	J&S 50	3,859.63
David E Verner	Water	Deferred Retirement	2/6/2019	2/6/1957	62.00	16.7066	155,264.51	101,071.90	3,256.12	J&S 100	1,041.13
Kari J Price	General Services	Early Retirement	2/9/2019	10/25/1963	55.29	22.5869 **		73,343.67	3,500.51	Single Life	1,552.48
Stacy Stauffer	City Attorney	Normal Retirement	2/9/2019	3/21/1966	52.88	27.1434 **		231,360.81	7,004.46	Single Life	4,277.80
									<u>42,557.64</u>		<u>23,472.33</u>
Source Material: GRS/Payroll					Averages	57.68	24.24	304,235.65	134,431.31	4,728.63	2,608.04

** Present value not available as first payment was made based on an estimate

Report ID : FIN-COT-BA-0001

Run Date : 02/19/2019

Run Time : 09:43 AM

City of Tucson
Budget vs Actual Expenses
Through: January, 2019
For Fiscal Year 2019

Parameter Page

Parameters and Prompts

Fiscal Year	2019
Accounting Period	7
Fund	072
Department	*
Unit	*
Object Code	*

Report Description

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

City of Tucson
Budget vs Actual Expenses
Through: January, 2019
For Fiscal Year 2019

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

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
105 - PAYROLL PENSION	0.00	5,653,907.91	5,653,907.91	0.00	39,408,254.59	39,408,254.59	72,000,000	32,591,745.41	45.27 %
Total for 100 - PAYROLL CHGS	0.00	5,653,907.91	5,653,907.91	0.00	39,408,254.59	39,408,254.59	72,000,000	32,591,745.41	45.27 %
Total for Unit 9001 - Normal Retiree Benefit	0.00	5,653,907.91	5,653,907.91	0.00	39,408,254.59	39,408,254.59	72,000,000	32,591,745.41	45.27 %

City of Tucson
Budget vs Actual Expenses
Through: January, 2019
For Fiscal Year 2019

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

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
105 - PAYROLL PENSION	0.00	358,702.04	358,702.04	0.00	2,511,598.44	2,511,598.44	3,900,000	1,388,401.56	35.60 %
Total for 100 - PAYROLL CHGS	0.00	358,702.04	358,702.04	0.00	2,511,598.44	2,511,598.44	3,900,000	1,388,401.56	35.60 %
Total for Unit 9003 - Normal Retiree Beneficiary Benefit	0.00	358,702.04	358,702.04	0.00	2,511,598.44	2,511,598.44	3,900,000	1,388,401.56	35.60 %

City of Tucson
Budget vs Actual Expenses
Through: January, 2019
For Fiscal Year 2019

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

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
105 - PAYROLL PENSION	0.00	164,647.30	164,647.30	0.00	1,165,542.42	1,165,542.42	2,100,000	934,457.58	44.50 %
Total for 100 - PAYROLL CHGS	0.00	164,647.30	164,647.30	0.00	1,165,542.42	1,165,542.42	2,100,000	934,457.58	44.50 %
Total for Unit 9020 - Disability Retiree Benefit	0.00	164,647.30	164,647.30	0.00	1,165,542.42	1,165,542.42	2,100,000	934,457.58	44.50 %

City of Tucson
Budget vs Actual Expenses
Through: January, 2019
For Fiscal Year 2019

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

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
101 - SALARIES & WAGES FOR PERMANENT EMPLOYEES	0.00	95,662.60	95,662.60	0.00	221,276.79	221,276.79	276,420	55,143.21	19.95 %
102 - EXTRA TIME	0.00	0.00	0.00	0.00	2.17	2.17	0	(2.17)	0.00%
103 - OVERTIME WAGES	0.00	0.00	0.00	0.00	125.62	125.62	0	(125.62)	0.00%
105 - PAYROLL PENSION	0.00	0.00	0.00	0.00	3,971.22	3,971.22	0	(3,971.22)	0.00%
108 - DOWNTOWN ALLOWANCE & DISCOUNTED TRANSIT PASSES	0.00	40.39	40.39	0.00	628.93	628.93	2,310	1,681.07	72.77 %
113 - TSRS PENSION CONTRIBUTION	0.00	(44.00)	(44.00)	0.00	34,433.52	34,433.52	76,010	41,576.48	54.70 %
114 - FICA (SOCIAL SECURITY)	0.00	(72.23)	(72.23)	0.00	9,856.70	9,856.70	20,090	10,233.30	50.94 %
115 - WORKERS COMPENSATION INSURANCE	0.00	(157.81)	(157.81)	0.00	666.26	666.26	4,500	3,833.74	85.19 %
116 - GROUP PLAN INSURANCE	0.00	(1,547.94)	(1,547.94)	0.00	13,975.41	13,975.41	27,000	13,024.59	48.24 %
117 - STATE UNEMPLOYMENT	0.00	8.67	8.67	0.00	156.08	156.08	380	223.92	58.93 %
125 - ONE-TIME DISTRIBUTION	0.00	(750.00)	(750.00)	0.00	5,250.00	5,250.00	0	(5,250.00)	0.00%
196 - INTERDEPARTMENTAL LABOR	0.00	8,000.00	8,000.00	0.00	56,000.00	56,000.00	96,000	40,000.00	41.67 %
Total for 100 - PAYROLL CHGS	0.00	101,139.68	101,139.68	0.00	346,342.70	346,342.70	502,710	156,367.30	31.10 %
202 - TRAVEL	0.00	681.54	681.54	0.00	6,105.13	6,105.13	4,000	(2,105.13)	-52.63 %
204 - TRAINING	0.00	453.06	453.06	0.00	575.06	575.06	14,000	13,424.94	95.89 %
205 - PARKING SERVICE	0.00	47.00	47.00	0.00	271.00	271.00	500	229.00	45.80 %
212 - CONSULTANTS AND SURVEYS	0.00	141,437.25	141,437.25	0.00	141,437.25	141,437.25	50,000	(91,437.25)	#####
213 - LEGAL	0.00	0.00	0.00	0.00	12,286.50	12,286.50	50,000	37,713.50	75.43 %

City of Tucson
Budget vs Actual Expenses
Through: January, 2019
For Fiscal Year 2019

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

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
215 - AUDITING AND BANK SERVICES	0.00	38,563.53	38,563.53	0.00	40,613.53	40,613.53	60,000	19,386.47	32.31 %
219 - MISCELLANEOUS PROFESSIONAL SERVICES	0.00	(1,132,378.35)	(1,132,378.35)	0.00	75.00	75.00	9,900,000	9,899,925.00	100.00 %
221 - INSUR-PUBLIC LIABILITY	0.00	(182.82)	(182.82)	0.00	1,681.74	1,681.74	31,000	29,318.26	94.58 %
232 - R&M MACHINERY & EQUIPMENT	0.00	0.00	0.00	0.00	0.00	0.00	1,200	1,200.00	100.00 %
234 - COMPUTER HARDWARE MAINTENANCE	0.00	0.00	0.00	0.00	258.35	258.35	0	(258.35)	0.00%
245 - TELEPHONE	0.00	0.00	0.00	0.00	0.00	0.00	1,200	1,200.00	100.00 %
252 - RENTS EQUIPMENT	0.00	0.00	0.00	0.00	303.97	303.97	0	(303.97)	0.00%
260 - COMPUTER SOFTWARE MAINTENANCE AGREEMENTS	0.00	0.00	0.00	0.00	38,000.00	38,000.00	51,000	13,000.00	25.49 %
263 - PUBLIC RELATIONS	0.00	0.00	0.00	0.00	0.00	0.00	2,560	2,560.00	100.00 %
264 - INVESTMENT MGT FEES & COMMISSIONS	0.00	846,771.36	846,771.36	0.00	846,771.36	846,771.36	0	(846,771.36)	0.00%
265 - SECURITIES LENDING (STOCK FEES)	0.00	27,838.87	27,838.87	0.00	27,838.87	27,838.87	0	(27,838.87)	0.00%
277 - CARRIED INTEREST EXPENSE	0.00	136,616.71	136,616.71	0.00	136,616.71	136,616.71	0	(136,616.71)	0.00%
284 - MEMBERSHIPS AND SUBSCRIPTIONS	0.00	0.00	0.00	0.00	0.00	0.00	1,500	1,500.00	100.00 %
Total for 200 - PROF CHARGES	0.00	59,848.15	59,848.15	0.00	1,252,834.47	1,252,834.47	10,166,960	8,914,125.53	87.68 %
311 - OFFICE SUPPLIES	0.00	0.00	0.00	0.00	656.90	656.90	9,000	8,343.10	92.70 %
312 - PRINTING,PHOTOGRAPHY,REPRODUCTION	0.00	6,599.52	6,599.52	0.00	7,685.67	7,685.67	9,000	1,314.33	14.60 %
314 - POSTAGE	0.00	0.00	0.00	0.00	4,176.11	4,176.11	12,000	7,823.89	65.20 %
317 - COMPUTER SOFTWARE < \$100,000	0.00	0.00	0.00	0.00	71.91	71.91	0	(71.91)	0.00%
341 - BOOK, PERIODICALS AND RECORDS	0.00	0.00	0.00	0.00	0.00	0.00	250	250.00	100.00 %

City of Tucson
Budget vs Actual Expenses
Through: January, 2019
For Fiscal Year 2019

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

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
345 - FURNISHINGS, EQUIPMENT AND TOOLS < \$5,000	0.00	0.00	0.00	0.00	0.00	0.00	1,000	1,000.00	100.00 %
346 - COMPUTER EQUIPMENT < \$5,000	0.00	0.00	0.00	0.00	1,764.33	1,764.33	1,000	(764.33)	-76.43 %
359 - NON OFFICE SUPPLIES	0.00	2,445.75	2,445.75	0.00	2,537.88	2,537.88	0	(2,537.88)	0.00%
Total for 300 - SUPPLIES	0.00	9,045.27	9,045.27	0.00	16,892.80	16,892.80	32,250	15,357.20	47.62 %
Total for Unit 9021 - Pension Fund Administration	0.00	170,033.10	170,033.10	0.00	1,616,069.97	1,616,069.97	10,701,920	9,085,850.03	84.90 %

City of Tucson
Budget vs Actual Expenses
Through: January, 2019
For Fiscal Year 2019

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

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
105 - PAYROLL PENSION	0.00	34,734.26	34,734.26	0.00	243,139.82	243,139.82	370,000	126,860.18	34.29 %
Total for 100 - PAYROLL CHGS	0.00	34,734.26	34,734.26	0.00	243,139.82	243,139.82	370,000	126,860.18	34.29 %
Total for Unit 9022 - Disability Retiree Beneficiary Bene	0.00	34,734.26	34,734.26	0.00	243,139.82	243,139.82	370,000	126,860.18	34.29 %

**City of Tucson
Budget vs Actual Expenses
Through: January, 2019
For Fiscal Year 2019**

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

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
186 - TSRS REFUNDS	0.00	49,248.77	49,248.77	0.00	840,136.16	840,136.16	2,736,000	1,895,863.84	69.29 %
Total for 100 - PAYROLL CHGS	0.00	49,248.77	49,248.77	0.00	840,136.16	840,136.16	2,736,000	1,895,863.84	69.29 %
Total for Unit 9023 - ACTIVE MEMBER REFUNDS-CON	0.00	49,248.77	49,248.77	0.00	840,136.16	840,136.16	2,736,000	1,895,863.84	69.29 %

City of Tucson
Budget vs Actual Expenses
Through: January, 2019
For Fiscal Year 2019

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

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
186 - TSRS REFUNDS	0.00	34.08	34.08	0.00	5,442.63	5,442.63	50,000	44,557.37	89.11 %
Total for 100 - PAYROLL CHGS	0.00	34.08	34.08	0.00	5,442.63	5,442.63	50,000	44,557.37	89.11 %
Total for Unit 9025 - INTEREST ON REFUNDS	0.00	34.08	34.08	0.00	5,442.63	5,442.63	50,000	44,557.37	89.11 %

City of Tucson
Budget vs Actual Expenses
Through: January, 2019
For Fiscal Year 2019

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

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
186 - TSRS REFUNDS	0.00	35,873.78	35,873.78	0.00	99,718.05	99,718.05	200,000	100,281.95	50.14 %
Total for 100 - PAYROLL CHGS	0.00	35,873.78	35,873.78	0.00	99,718.05	99,718.05	200,000	100,281.95	50.14 %
Total for Unit 9026 - DWE SYSTEM BENEFIT PAYMENT	0.00	35,873.78	35,873.78	0.00	99,718.05	99,718.05	200,000	100,281.95	50.14 %

**City of Tucson
Budget vs Actual Expenses
Through: January, 2019
For Fiscal Year 2019**

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

Object	Current Period Encumbrance	Current Period Expenditure	Current Total Obligations	YTD Encumbrance	YTD Expenditure	YTD Total Obligations	Current Budgeted Amount	Unobligated Budget Balance	Percent
186 - TSRS REFUNDS	0.00	0.00	0.00	0.00	2,138.47	2,138.47	0	(2,138.47)	0.00%
Total for 100 - PAYROLL CHGS	0.00	0.00	0.00	0.00	2,138.47	2,138.47	0	(2,138.47)	0.00%
Total for Unit 9027 - CREDITABLE SERVICE TRANS(AS	0.00	0.00	0.00	0.00	2,138.47	2,138.47	0	(2,138.47)	0.00%
Total for Fund 072 - TUCSON SUPP RETIREMENT SYS	0.00	6,467,181.24	6,467,181.24	0.00	45,892,040.55	45,892,040.55	92,057,920	46,165,879.45	50.15 %
Total for Department 900 - TUCSON SUPPL RETIREME	0.00	6,467,181.24	6,467,181.24	0.00	45,892,040.55	45,892,040.55	92,057,920	46,165,879.45	50.15 %
Grand Totals	0.00	6,467,181.24	6,467,181.24	0.00	45,892,040.55	45,892,040.55	92,057,920	46,165,879.45	50.15 %

January 31, 2019



Tucson Supplemental Retirement System

**Investment Measurement Service
Monthly Review**

Information contained herein includes confidential, trade secret and proprietary information. Neither this Report nor any specific information contained herein is to be used other than by the intended recipient for its intended purpose or disseminated to any other person without Callan's permission. Certain information herein has been compiled by Callan and is based on information provided by a variety of sources believed to be reliable for which Callan has not necessarily verified the accuracy or completeness of or updated. This content may consist of statements of opinion, which are made as of the date they are expressed and are not statements of fact. This content is for informational purposes only and should not be construed as legal or tax advice on any matter. Any decision you make on the basis of this content is your sole responsibility. You should consult with legal and tax advisers before applying any of this information to your particular situation. Past performance is no guarantee of future results. For further information, please see Appendix for Important Information and Disclosures.

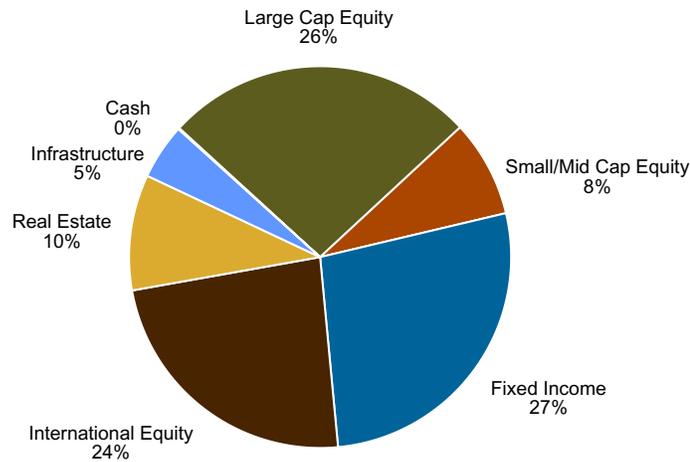
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January 31, 2019

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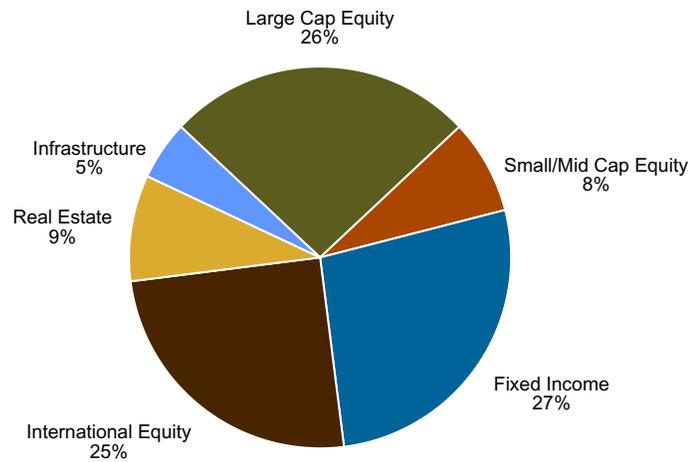
Actual vs Target Asset Allocation

The first chart below shows the Fund's asset allocation as of January 31, 2019. The second chart shows the Fund's target asset allocation as outlined in the investment policy statement.

Actual Asset Allocation



Target Asset Allocation



Asset Class	\$000s Actual	Percent Actual	Percent Target	Percent Difference	\$000s Difference
Large Cap Equity	211,130	26.3%	26.0%	0.3%	2,568
Small/Mid Cap Equity	65,990	8.2%	8.0%	0.2%	1,817
Fixed Income	218,095	27.2%	27.0%	0.2%	1,511
International Equity	189,905	23.7%	25.0%	(1.3%)	(10,635)
Real Estate	78,621	9.8%	9.0%	0.8%	6,426
Infrastructure	37,731	4.7%	5.0%	(0.3%)	(2,377)
Cash	690	0.1%	0.0%	0.1%	690
Total	802,161	100.0%	100.0%		

*Current Month Target Performance is calculated using monthly rebalancing.

Investment Manager Asset Allocation

The table below contrasts the distribution of assets across the Fund's investment managers as of January 31, 2019, with the distribution as of December 31, 2018. 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

	January 31, 2019		Net New Inv.	Inv. Return	December 31, 2018	
	Market Value	Weight			Market Value	Weight
Domestic Equity	\$277,119,518	34.55%	\$(5,640)	\$23,526,895	\$253,598,264	33.29%
Large Cap Equity	\$211,129,979	26.32%	\$(8,403)	\$16,931,360	\$194,207,023	25.50%
Alliance S&P Index	64,188,895	8.00%	(3,452)	4,756,091	59,436,256	7.80%
PIMCO StocksPLUS	30,955,783	3.86%	0	2,418,276	28,537,507	3.75%
BlackRock Russell 1000 Value	56,984,834	7.10%	(5,949)	4,117,232	52,873,550	6.94%
T. Rowe Price Large Cap Growth	59,000,468	7.36%	998	5,639,780	53,359,690	7.01%
Small/Mid Cap Equity	\$65,989,539	8.23%	\$2,763	\$6,595,535	\$59,391,241	7.80%
Champlain Mid Cap	33,218,176	4.14%	691	3,118,346	30,099,140	3.95%
Pyramis Small Cap	32,771,362	4.09%	2,072	3,477,189	29,292,101	3.85%
International Equity	\$189,904,775	23.67%	\$0	\$13,018,607	\$176,886,167	23.22%
Causeway International Opps (2)	75,470,800	9.41%	0	5,547,600	69,923,200	9.18%
Aberdeen EAFE Plus	77,436,100	9.65%	0	4,178,248	73,257,853	9.62%
American Century Non-US SC (1)	36,997,874	4.61%	0	3,292,760	33,705,114	4.43%
Fixed Income	\$218,094,679	27.19%	\$(14,269)	\$4,305,353	\$213,803,595	28.07%
BlackRock U.S. Debt Fund	106,374,334	13.26%	(14,269)	1,140,572	105,248,032	13.82%
PIMCO Fixed Income	111,720,344	13.93%	0	3,164,781	108,555,563	14.25%
Real Estate	\$78,620,719	9.80%	\$0	\$7,471	\$78,613,249	10.32%
JPM Strategic Property Fund	52,732,786	6.57%	0	7,471	52,725,315	6.92%
JPM Income and Growth Fund	25,887,933	3.23%	0	0	25,887,933	3.40%
Infrastructure	\$37,731,184	4.70%	\$0	\$39,096	\$37,692,088	4.95%
Macquarie European	9,810,528	1.22%	0	39,096	9,771,432	1.28%
SteelRiver Infrastructure	27,920,656	3.48%	0	0	27,920,656	3.67%
Total Cash	\$689,978	0.09%	\$(408,092)	\$1,990	\$1,096,081	0.14%
Cash	689,978	0.09%	(408,092)	1,990	1,096,081	0.14%
Total Fund	\$802,160,854	100.0%	\$(428,002)	\$40,899,411	\$761,689,444	100.0%

(2) Client transitioned from Causeway International Value to International Opportunities in May 2016.

Investment Manager Returns

The table below details the rates of return for the fund's investment managers over various time periods ended January 31, 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 January 31, 2019

	Last Month	Last 3 Months	Last 12 Months	Last 36 Months	Last 60 Months
Gross of Fees					
Domestic Equity	9.28%	1.75%	0.32%	16.25%	11.51%
Total Domestic Equity Target (1)	8.85%	0.49%	(2.34%)	14.13%	10.33%
Large Cap Equity	8.72%	1.35%	(0.97%)	15.73%	11.42%
S&P 500 Index	8.01%	0.26%	(2.31%)	14.02%	10.96%
Alliance S&P Index	8.00%	0.30%	(2.27%)	13.94%	10.92%
S&P 500 Index	8.01%	0.26%	(2.31%)	14.02%	10.96%
PIMCO StocksPLUS	8.47%	(0.11%)	(3.09%)	14.45%	11.00%
S&P 500 Index	8.01%	0.26%	(2.31%)	14.02%	10.96%
BlackRock Russell 1000 Value	7.79%	0.41%	(4.68%)	11.63%	8.41%
Russell 1000 Value Index	7.78%	0.34%	(4.81%)	11.62%	8.33%
T. Rowe Price Large Cap Growth	10.57%	4.47%	5.45%	22.46%	15.11%
Russell 1000 Growth Index	8.99%	0.68%	0.24%	16.60%	12.97%
Small/Mid Cap Equity	11.11%	3.05%	4.74%	18.02%	11.81%
Russell 2500 Index	11.51%	1.17%	(2.61%)	14.42%	7.96%
Champlain Mid Cap	10.36%	5.24%	10.40%	21.73%	14.42%
Russell MidCap Index	10.79%	2.25%	(2.90%)	13.29%	8.89%
Pyramis Small Cap	11.87%	0.53%	(1.38%)	13.98%	8.94%
Russell 2000 Index	11.25%	(0.41%)	(3.52%)	14.71%	7.26%
International Equity	7.36%	1.99%	(15.32%)	9.23%	2.62%
Total International Equity Target (2)	7.59%	3.46%	(13.04%)	9.45%	3.03%
Causeway International Opps (5)	7.93%	0.88%	(16.05%)	8.39%	2.72%
MSCI ACWI ex US	7.56%	3.66%	(12.58%)	9.59%	3.11%
Aberdeen EAFE Plus	5.70%	3.85%	(12.75%)	9.74%	2.10%
MSCI ACWI x US (Net)	7.56%	3.66%	(12.58%)	9.59%	3.11%
American Century Non-US SC (3)	9.85%	0.62%	(18.15%)	-	-
MSCI ACWI ex US Small Cap	7.83%	2.22%	(15.93%)	9.33%	3.91%
Fixed Income	2.01%	3.62%	2.55%	4.97%	3.98%
Bimbg Aggregate Index	1.06%	3.53%	2.25%	1.95%	2.44%
BlackRock U.S. Debt Fund	1.08%	3.56%	2.35%	2.04%	2.56%
Bimbg Aggregate Index	1.06%	3.53%	2.25%	1.95%	2.44%
PIMCO Fixed Income	2.92%	3.68%	2.74%	7.10%	5.01%
Custom Index (4)	3.07%	4.12%	1.46%	4.59%	4.04%

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

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

(3) The American Century Non-US Small Cap strategy was funded May 2016.

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

(5) Client transitioned from Causeway International Value to International Opportunities in May 2016.

Investment Manager Returns

The table below details the rates of return for the fund's investment managers over various time periods ended January 31, 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 January 31, 2019

	Last Month	Last 3 Months	Last 12 Months	Last 36 Months	Last 60 Months
Gross of Fees					
Real Estate	0.01%	0.77%	6.81%	7.45%	9.65%
NFI-ODCE Value Weight Gr*	0.58%	1.76%	8.19%	8.19%	10.36%
JPM Strategic Property Fund	0.01%	0.88%	6.86%	7.47%	9.69%
JPM Income and Growth Fund**	0.00%	0.56%	6.70%	7.44%	9.75%
NFI-ODCE Value Weight Gr*	0.58%	1.76%	8.19%	8.19%	10.36%
Infrastructure	0.10%	5.44%	8.34%	16.75%	12.16%
CPI + 4%	0.46%	0.24%	5.33%	5.99%	5.28%
Macquarie European Infrastructure Fund	0.40%	5.12%	10.12%	29.65%	15.64%
SteelRiver Infrastructure North Amer.**	0.00%	5.55%	7.76%	8.03%	11.02%
CPI + 4%	0.46%	0.24%	5.33%	5.99%	5.28%
Total Fund	5.37%	2.38%	(2.32%)	10.80%	7.80%
Total Fund Target	5.27%	2.33%	(2.35%)	8.82%	6.69%

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

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

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

Investment Manager Returns

The table below details the rates of return for the fund's investment managers over various time periods ended January 31, 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 January 31, 2019

	Last Month	Last 3 Months	Last 12 Months	Last 36 Months	Last 60 Months
Net of Fees					
Domestic Equity	9.27%	1.74%	0.07%	15.92%	11.20%
Total Domestic Equity Target (1)	8.85%	0.49%	(2.34%)	14.13%	10.33%
Large Cap Equity	8.72%	1.34%	(1.09%)	15.57%	11.27%
S&P 500 Index	8.01%	0.26%	(2.31%)	14.02%	10.96%
Alliance S&P Index	8.00%	0.28%	(2.30%)	13.90%	10.88%
S&P 500 Index	8.01%	0.26%	(2.31%)	14.02%	10.96%
PIMCO StocksPLUS	8.47%	(0.11%)	(3.09%)	14.45%	11.00%
S&P 500 Index	8.01%	0.26%	(2.31%)	14.02%	10.96%
BlackRock Russell 1000 Value	7.78%	0.40%	(4.72%)	11.59%	8.37%
Russell 1000 Value Index	7.78%	0.34%	(4.81%)	11.62%	8.33%
T. Rowe Price Large Cap Growth	10.57%	4.47%	5.04%	21.94%	14.62%
Russell 1000 Growth Index	8.99%	0.68%	0.24%	16.60%	12.97%
Small/Mid Cap Equity	11.11%	3.05%	4.05%	17.13%	10.96%
Russell 2500 Index	11.51%	1.17%	(2.61%)	14.42%	7.96%
Champlain Mid Cap	10.36%	5.24%	9.63%	20.77%	13.48%
Russell MidCap Index	10.79%	2.25%	(2.90%)	13.29%	8.89%
Pyramis Small Cap	11.87%	0.53%	(2.00%)	13.16%	8.20%
Russell 2000 Index	11.25%	(0.41%)	(3.52%)	14.71%	7.26%
International Equity	7.36%	1.90%	(15.65%)	8.76%	2.07%
Total International Equity Target (2)	7.59%	3.46%	(13.04%)	9.45%	3.03%
Causeway International Opps (5)	7.93%	0.88%	(16.33%)	7.97%	2.22%
MSCI ACWI ex US	7.56%	3.66%	(12.58%)	9.59%	3.11%
Aberdeen EAFE Plus	5.70%	3.67%	(13.25%)	9.06%	1.39%
MSCI ACWI x US (Net)	7.56%	3.66%	(12.58%)	9.59%	3.11%
American Century Non-US SC (3)	9.77%	0.39%	(18.99%)	-	-
MSCI ACWI ex US Small Cap	7.83%	2.22%	(15.93%)	9.33%	3.91%
Fixed Income	2.01%	3.62%	2.33%	4.70%	3.68%
Bimbg Aggregate Index	1.06%	3.53%	2.25%	1.95%	2.44%
BlackRock U.S. Debt Fund	1.08%	3.56%	2.32%	1.99%	2.51%
Bimbg Aggregate Index	1.06%	3.53%	2.25%	1.95%	2.44%
PIMCO Fixed Income	2.92%	3.68%	2.35%	6.63%	4.53%
Custom Index (4)	3.07%	4.12%	1.46%	4.59%	4.04%

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

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

(3) The American Century Non-US Small Cap strategy was funded May 2016.

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

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Investment Manager Returns

The table below details the rates of return for the fund's investment managers over various time periods ended January 31, 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 January 31, 2019

	Last Month	Last 3 Months	Last 12 Months	Last 36 Months	Last 60 Months
Net of Fees					
Real Estate	0.01%	0.68%	5.86%	6.44%	8.56%
NFI-ODCE Value Weight Gr*	0.58%	1.76%	8.19%	8.19%	10.36%
JPM Strategic Property Fund	0.01%	0.88%	6.00%	6.48%	8.66%
JPM Income and Growth Fund**	0.00%	0.30%	5.59%	6.36%	8.48%
NFI-ODCE Value Weight Gr*	0.58%	1.76%	8.19%	8.19%	10.36%
Infrastructure	0.10%	5.05%	7.08%	12.31%	9.14%
CPI + 4%	0.46%	0.24%	5.33%	5.99%	5.28%
Macquarie European Infrastructure Fund	0.40%	4.10%	6.22%	18.84%	9.40%
SteelRiver Infrastructure North Amer.**	0.00%	5.39%	7.43%	7.56%	10.18%
CPI + 4%	0.46%	0.24%	5.33%	5.99%	5.28%
Total Fund	5.32%	2.28%	(2.73%)	10.14%	7.22%
Total Fund Target	5.27%	2.33%	(2.35%)	8.82%	6.69%

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

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

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

Callan



February 28, 2019

Tucson Supplemental Retirement System

Performance and Asset Allocation

Gordie Weightman, CFA
Senior Vice President

Paul Erlendson
Senior Vice President

Topics of Conversation

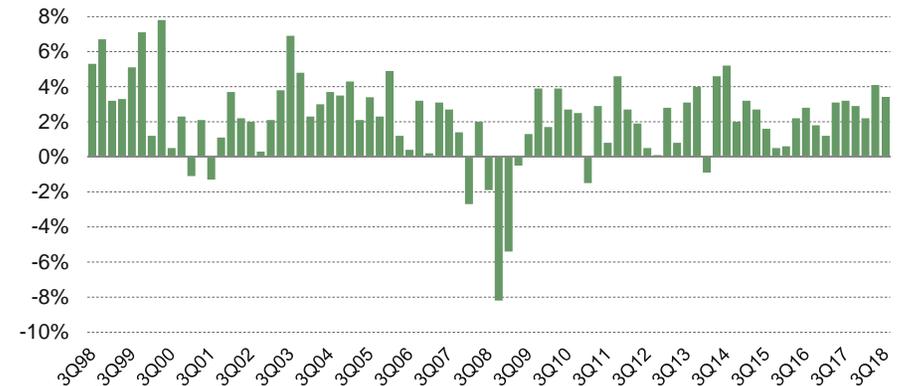
- Recent Capital Market Environment
- TSRS Investment Results
- Capital Market Projections
 - Historical (1989 – 2019)
 - Future (2019 – 2028)
- Observations and Recommendations

U.S. Economy

December 31, 2018

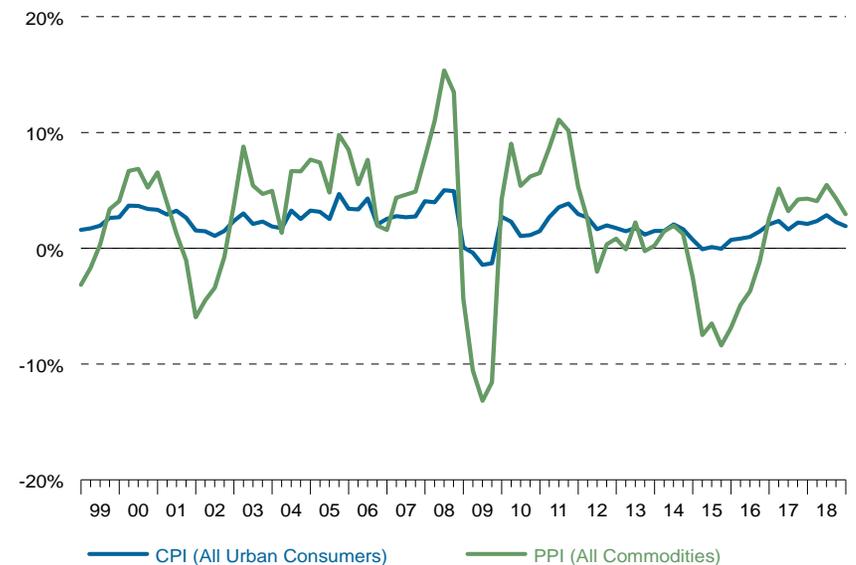
- The final revision of third quarter GDP growth came in at 3.4% (annualized)
 - Down from 4.2% in the second quarter, and revised 10 basis points lower from the first two estimates
 - Consumer spending up 3.5% (annualized); down slightly from a strong 3.8% in Q2
 - As of February 1, Federal Reserve Officials are projecting fourth quarter GDP will come in at 2.5% (annualized)
- Labor market remains strong
 - Unemployment climbed to 4.0% in December; although this was largely due to a rise in the participation rate
 - Approximately 239,000 nonfarm payrolls were added per month during the fourth quarter; 304,000 were added in January
- Modest inflation
 - Headline CPI climbed 1.9% in 2018, while Core CPI was up 2.2% during the year
 - Core PCE in line with Fed's 2% target
- The Fed raised rates, but strikes a more dovish tone looking ahead into 2019
 - A 25 bp hike in December brought the target range to 2.25% to 2.50%
 - The Fed's outlook for 2019 has signaled market participants to expect two rate hikes instead of the previously anticipated three

Quarterly Real GDP Growth (20 Years)



Source: Bureau of Economic Analysis

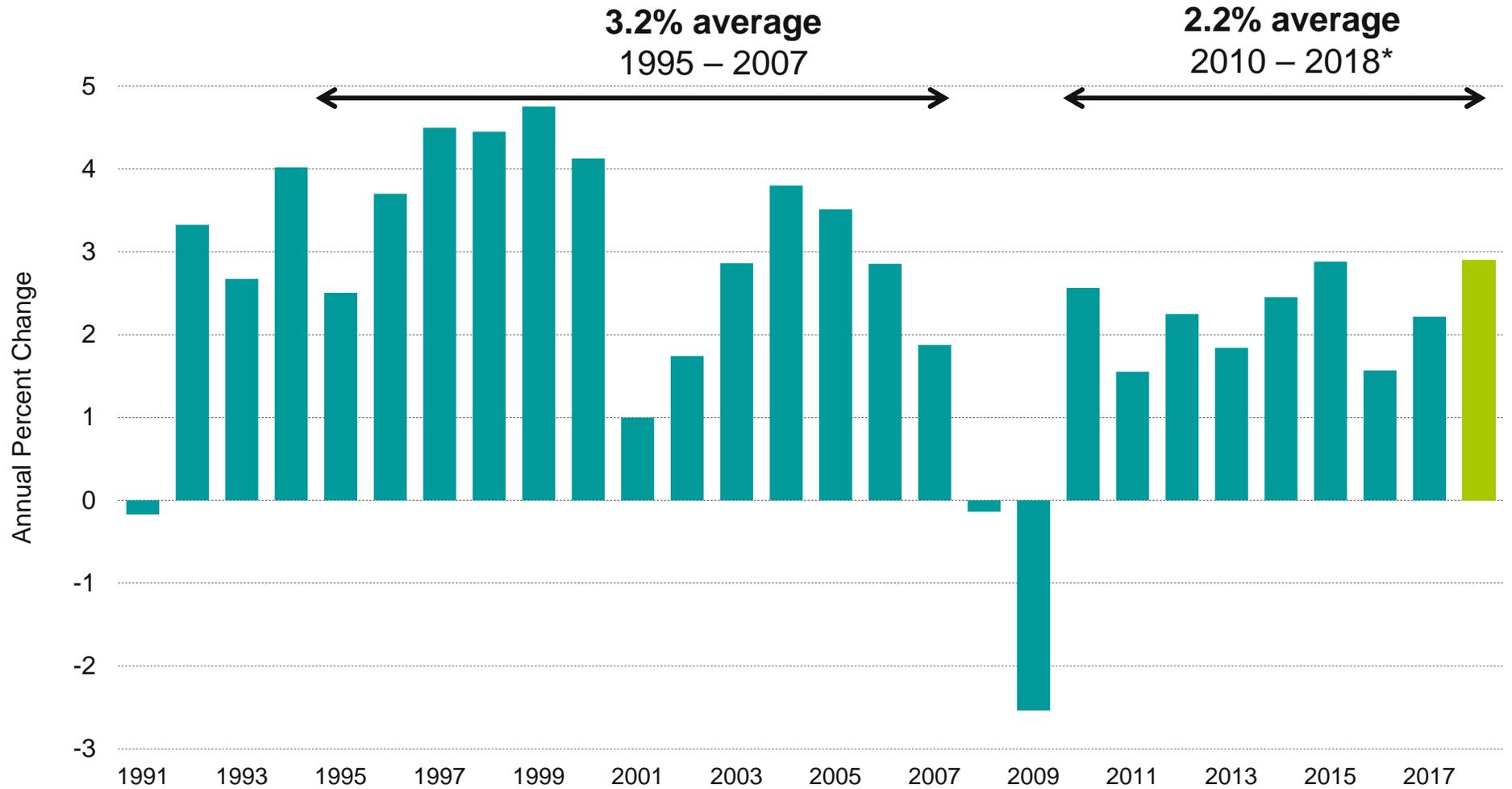
Inflation Year-Over-Year



Source: Bureau of Labor Statistics

U.S GDP Growth on a Slower Trajectory

Real GDP Growth



*2018 Forecast: IHS Markit

Source: IHS Markit

Asset Class Performance

Commodities, cash and developed non-US equity have trailed other asset classes

**Periodic Table of Investment Returns
for Periods Ended December 31, 2018**



	Last Quarter	Last 2 Quarters	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 20 Years
	Blmbg:Aggregate 1.6%	NCREIF:NFI-ODCE Val Wt Nt 3.4%	NCREIF:NFI-ODCE Val Wt Nt 7.4%	MSCI:EM Gross 9.7%	NCREIF:NFI-ODCE Val Wt Nt 9.4%	S&P:500 13.1%	MSCI:EM Gross 8.8%
	NCREIF:NFI-ODCE Val Wt Nt 1.5%	Blmbg:Aggregate 1.7%	3 Month T-Bill 1.9%	S&P:500 9.3%	S&P:500 8.5%	Russell:2000 Index 12.0%	NCREIF:NFI-ODCE Val Wt Nt 7.5%
	3 Month T-Bill 0.6%	3 Month T-Bill 1.1%	Blmbg:Aggregate 0.0%	Russell:2000 Index 7.4%	Russell:2000 Index 4.4%	MSCI:EM Gross 8.4%	Russell:2000 Index 7.4%
	MSCI:EM Gross (7.4%)	S&P:500 (6.9%)	S&P:500 (4.4%)	NCREIF:NFI-ODCE Val Wt Nt 7.3%	Blmbg:Aggregate 2.5%	MSCI:EAFE 6.3%	S&P:500 5.6%
	Blmbg:Commodity Price Idx (10.0%)	MSCI:EM Gross (8.3%)	Russell:2000 Index (11.0%)	MSCI:EAFE 2.9%	MSCI:EM Gross 2.0%	NCREIF:NFI-ODCE Val Wt Nt 6.0%	Blmbg:Aggregate 4.5%
	MSCI:EAFE (12.5%)	MSCI:EAFE (11.4%)	Blmbg:Commodity Price Idx (13.0%)	Blmbg:Aggregate 2.1%	3 Month T-Bill 0.6%	Blmbg:Aggregate 3.5%	MSCI:EAFE 3.5%
	S&P:500 (13.5%)	Blmbg:Commodity Price Idx (12.2%)	MSCI:EAFE (13.8%)	3 Month T-Bill 1.0%	MSCI:EAFE 0.5%	3 Month T-Bill 0.4%	3 Month T-Bill 1.9%
	Russell:2000 Index (20.2%)	Russell:2000 Index (17.3%)	MSCI:EM Gross (14.2%)	Blmbg:Commodity Price Idx (0.8%)	Blmbg:Commodity Price Idx (9.4%)	Blmbg:Commodity Price Idx (4.2%)	Blmbg:Commodity Price Idx (0.1%)

Diversification Is The Key to Risk Control

Annual Returns for Key Indices Ranked in Order of Performance (1999–2018)

1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Non-U.S. Equity 27.92%	Real Estate 13.84%	U.S. Fixed Income 8.43%	Non-U.S. Fixed Income 22.37%	Emerging Market Equity 55.82%	Real Estate 37.96%	Emerging Market Equity 34.00%	Real Estate 42.12%	Emerging Market Equity 39.38%	U.S. Fixed Income 5.24%	Emerging Market Equity 78.51%	Small Cap Equity 26.85%	U.S. Fixed Income 7.84%	Real Estate 27.73%	Small Cap Equity 38.82%	Real Estate 15.02%	Large Cap Equity 1.38%	Small Cap Equity 21.31%	Emerging Market Equity 37.28%	Cash Equivalent 1.87%
Small Cap Equity 21.26%	U.S. Fixed Income 11.63%	High Yield 5.28%	U.S. Fixed Income 10.26%	Small Cap Equity 47.25%	Emerging Market Equity 25.55%	Real Estate 15.35%	Emerging Market Equity 32.17%	Non-U.S. Equity 12.44%	Non-U.S. Fixed Income 4.39%	High Yield 58.21%	Real Estate 19.63%	High Yield 4.98%	Emerging Market Equity 18.23%	Large Cap Equity 32.39%	Large Cap Equity 13.69%	U.S. Fixed Income 0.55%	High Yield 17.13%	Non-U.S. Equity 24.21%	U.S. Fixed Income 0.01%
Large Cap Equity 21.04%	Cash Equivalent 6.18%	Cash Equivalent 4.42%	Real Estate 2.82%	Real Estate 40.69%	Non-U.S. Equity 20.38%	Non-U.S. Equity 14.47%	Non-U.S. Equity 25.71%	Non-U.S. Fixed Income 11.03%	Cash Equivalent 2.06%	Real Estate 37.13%	Emerging Market Equity 18.88%	Non-U.S. Fixed Income 4.36%	Non-U.S. Equity 16.41%	Non-U.S. Equity 21.02%	U.S. Fixed Income 5.97%	Cash Equivalent 0.05%	Large Cap Equity 11.96%	Large Cap Equity 21.83%	High Yield -2.08%
Real Estate 8.87%	Small Cap Equity -3.02%	Small Cap Equity 2.49%	Cash Equivalent 1.78%	Non-U.S. Equity 39.42%	Small Cap Equity 18.33%	Large Cap Equity 4.91%	Small Cap Equity 18.37%	U.S. Fixed Income 6.97%	High Yield -26.16%	Non-U.S. Equity 33.67%	High Yield 15.12%	Large Cap Equity 2.11%	Small Cap Equity 16.35%	High Yield 7.44%	Small Cap Equity 4.89%	Real Estate -0.79%	Emerging Market Equity 11.19%	Small Cap Equity 14.65%	Non-U.S. Fixed Income -2.15%
Cash Equivalent 4.85%	Non-U.S. Fixed Income -3.91%	Emerging Market Equity -2.61%	High Yield -1.37%	High Yield 28.97%	Non-U.S. Fixed Income 12.54%	Small Cap Equity 4.55%	Large Cap Equity 15.79%	Large Cap Equity 5.49%	Small Cap Equity -33.79%	Small Cap Equity 27.17%	Large Cap Equity 15.06%	Cash Equivalent 0.10%	Large Cap Equity 16.00%	Real Estate 3.67%	High Yield 2.45%	Non-U.S. Equity -3.04%	Real Estate 4.06%	Non-U.S. Fixed Income 10.51%	Large Cap Equity -4.38%
High Yield 2.39%	High Yield -5.86%	Non-U.S. Fixed Income -3.75%	Emerging Market Equity -6.16%	Large Cap Equity 28.68%	High Yield 11.13%	Cash Equivalent 3.07%	High Yield 11.85%	Cash Equivalent 5.00%	Large Cap Equity -37.00%	Large Cap Equity 26.47%	Non-U.S. Equity 8.95%	Small Cap Equity -4.18%	High Yield 15.81%	Cash Equivalent 0.07%	Cash Equivalent 0.03%	Small Cap Equity -4.41%	Non-U.S. Equity 2.75%	Real Estate 10.36%	Real Estate -5.63%
U.S. Fixed Income -0.83%	Large Cap Equity -9.11%	Real Estate -3.81%	Non-U.S. Equity -15.80%	Non-U.S. Fixed Income 19.36%	Large Cap Equity 10.88%	High Yield 2.74%	Non-U.S. Fixed Income 8.16%	High Yield 1.87%	Non-U.S. Equity -43.56%	Non-U.S. Fixed Income 7.53%	U.S. Fixed Income 6.54%	Real Estate -6.46%	U.S. Fixed Income 4.21%	U.S. Fixed Income -2.02%	Emerging Market Equity -2.19%	High Yield -4.47%	U.S. Fixed Income 2.65%	High Yield 7.50%	Small Cap Equity -11.01%
Non-U.S. Fixed Income -8.83%	Non-U.S. Equity -13.37%	Large Cap Equity -11.89%	Small Cap Equity -20.48%	U.S. Fixed Income 4.10%	U.S. Fixed Income 4.34%	U.S. Fixed Income 2.43%	Cash Equivalent 4.85%	Small Cap Equity -1.57%	Real Estate -48.21%	U.S. Fixed Income 5.93%	Non-U.S. Fixed Income 4.95%	Non-U.S. Equity -12.21%	Non-U.S. Fixed Income 4.09%	Emerging Market Equity -2.60%	Non-U.S. Fixed Income -3.09%	Non-U.S. Fixed Income -6.02%	Non-U.S. Fixed Income 1.49%	U.S. Fixed Income 3.54%	Non-U.S. Equity -14.09%
		Non-U.S. Equity -21.40%	Large Cap Equity -22.10%	Cash Equivalent 1.15%	Cash Equivalent 1.33%	Non-U.S. Fixed Income -8.65%	U.S. Fixed Income 4.33%	Real Estate -7.39%	Emerging Market Equity -53.33%	Cash Equivalent 0.21%	Cash Equivalent 0.13%	Emerging Market Equity -18.42%	Cash Equivalent 0.11%	Non-U.S. Fixed Income -3.08%	Non-U.S. Equity -4.32%	Emerging Market Equity -14.92%	Cash Equivalent 0.33%	Cash Equivalent 0.86%	Emerging Market Equity -14.58%

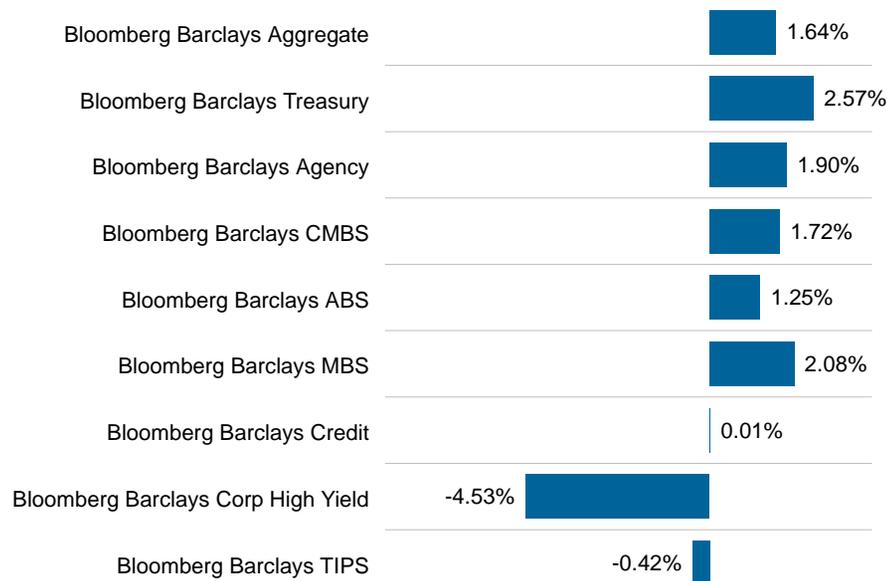
The Callan Periodic Table of Investment Returns conveys the strong **case for diversification** across asset classes (stocks vs. bonds), capitalizations (large vs. small), and equity markets (U.S. vs. non-U.S.). The Table highlights the uncertainty inherent in all capital markets. Rankings change every year. Also noteworthy is the difference between absolute and relative performance, as returns for the top-performing asset class span a wide range over the past 20 years.



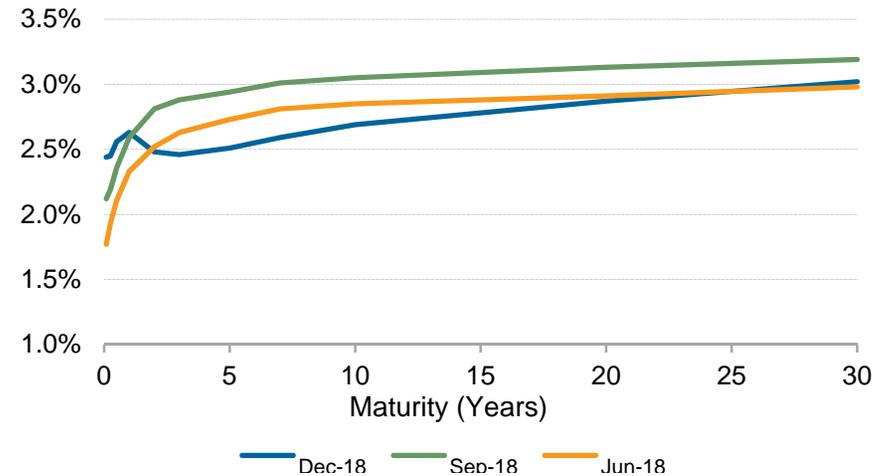
Fixed Income Returns

December 31, 2018

Total Returns



Treasury Yield Curve



Source: U.S. Department of the Treasury

- Fears of slowing global growth pushed investors into the relative safety of fixed income investments, which generally favored the mid- to longer-dated treasuries
- The Federal Reserve raised the federal funds target rate by 25bps, which led to higher yields for short-dated Treasuries
- The result of these two pressures led to a flatter overall Treasury curve and a partial inversion where rates on 1-year notes exceeded those with maturities of 2-, 3-, 5-, and 7-years
- The Bloomberg Aggregate returned 1.6% in the quarter; Treasuries performed the best (+2.6%) while a risk-off environment pushed up corporate yields and led to negative performance for the Bloomberg High Yield Corporate Index (-4.5%)

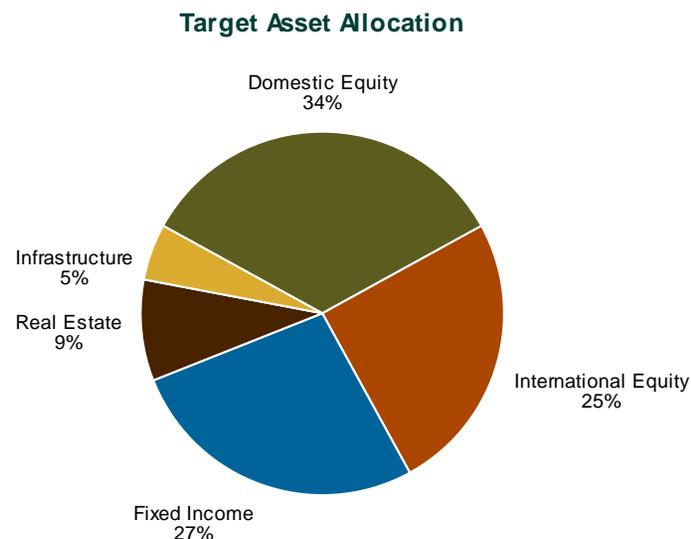
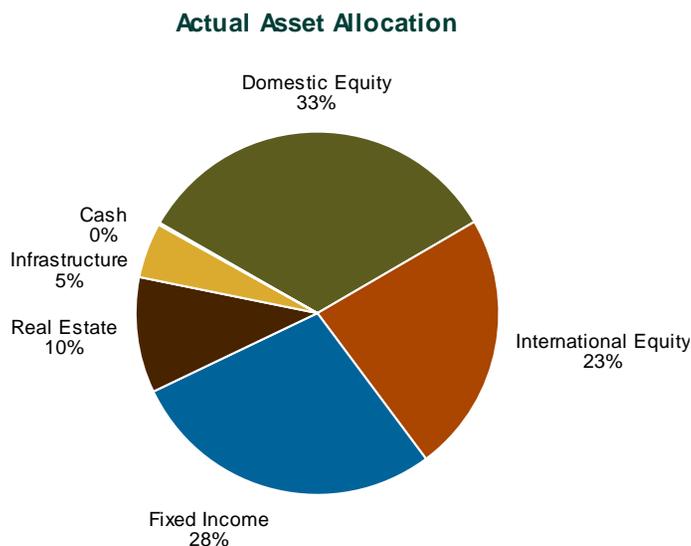
Callan

TSRS Investment Results

As of December 31, 2018

TSRS Total Fund Asset Allocation: How Close to the Strategic Policy?

As of December 31, 2018



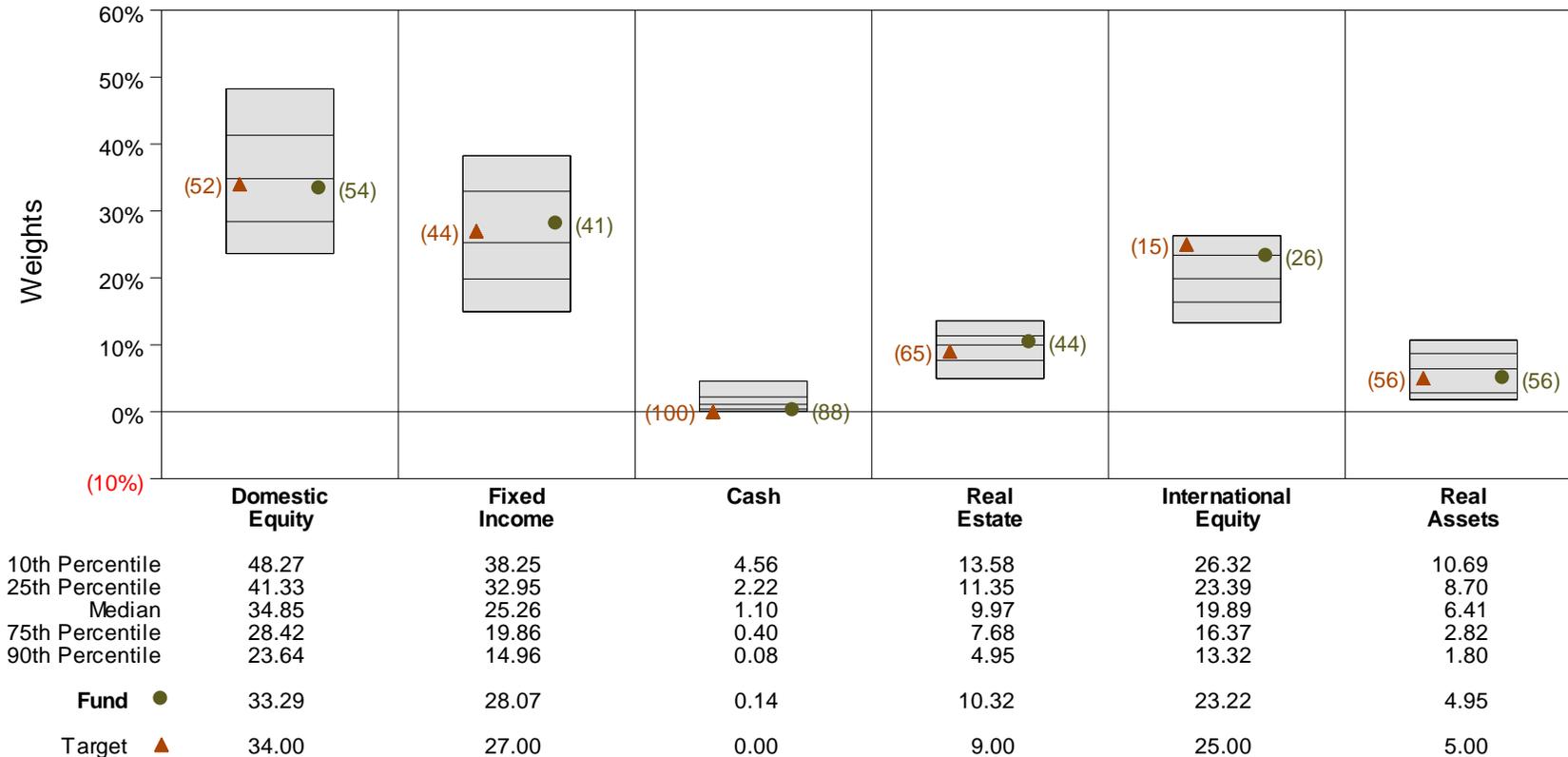
Asset Class	\$000s Actual	Weight Actual	Target	Percent Difference	\$000s Difference
Domestic Equity	253,598	33.3%	34.0%	(0.7%)	(5,376)
International Equity	176,886	23.2%	25.0%	(1.8%)	(13,536)
Fixed Income	213,804	28.1%	27.0%	1.1%	8,147
Real Estate	78,613	10.3%	9.0%	1.3%	10,061
Infrastructure	37,692	4.9%	5.0%	(0.1%)	(392)
Cash	1,096	0.1%	0.0%	0.1%	1,096
Total	761,689	100.0%	100.0%		

- As of 12/31/2018, TSRS's asset allocation was within the ranges specified in the Investment Policy Statement.
 - Public market equities were under target as a result of the stock market declines that occurred during 2018Q4.
 - Fixed income retained more of its value, resulting in its allocation being above target at the end of Q4.

TSRS Asset Allocation Compared to Other Public Pension Funds

As of December 31, 2018

Asset Class Weights vs Callan Public Fund Sponsor Database



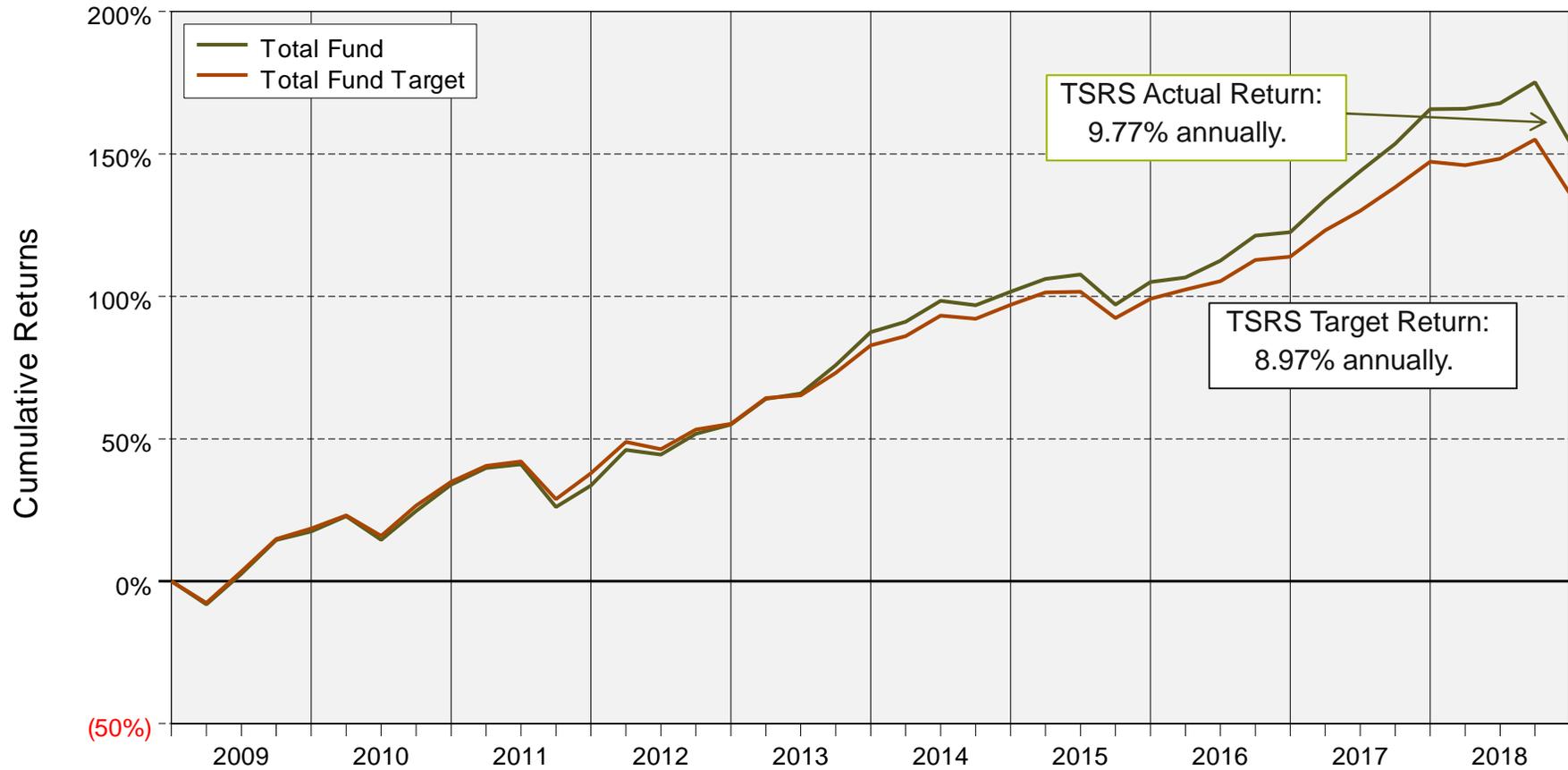
- The chart above shows TSRS's Target asset class weights (triangle) and actual weights (circle) as of 12/31/2018.
- The bars represent the range of allocations within asset classes by other public pension funds.
 - TSRS has more invested in international equity than most other public funds, while other asset allocations are near peer medians.

* 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%.

TSRS's investment returns over the last 10 years have exceeded those of your target

As of December 31, 2018

Cumulative Returns Actual vs Target



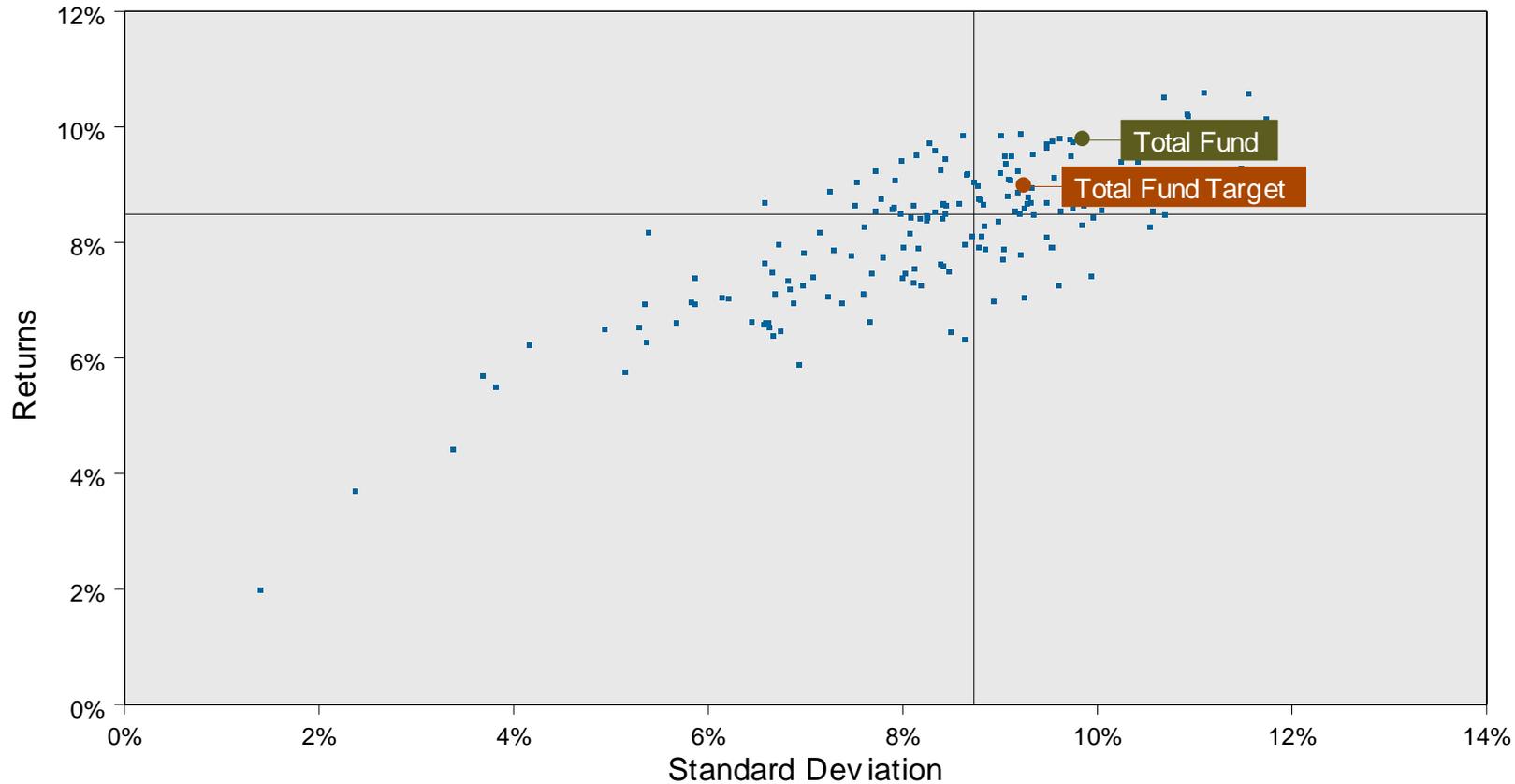
- The red line represents the return that TSRS would have achieved had each asset class matched its index.
- The green line shows TSRS's actual returns over 10 years. The green line is higher than the red line: GREAT!

* 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%.

Over the last 10 years, TSRS's volatility was greater than the "average" public fund's

As of December 31, 2018

Ten Year Annualized Risk vs Return



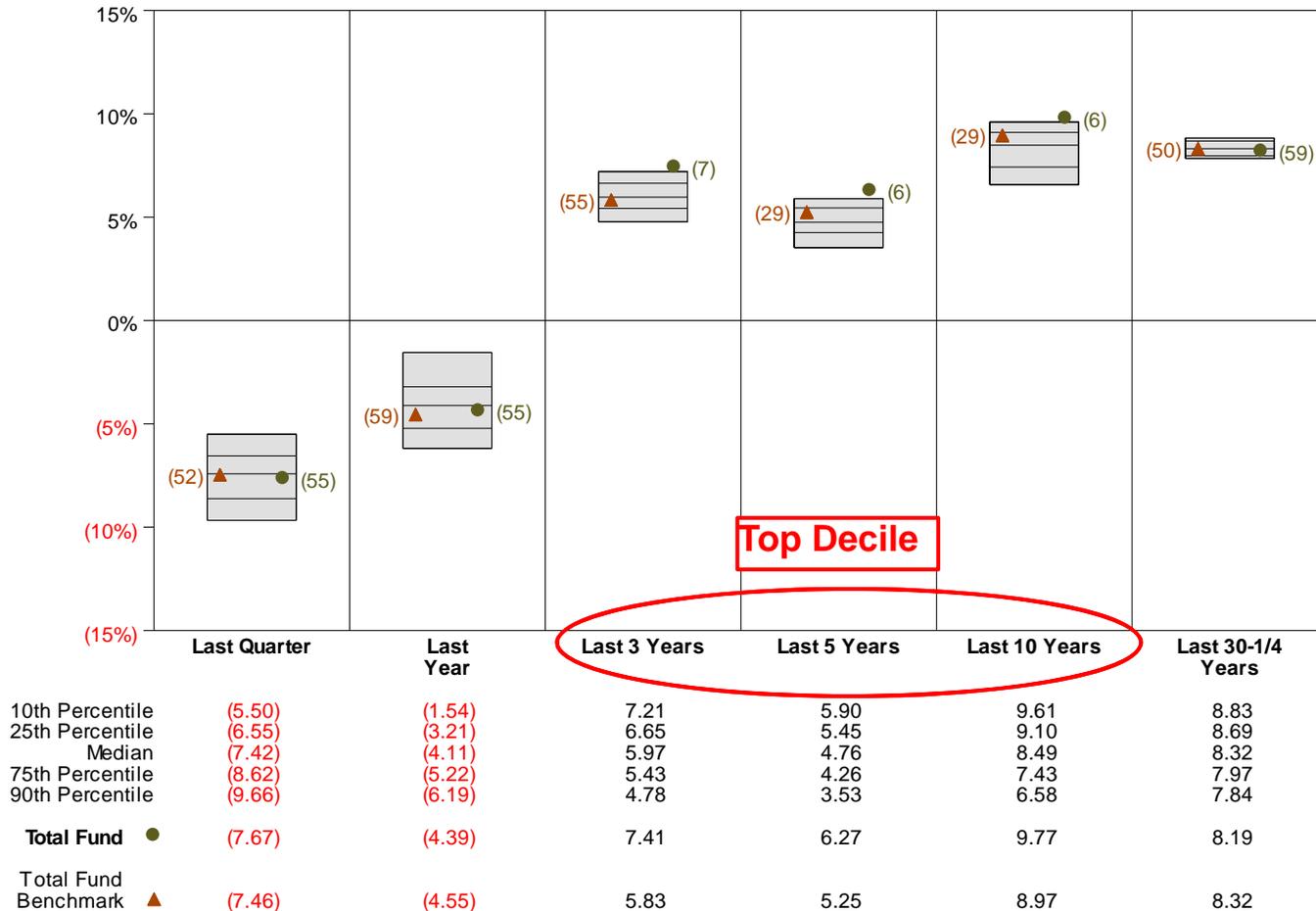
Squares represent membership of the Callan Public Fund Sponsor Database

* 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%.

TSRS Total Fund Annualized Returns versus Other Public Pension Funds

As of December 31, 2018

Performance vs Callan Public Fund Sponsor Database (Gross)

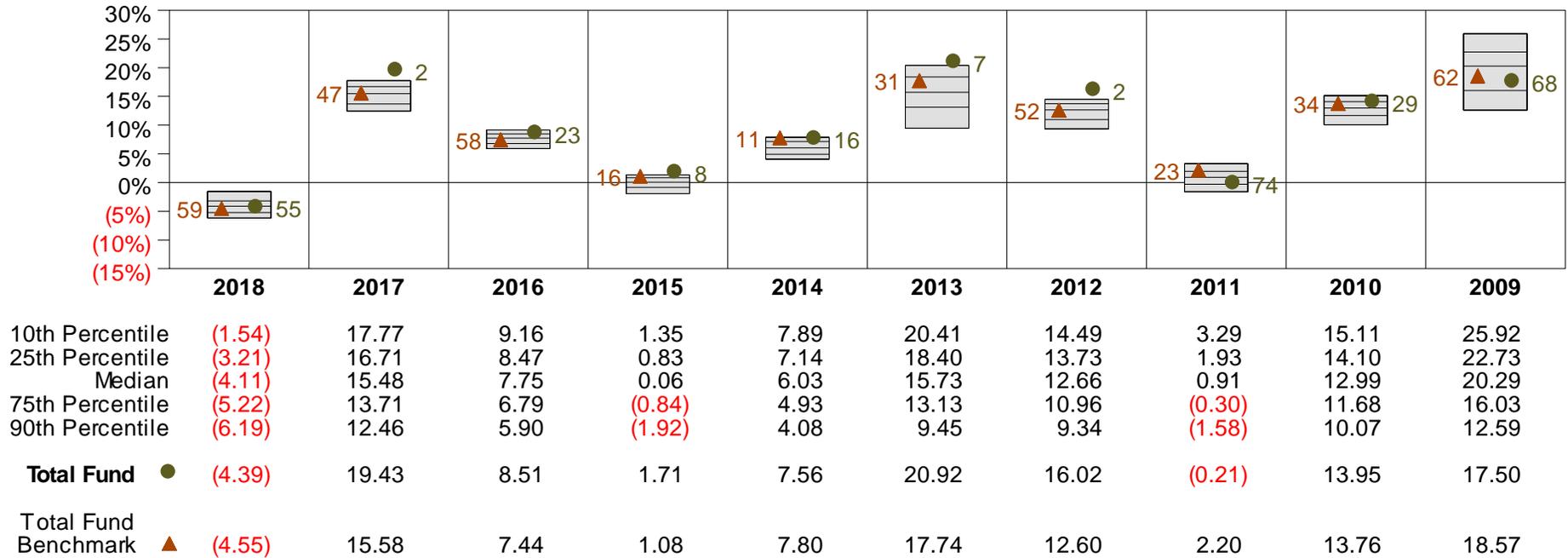


- TSRS's performance has measured near the median of peers over the past year and since inception. Over the 3-, 5-, and 10-year periods the plan has ranked in the top decile.

Calendar Year Returns: TSRS and Other Public Pension Funds

TSRS's rankings tend to be higher in years when risk has been rewarded

Performance vs Callan Public Fund Sponsor Database (Gross)

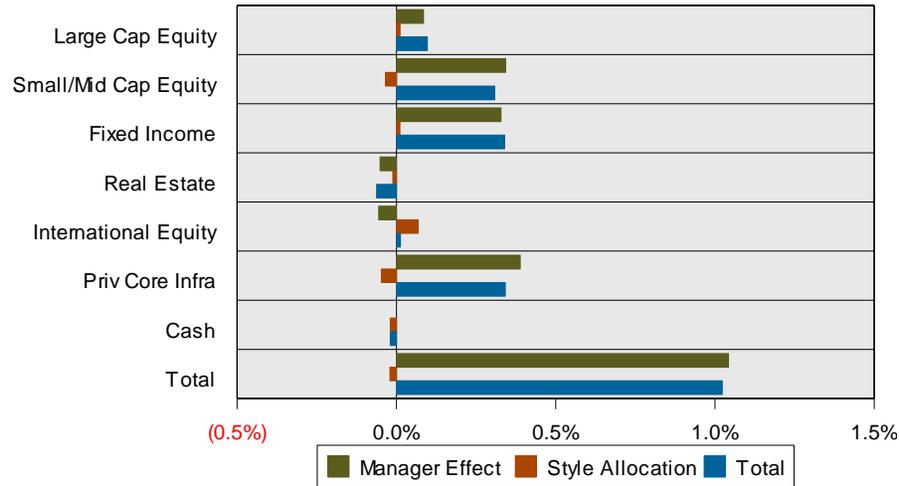


- TSRS's actual results are better than your benchmark in seven of the last ten years: an outstanding result.
- TSRS had higher returns than the "average" public pension fund in seven of the last ten years: a very good result.

Five-Year Performance and Attribution: What helped and what hurt?

As of December 31, 2018

Five Year Annualized 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	32%	31%	8.98%	8.49%	0.09%	0.01%	0.10%
Small/Mid Cap Equity	10%	9%	8.72%	5.15%	0.34%	(0.03%)	0.31%
Fixed Income	24%	27%	3.81%	2.52%	0.33%	0.01%	0.34%
Real Estate	9%	9%	9.77%	10.41%	(0.05%)	(0.01%)	(0.06%)
International Equity	19%	20%	0.19%	0.59%	(0.06%)	0.07%	0.01%
Priv Core Infra	6%	5%	11.85%	5.33%	0.39%	(0.05%)	0.34%
Cash	0%	0%	0.60%	0.60%	0.00%	(0.02%)	(0.02%)
Total			6.27%	5.25%	+ 1.04%	+ (0.02%)	1.02%

① shows that TSRS's 5-year return beats the target. ② shows that your managers collectively beat their bogies.

Manager Returns for Traditional Asset Classes

Periods Ending December 31, 2018

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Net of Fees					
Domestic Equity	(13.60%)	(3.04%)	9.93%	8.60%	13.69%
Total Domestic Equity Target (1)	(14.71%)	(5.72%)	8.82%	7.76%	13.15%
Large Cap Equity	(13.01%)	(3.15%)	9.90%	8.82%	13.19%
S&P 500 Index	(13.52%)	(4.38%)	9.26%	8.49%	13.12%
Alliance S&P Index	(13.47%)	(4.38%)	9.15%	8.43%	13.05%
PIMCO StocksPLUS S&P 500 Index	(14.36%)	(5.47%)	9.29%	8.53%	15.69%
	(13.52%)	(4.38%)	9.26%	8.49%	13.12%
BlackRock Russell 1000 Value Index	(11.67%)	(8.16%)	6.93%	5.99%	11.28%
Russell 1000 Value Index	(11.72%)	(8.27%)	6.95%	5.95%	11.18%
T. Rowe Price Large Cap Growth	(12.85%)	4.69%	13.88%	12.11%	18.17%
Russell 1000 Growth Index	(15.89%)	(1.51%)	11.15%	10.40%	15.29%
Small/Mid Cap Equity U.S. Equity	(15.41%)	(2.59%)	10.11%	7.86%	15.54%
Russell 2500 Index	(18.49%)	(10.00%)	7.32%	5.15%	13.15%
Champlain Mid Cap	(11.57%)	3.94%	14.19%	10.39%	14.90%
Russell MidCap Index	(15.37%)	(9.06%)	7.04%	6.26%	14.03%
FIAM Small Cap	(19.59%)	(9.47%)	5.74%	5.10%	15.46%
Russell 2000 Index	(20.20%)	(11.01%)	7.36%	4.41%	11.97%
International Equity	(13.41%)	(17.69%)	3.64%	(0.38%)	5.37%
MSCI ACWI x US (Net)	(11.46%)	(14.20%)	4.48%	0.68%	6.57%
Causeway International Opportunities (3)	(13.70%)	(18.84%)	2.41%	(0.21%)	7.85%
Causeway Linked Index (3)	(11.46%)	(14.20%)	3.55%	0.93%	6.53%
Aberdeen EAFE Plus	(9.53%)	(14.53%)	4.90%	(0.90%)	6.41%
MSCI ACWI x US (Net)	(11.46%)	(14.20%)	4.48%	0.68%	6.57%
American Century Non-US SC (4)	(20.26%)	(21.65%)	-	-	-
MSCI ACWI ex US Small Cap	(14.43%)	(18.20%)	3.82%	1.96%	10.02%
Fixed Income	0.57%	(0.60%)	4.17%	3.50%	5.31%
Bimbg Aggregate Index	1.64%	0.01%	2.06%	2.52%	3.48%
BlackRock U.S. Debt Fund	1.63%	0.05%	2.11%	2.60%	3.57%
Bimbg Aggregate Index	1.64%	0.01%	2.06%	2.52%	3.48%
PIMCO Fixed Income	(0.45%)	(1.22%)	5.56%	4.13%	6.47%
Custom Index (2)	(0.37%)	(2.21%)	3.68%	3.53%	5.41%

Manager Returns for Alternative Asset Classes

Periods Ending December 31, 2018

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Net of Fees					
Real Estate	0.94%	6.19%	6.56%	8.64%	5.46%
NFI-ODCE Equal Weight Net	1.39%	7.30%	7.53%	9.60%	5.92%
JP Morgan Strategic Property Fund	1.26%	6.49%	6.64%	8.78%	6.22%
NFI-ODCE Equal Weight Net	1.39%	7.30%	7.53%	9.60%	5.92%
JP Morgan Income and Growth Fund	0.30%	5.59%	6.36%	8.48%	5.23%
NFI-ODCE Equal Weight Net	1.39%	7.30%	7.53%	9.60%	5.92%
Infrastructure	4.26%	7.99%	12.23%	8.84%	7.32%
CPI + 4%	0.29%	5.77%	5.98%	5.33%	5.80%
Macquarie European Infrastructure	1.15%	9.75%	18.52%	8.84%	7.45%
SteelRiver Infrastructure	5.39%	7.43%	7.60%	10.18%	8.06%
CPI + 4%	0.29%	5.77%	5.98%	5.33%	5.80%
Cash Composite	0.51%	1.71%	0.99%	0.60%	0.40%
Total Fund	(7.77%)	(4.79%)	6.75%	5.69%	9.18%
Total Fund Benchmark*	(7.46%)	(4.55%)	5.83%	5.25%	8.97%

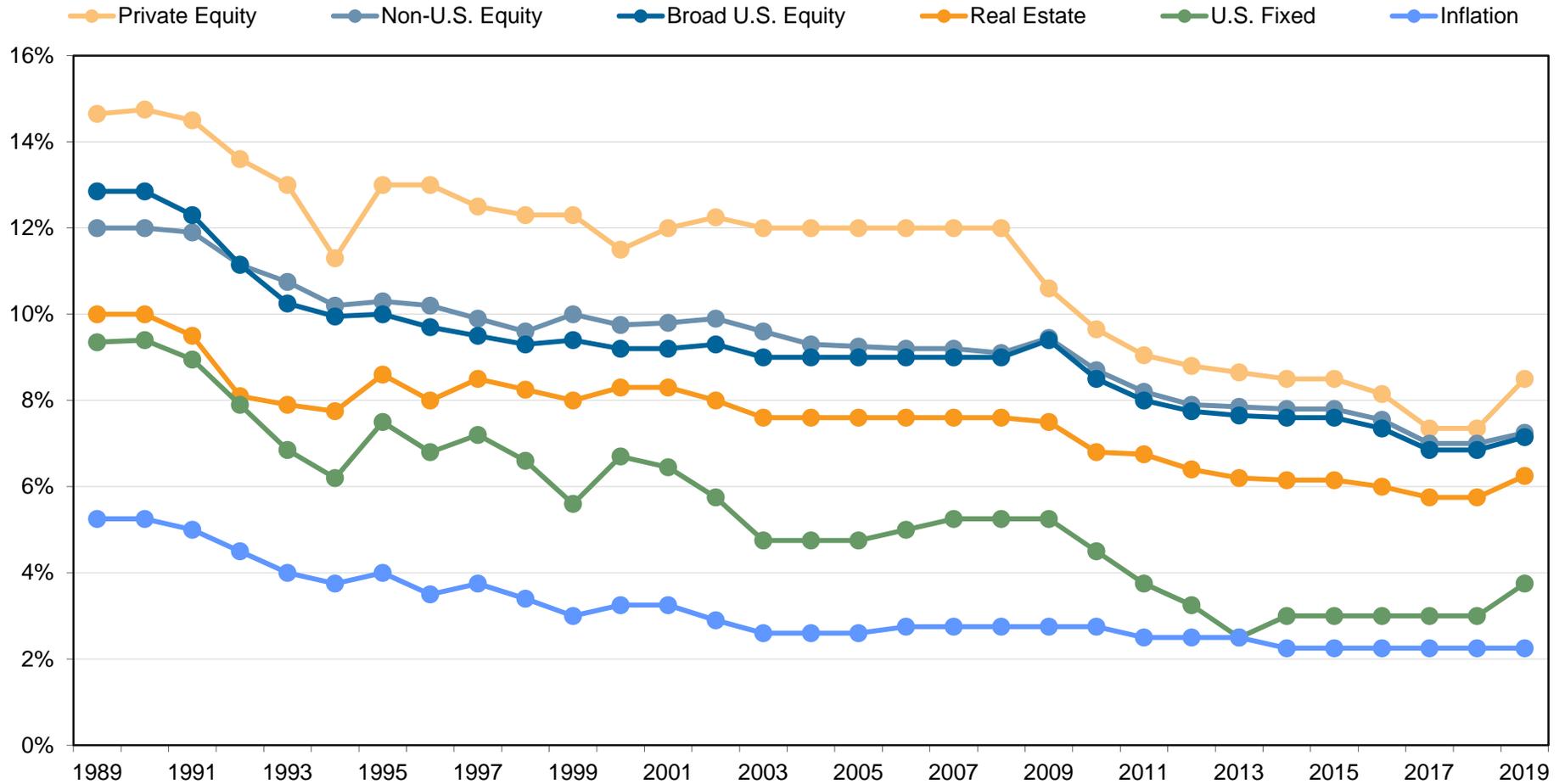
* Current Quarter Target = 27.0% Blmbg Aggregate, 26.0% S&P 500 Index, 25.0% MSCI ACWI ex US IMI, 9.0% NCREIF NFI-ODCE Val Wt Gr, 8.0% Russell 2500 Index and 5.0% CPI-W+4.0%.

Callan

Capital Market Projections

Historical Return Projections: Major Asset Classes

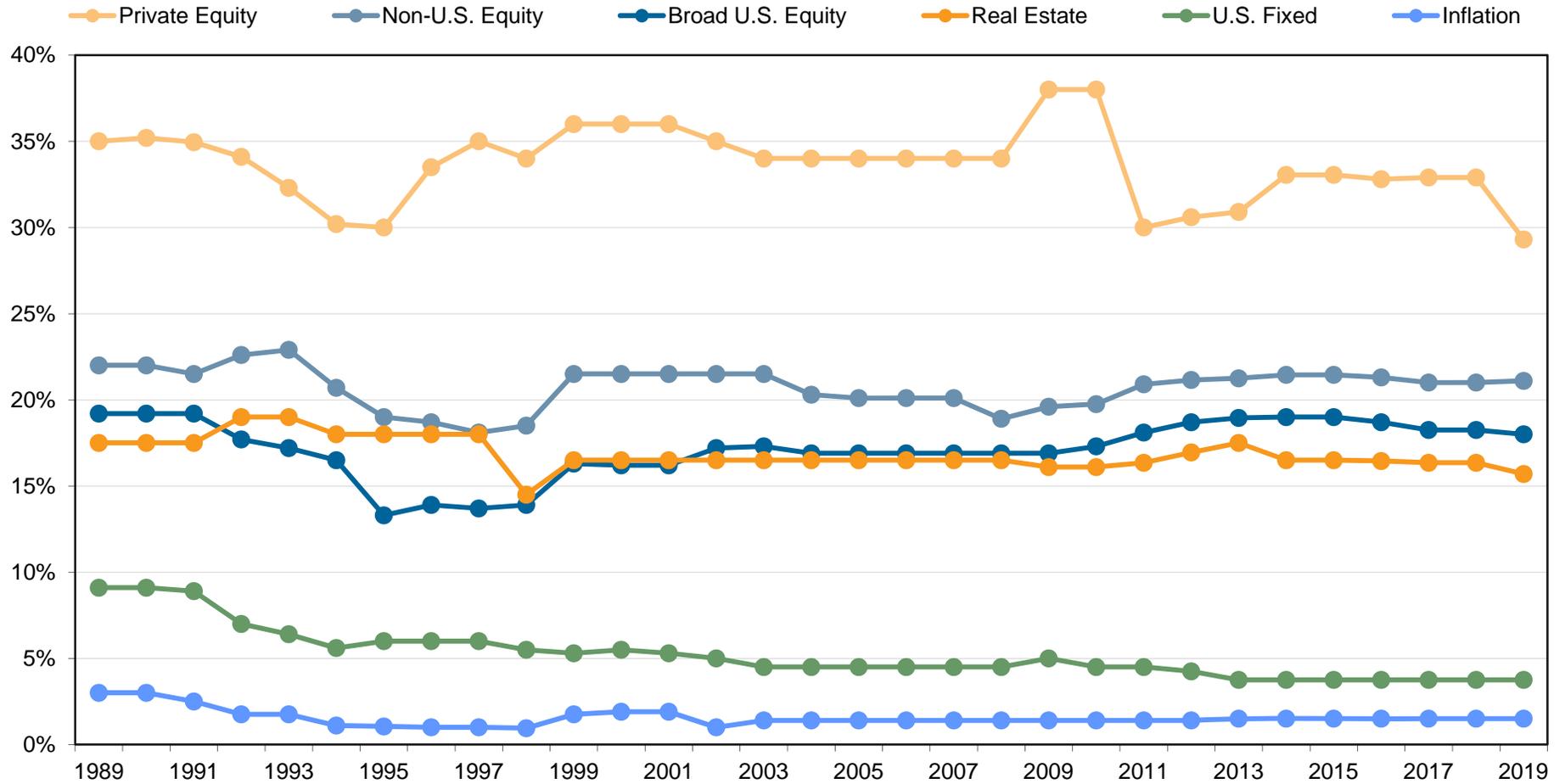
1989 – 2019



Source: Callan

Historical Risk Projections: Major Asset Classes

1989 – 2019

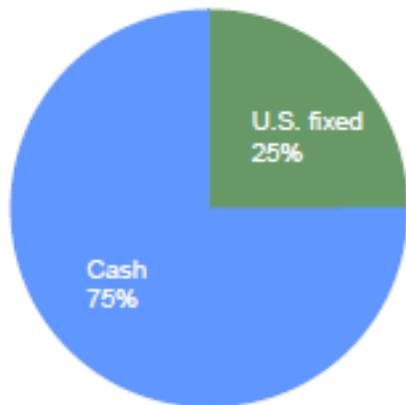


Source: Callan

7.5% Expected Return Over 30+ Years

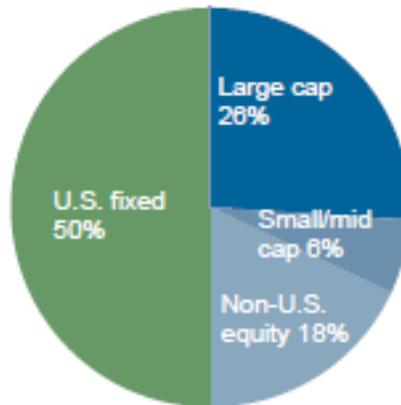
Increasing Levels of Risk Required to Obtain the Same Expected Rate of Return

Increasing Complexity →



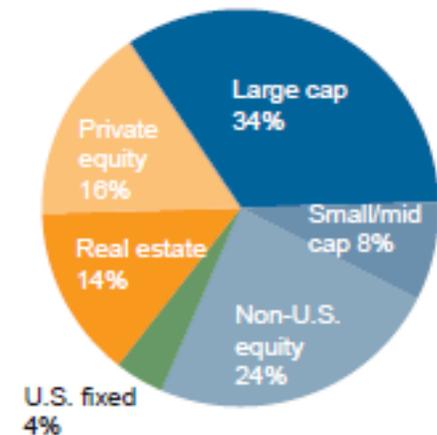
1989

Return: 7.5%
Risk: 3.1%



2004

Return: 7.5%
Risk: 8.9%



2019

Return: 7.5%
Risk: 18.0%

Increasing Risk →

In 1989, our expectations for cash and broad U.S. fixed income were 6.80% and 9.35%, respectively
Return-seeking assets were not required to earn 7.5%

15 years later, an investor would have needed half of the portfolio in public equities to achieve 7.5%, nearly tripling the portfolio volatility of 1989

Today an investor is required to include 96% in return-seeking assets to earn 7.5% at almost 6x the volatility compared to 1989

2019 Callan Capital Market Projections

Expected risk and return (2019–2028)

Asset Class	Index	PROJECTED RETURN			PROJECTED RISK		2018 - 2027	
		1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation	Projected Yield	10-Year Geometric*	Standard Deviation
Equities								
Broad U.S. Equity	Russell 3000	8.50%	7.15%	4.90%	17.95%	2.00%	6.85%	18.25%
Large Cap	S&P 500	8.25%	7.00%	4.75%	17.10%	2.10%	6.75%	17.40%
Small/Mid Cap	Russell 2500	9.55%	7.25%	5.00%	22.65%	1.55%	7.00%	22.60%
Global ex-US Equity	MSCI ACWI ex USA	9.20%	7.25%	5.00%	21.10%	3.10%	7.00%	21.00%
Non-U.S. Equity	MSCI World ex USA	8.70%	7.00%	4.75%	19.75%	3.25%	6.75%	19.70%
Emerging Market Equity	MSCI Emerging Markets	10.70%	7.25%	5.00%	27.45%	2.65%	7.00%	27.45%
Fixed Income								
Short Duration	Bloomberg Barclays 1-3 Yr G/C	3.40%	3.40%	1.15%	2.10%	3.25%	2.60%	2.10%
U.S. Fixed	Bloomberg Barclays Aggregate	3.75%	3.75%	1.50%	3.75%	3.50%	3.00%	3.75%
Long Duration	Bloomberg Barclays Long G/C	4.25%	3.75%	1.50%	10.65%	4.80%	3.00%	10.95%
TIPS	Bloomberg Barclays TIPS	3.80%	3.75%	1.50%	5.05%	3.90%	3.00%	5.25%
High Yield	Bloomberg Barclays High Yield	5.75%	5.35%	3.10%	10.35%	7.75%	4.75%	10.35%
Non-U.S. Fixed	Bloomberg Barclays Gbl Agg ex US	1.80%	1.40%	-0.85%	9.20%	2.50%	1.40%	9.20%
Emerging Market Debt	EMBI Global Diversified	5.40%	5.05%	2.80%	9.50%	6.00%	4.50%	9.60%
Other								
Real Estate	NFI-ODCE	7.30%	6.25%	4.00%	15.70%	4.75%	5.75%	16.35%
Private Equity	Cambridge Private Equity	12.40%	8.50%	6.25%	29.30%	0.00%	7.35%	32.90%
Hedge Funds	Callan Hedge FOF Database	5.75%	5.50%	3.25%	8.85%	2.25%	5.05%	9.15%
Commodities	Bloomberg Commodity	4.75%	3.20%	0.95%	18.00%	2.50%	2.65%	18.30%
Cash Equivalents	90-Day T-Bill	2.50%	2.50%	0.25%	0.90%	2.50%	2.25%	0.90%
Inflation	CPI-U		2.25%		1.50%		2.25%	1.50%

Note that return projections for public markets assume index returns with no premium for active management.

Source: Callan

TSRS Current Target Mix and Alternatives

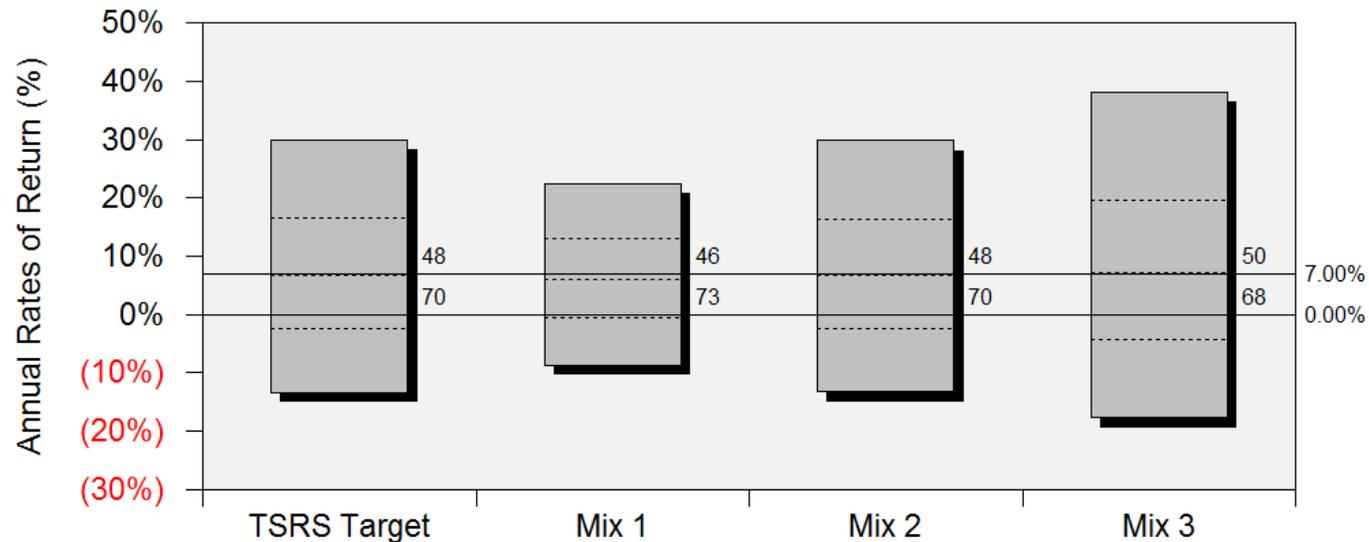
Asset Mix Alternatives

Portfolio Component	TSRS Target	Min	Max	Mix 1	Mix 2	Mix 3
Broad US Equity	34	0	100	26	36	45
Global ex US Equity	25	0	100	18	24	30
Domestic Fixed	27	0	100	46	27	8
Real Assets	14	0	100	10	13	17
Totals	100			100	100	100
Projected Arithmetic Return	7.2%			6.3%	7.2%	8.2%
10 Yr. Geometric Mean Return	6.6%			6.0%	6.6%	7.1%
Projected Standard Deviation	12.6%			9.3%	12.6%	16.0%
10 Yr. Simulated Sharpe Ratio	0.3%			0.4%	0.3%	0.3%

- The asset classes listed assume a net-of-fee return based on a passive investment in the asset class.
- In the TSRS Target, Real Assets represents the combination of private real estate at 9% and private infrastructure at 5%.
- The “Arithmetic” return represents the rate of return over the projection period (i.e. a single period estimate).
- “Geometric” return represents the compounded rate of return over the period and includes the effect of volatility.

Range of Projected Returns

One-Year Period

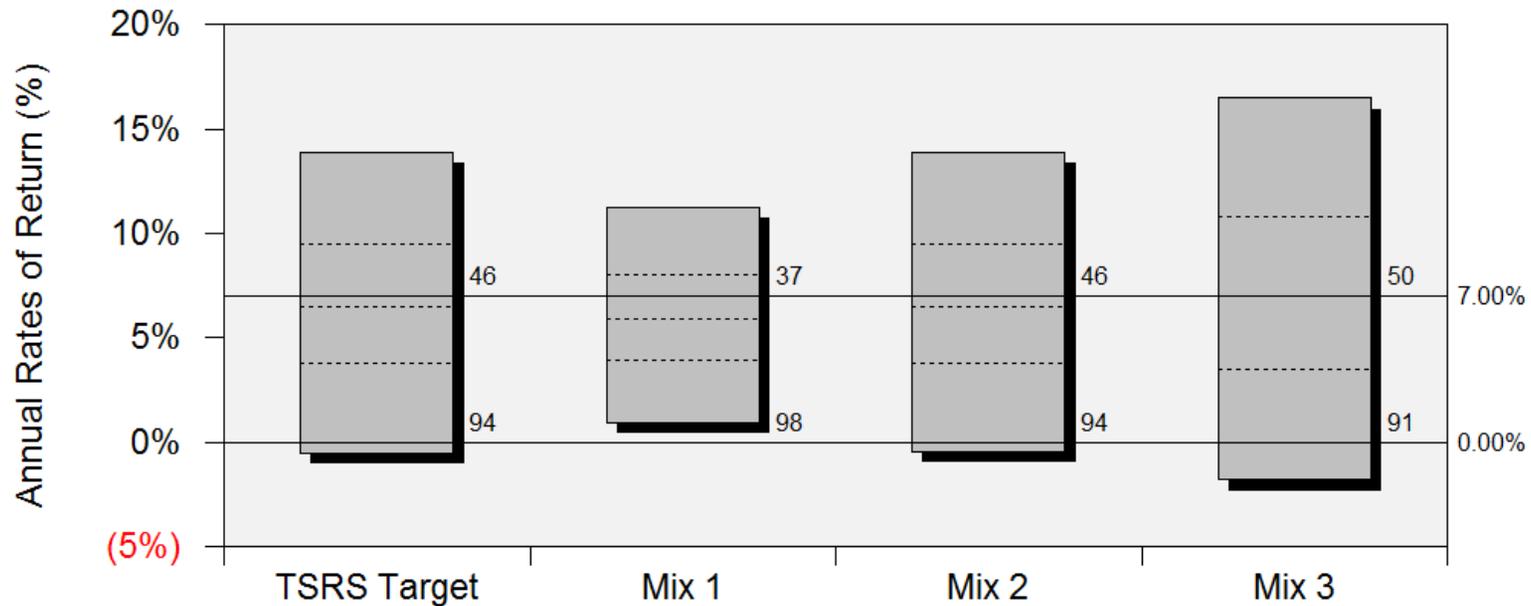


5th Percentile	30.0%	22.5%	29.9%	38.2%
25th Percentile	16.5%	13.0%	16.4%	19.7%
Median	6.6%	6.1%	6.6%	7.1%
75th Percentile	(2.4%)	(0.6%)	(2.3%)	(4.3%)
95th Percentile	(13.3%)	(8.8%)	(13.3%)	(17.7%)
Prob > 7.00%	48.3%	45.6%	48.2%	50.3%
Prob > 0.00%	69.8%	72.8%	69.9%	68.0%

- The higher the expected median return, the wider the range of possible outcomes.
- The variability of return is quantified by standard deviation. That level of uncertainty is one definition of risk.
- The numbers next to each bar are the probability over a one-year period of each mix either:
 - Exceeding the actuarial return assumption of 7.0%
 - Producing a positive rate of return

Range of Projected Returns

Ten-Year Period



5th Percentile	13.9%	11.3%	13.9%	16.5%
25th Percentile	9.5%	8.1%	9.5%	10.8%
Median	6.5%	5.9%	6.5%	7.0%
75th Percentile	3.8%	3.9%	3.8%	3.5%
95th Percentile	(0.5%)	0.9%	(0.5%)	(1.8%)
Prob > 7.00%	46.1%	37.1%	46.2%	49.8%
Prob > 0.00%	93.9%	98.1%	93.9%	91.4%

- All mixes have a high probability of producing a positive return over any 10-year period.
- The likelihood of the target allocation achieving a 7.0% annualized rate of return over any 10-year period is 46%.

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**Summary Observations
and Recommendations**

In conclusion . . .

OBSERVATIONS

- The Tucson Supplemental Retirement System's asset allocation policy is diversified with 59% in growth assets (equities), 27% in income producing assets (fixed income) and 14% in real assets (private real estate and infrastructure).
- TSRS adjusted the asset allocation policy once in the last five years to increase the investment in non-U.S. equity. The adjustment was made at the conclusion of extensive due diligence with the goal of moving regional exposure closer to the global opportunity set.
- Over the last 10 years, TSRS's investment return has exceeded the policy benchmark (9.8% vs. 9.0%).
- Over the last ten years, TSRS's returns have been higher than 94% of other public pension funds (i.e. TSRS ranks in the 6th percentile for the ten-year period ended December 31, 2018).
- The Board has excellent governance practices and prudently oversees execution of investment policies and manager results.

RECOMMENDATIONS

- We encourage all trustees to actively and regularly pursue ongoing investment and fiduciary training.
- Periodically review asset allocation relative to risk tolerance, liquidity requirements, and funding objectives. An asset allocation and liability study is scheduled for the May 2019 meeting.
- Rebalance assets in accordance with policy so as to minimize performance deviations from the strategic target.
- Time horizon matters. Evaluate Total Fund results and manager return patterns relative to long-term trends.

December 31, 2018



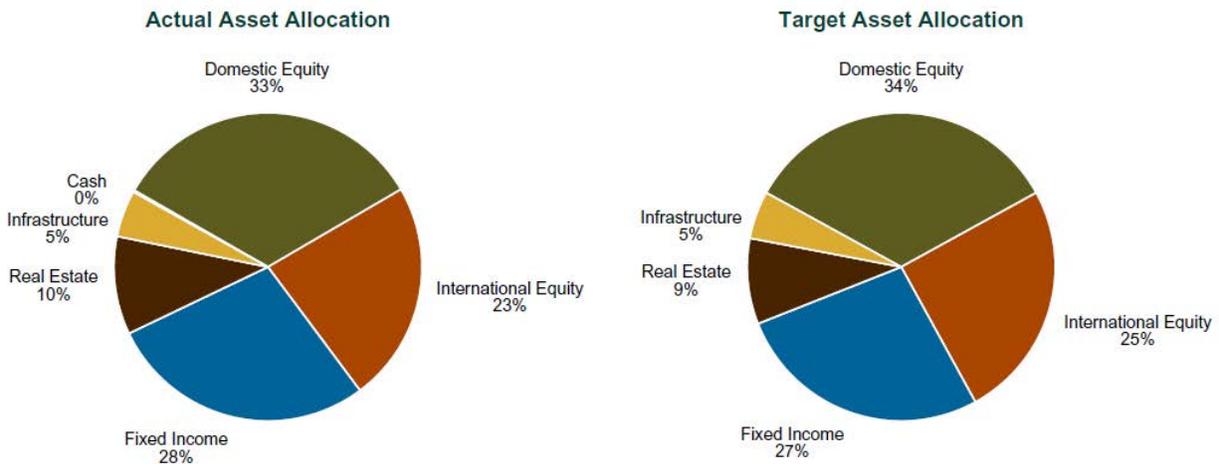
Tucson Supplemental Retirement System

Investment Measurement Service
Quarterly Review

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Tucson Supplemental Retirement System
Executive Summary for Period Ending December 31, 2018

Asset Allocation



Total Fund Performance

Returns for Periods Ended December 31, 2018

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Total Fund Gross	-7.67%	-4.39%	7.41%	6.27%	9.77%
Total Fund Net	-7.77%	-4.79%	6.75%	5.69%	9.18%
Total Fund Benchmark*	-7.46%	-4.55%	5.83%	5.25%	8.97%

Returns for Fiscal Years Ended June 30th

	2019 YTD	2018	2017	2016	2015
Total Fund Gross	-5.14%	9.81%	14.77%	2.33%	4.63%
Total Fund Net	-5.34%	8.77%	14.26%	1.89%	4.17%
Total Fund Benchmark*	-4.95%	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

- Fidelity Investments announced the appointment of Steve Neff as the Head of Asset Management. He will succeed Charlie Morrison, who retired at year end. Neff joined Fidelity 22 years ago and has held various senior positions at the firm; he has been the head of technology and global services since 2012. Neff will continue to report to president and chairman of the board Abby Johnson and will remain a member of Fidelity's Operating Committee.

Organizational Announcements

- NA

Active Manager Performance

Fund	Last Year	Peer Group Ranking	
		Last 3 Years	Last 5 Years
PIMCO Stocks Plus	56	38	42
T. Rowe Price Large Cap Growth	10	3	8
Champlain Mid Cap	2	1	1
FIAM Small Cap	38	64	37
Causeway International Opportunities**	90	57	79
Aberdeen EAFE Plus	38	17	87
American Century Int'l Small Cap	66	[64]	[68]
PIMCO Fixed Income	72	1	2
JP Morgan Strategic Property Fund	92	82	83
JP Morgan Income and Growth Fund	97	92	90

* Brackets indicate actual performance linked with manager composite

** Transitioned from International Value to International Opportunities in May 2016

- Aberdeen EAFE Plus outperformed its benchmark by 2.08% gross of fees in the fourth quarter and ranked in the 4th percentile among peers. Positive excess return was due to both favorable stock selection and asset allocation. The strongest relative returns from a regional perspective were produced in Europe ex UK, largely as a result of favorable stock selection. Brazil was the strongest contributing single country to relative returns. Japan was the only region to detract from excess performance during the quarter. TSRS has been invested for six and a half years and the portfolio returned +2.95% gross of fees versus +4.79% for the benchmark over that period.

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. In the fourth quarter, both the number of clients and total assets under management continued to deteriorate. The decline in assets is largely explained by difficult relative performance and the merger with Standard Life in 2017. Callan and TSRS have had multiple conversations about the merger, declining assets and performance record of the strategy. Patience is being tested and we look forward to continuing our conversation with the TSRS Board on this strategy.

Gordon Weightman, CFA
Senior Vice President

Paul Erlendson
Senior Vice President

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Change of Mind on the Global Outlook

ECONOMY

2 Confidence in the global economy's strength evaporated suddenly last October. What changed? Signs of slower growth in the global economy outside the U.S., trade war concerns, and fears that continued U.S. interest rate increases will slow growth.

Investors Calm Amid Market Turmoil

FUND SPONSOR

4 The median fund sponsor in Callan's database fell 7.5% in the fourth quarter, lagging a 60% U.S. stocks/40% U.S. fixed income index. Funds were affected by their exposure to non-U.S. stocks, which lagged U.S. stocks. Corporate plans fared best in a tough quarter.

Widespread Drops in Global Markets

EQUITY

6 Equity markets fell drastically in the fourth quarter. In the U.S., all sectors, save Utilities (+1.4%), were in negative territory. Small cap stocks were hardest hit. Economic deceleration fueled by the global trade dispute and Brexit impasse drove non-U.S. markets down.

Safety Ruled as Risk Assets Sold Off

FIXED INCOME

8 Safe-haven securities, such as U.S. Treasuries and other developed market sovereign bonds, rallied while risk assets sold off. Non-U.S. developed market sovereign bonds rallied, though the strength in the U.S. dollar proved to be a headwind for unhedged assets.

Real Estate Healthy, Real Assets Struggled

REAL ESTATE/REAL ASSETS

10 Private real estate rose in the fourth quarter, with returns shifting toward income. The fundamentals of the U.S. real estate market remained healthy. REITs fell both in the U.S. and overseas. Most commodity indices dropped in the quarter, leaving few safe havens.

Downshifting Into a Tricky Corner

PRIVATE EQUITY

12 The number of transactions across all metrics fell modestly for 2018 and in the fourth quarter, reflecting less certainty in trickier capital markets. However, dollar volumes associated primarily with fundraising, and venture capital investments and exits, increased.

Hedge Funds in Hot Mess; MACs Stumble

HEDGE FUNDS/MACs

13 As the global capital markets reacted to the sharp risk-off environment, volatile prices and tightening liquidity inside these markets became a heated mess for hedge funds. The Callan MAC Style Groups tripped again in the fourth quarter's risk-off mode.

DC Index Tops Age 45 TDF in 3rd Quarter

DEFINED CONTRIBUTION

15 The Callan DC Index™ gained 3.7% in the third quarter, outpacing the 3.5% rise of the Age 45 Target Date Fund (TDF). DC plan balances grew by 3.1%, driven completely by market performance. For the first time since the third quarter of 2016, flows into the Index were negative.

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 GBI ex US



Sources: Bloomberg Barclays, MSCI, FTSE Russell

Change of Mind

ECONOMY | Jay Kloepfer

Confidence in the strength of the global economy evaporated suddenly in October 2018, leading to sharp declines in equity and commodity prices, widening interest rate spreads, and an appreciation of the U.S. dollar. Little in the underlying fundamentals of the U.S. economy had changed: GDP enjoyed solid gains of 4.2% and 3.4% in the second and third quarters of 2018, the robust labor market continued to create jobs at a rate of over 200,000 per month, and consumer spending was strong, fueled by rising wages. After two hiccups in the equity markets in February and March, confidence returned and equity markets steamrolled to a new peak in September.

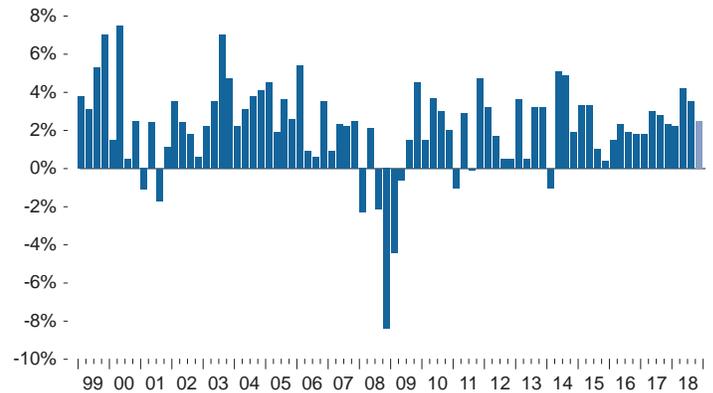
So what changed? Emerging signs of slower growth in the global economy outside the U.S., rising concerns over a trade war, and fears that continued U.S. interest rate increases will slow growth both here and abroad eroded confidence. A slowdown in U.S. and global growth suddenly seemed inevitable as waning fiscal stimulus and rising interest rates weaken demand.

Despite the loss of confidence, data on U.S. economic growth largely remained solid through the fourth quarter, led by the labor market. The U.S. economy added over 2.6 million new jobs in 2018, up from 2.3 million in 2017. The unemployment rate fell to a generational low of 3.7% in September. The rate rose to 3.9% in December, but not because of weakening job growth—the tight labor market finally spurred an increase in the labor force participation rate. Fourth quarter GDP growth is projected to come in close to 2.5%, resulting in an annual rate of growth for 2018 of 3.0%. (The government shutdown delayed reporting of GDP; estimate provided by IHS Markit.) GDP growth of 3.0% for the year would mark the high point in the current expansion that began in 2009 after the Global Financial Crisis.

Not all of the economic data were positive. One of the biggest contributors to GDP growth in the third quarter was investment in inventory. Imports surged, likely ahead of the imposition of tariffs on Chinese goods, and much of these imports landed in

Quarterly Real GDP Growth

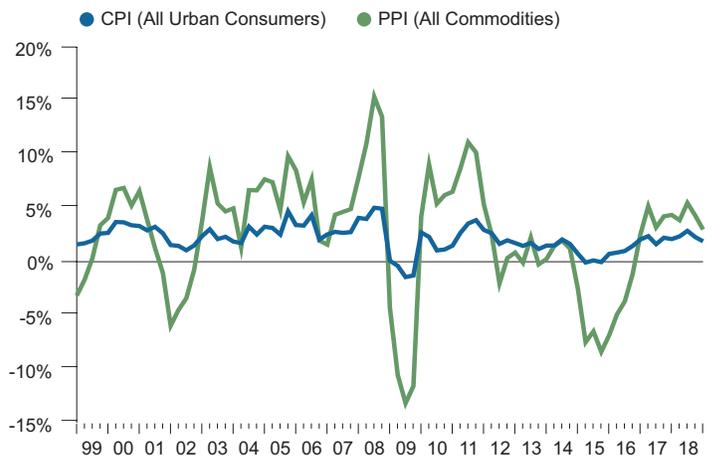
(20 Years)



Source: Bureau of Economic Analysis

Note: 4Q18 GDP not available at time of publication, estimate provided by IHS Markit

Inflation Year-Over-Year



Source: Bureau of Labor Statistics

inventories. Building inventories adds to GDP, while the working down of inventories in the coming months will subtract from GDP. Growth in business fixed investment—capital expenditures—stalled in the second half of the year, possibly discouraged by uncertainty over trade policy. Residential investment declined in each quarter during the year, as the housing market continues to sputter.

Housing has been a persistent disappointment. While demographic trends may appear to be favorable—the emergence of the millennial generation into prime home-buying age—housing faces several headwinds: strong prices and rising mortgage rates have made homes less affordable, several provisions of the 2017 Tax Act are unfriendly to housing, and builders complain about the scarcity of lots and skilled labor to build homes.

Inflation risks seemed to increase throughout the year. Average hourly earnings reached a 3% growth rate in January, igniting fears of the arrival, finally, of inflationary pressures. This wage report in fact was cited as one of the key instigators in the market sell-off in February. Growth in the CPI reached 3% by mid-year, and the long, mysterious absence of inflation after all that monetary and fiscal stimulus was thought to be over. Oil prices reached \$84 in early October. But the risk of inflation lessened in the fourth quarter. Confidence in global growth collapsed and one of the first casualties was oil, whose price dropped to \$52 in December. As a result, the broad consumer price index (CPI) dropped below 2% growth, and the landscape for inflation going forward changed.

The Federal Reserve has played a large role in the evolving market sentiment. The Fed raised short-term interest rates four times during 2018, resulting in a federal funds rate of 2.25%-2.5% by year end. The Fed continued to point to solid growth, a strong labor market and potential inflationary pressures as justification for a path to a long-term federal funds rate that at mid-year 2018 was projected to reach 3.25%. While the Fed has been clear in communicating its intentions to tighten, concerns rose during 2018 that the U.S. rate increases were slowing growth both in the U.S. and around the globe. In addition,

The Long-Term View

Index	2018 4th Qtr	Periods ended Dec. 31, 2018			
		Year	5 Yrs	10 Yrs	25 Yrs
U.S. Equity					
Russell 3000	-14.30	-5.24	7.91	13.18	9.04
S&P 500	-13.52	-4.38	8.49	13.12	9.07
Russell 2000	-20.20	-11.01	4.41	11.97	8.28
Non-U.S. Equity					
MSCI ACWI ex USA	-11.46	-14.20	0.68	6.57	--
MSCI Emerging Markets	-7.47	-14.58	1.65	8.02	--
MSCI ACWI ex USA Small Cap	-14.43	-18.20	1.96	10.02	--
Fixed Income					
Bloomberg Barclays Agg	1.64	0.01	2.52	3.48	5.09
90-Day T-Bill	0.56	1.87	0.63	0.37	2.55
Bloomberg Barclays Long G/C	0.78	-4.68	5.37	5.88	6.82
Bloomberg Barclays GI Agg ex US	0.91	-2.15	-0.01	1.73	4.39
Real Estate					
NCREIF Property	1.67	7.03	9.39	7.52	9.35
FTSE Nareit Equity	-6.32	-4.62	7.90	12.12	9.76
Alternatives					
CS Hedge Fund	-4.30	-3.19	1.66	5.10	7.27
Cambridge PE*	3.37	16.77	13.77	11.62	15.46
Bloomberg Commodity	-9.41	-11.25	-8.80	-3.78	2.03
Gold Spot Price	7.11	-2.14	1.28	3.78	4.85
Inflation – CPI-U	-0.48	1.91	1.51	1.80	2.20

*Data for most recent period lags by a quarter. Data as of September 30, 2018. Sources: Bloomberg, Bloomberg Barclays, Bureau of Economic Analysis, Credit Suisse, FTSE Russell, MSCI, NCREIF, Standard & Poor's, Thomson Reuters/Cambridge

U.S. policy has deviated from that of central banks in the euro zone, which have yet to shift from easing to tightening. The Fed did reduce its projected long-term target for the fed funds rate to 2.75%-3%, but sentiment took a dive when it raised rates as promised for a fourth time in December.

Recent Quarterly Economic Indicators

	4Q18	3Q18	2Q18	1Q18	4Q17	3Q17	2Q17	1Q17
Employment Cost–Total Compensation Growth	2.9%	2.8%	2.8%	2.7%	2.6%	2.5%	2.4%	2.4%
Nonfarm Business–Productivity Growth	--*	2.2%	3.0%	0.3%	-0.3%	2.3%	1.6%	0.4%
GDP Growth	2.5%*	3.4%	4.2%	2.2%	2.3%	2.8%	3.0%	1.8%
Manufacturing Capacity Utilization	76.1%	75.9%	75.5%	75.3%	75.2%	74.4%	74.9%	74.6%
Consumer Sentiment Index (1966=100)	98.2	98.1	98.3	98.9	98.4	95.1	96.4	97.2

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

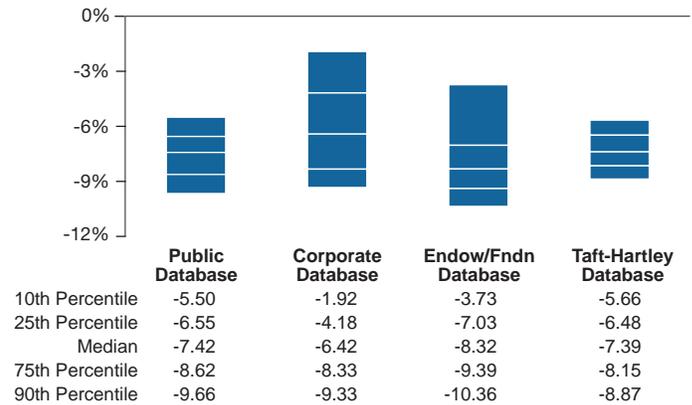
* 4Q18 data not available at time of publication; GDP estimate provided by IHS Markit

Investors Calm Amid Market Turmoil

FUND SPONSOR

- Corporate plans produced the highest returns on a relative basis in the fourth quarter, but still fell 6.4%. Taft-Hartley plans (-7.4%), public plans (-7.4%), and endowments/foundations (-8.3%) saw bigger losses. Callan's total plan database group dropped 7.5%.
- Public defined benefit (DB) funds showed stronger performance relative to corporate DB funds and endowments/foundations this past year as well as over the last 3 and 5 years. Over the last 15 years, all major fund types produced returns in a very narrow range, between 6.1% and 6.3%.
- A quarterly rebalanced 60% S&P 500/40% Bloomberg Barclays US Aggregate Bond Index portfolio fell 2.4% in 2018. All broad fund sponsor groups underperformed this benchmark over that time period.
- The MSCI ACWI ex USA Index underperformed U.S. equity markets over the past year. Funds that have taken steps to diversify away from home-country bias were not rewarded.
- As market events unfold, sponsors remain calm but are taking different approaches. Many sponsors' strategic positioning continues unchanged but is actively monitored. Those driven by higher return targets may seek opportunities in less-efficient markets. Others seeking increased risk mitigation want transparent risk controls, lower volatility, and downside protection.

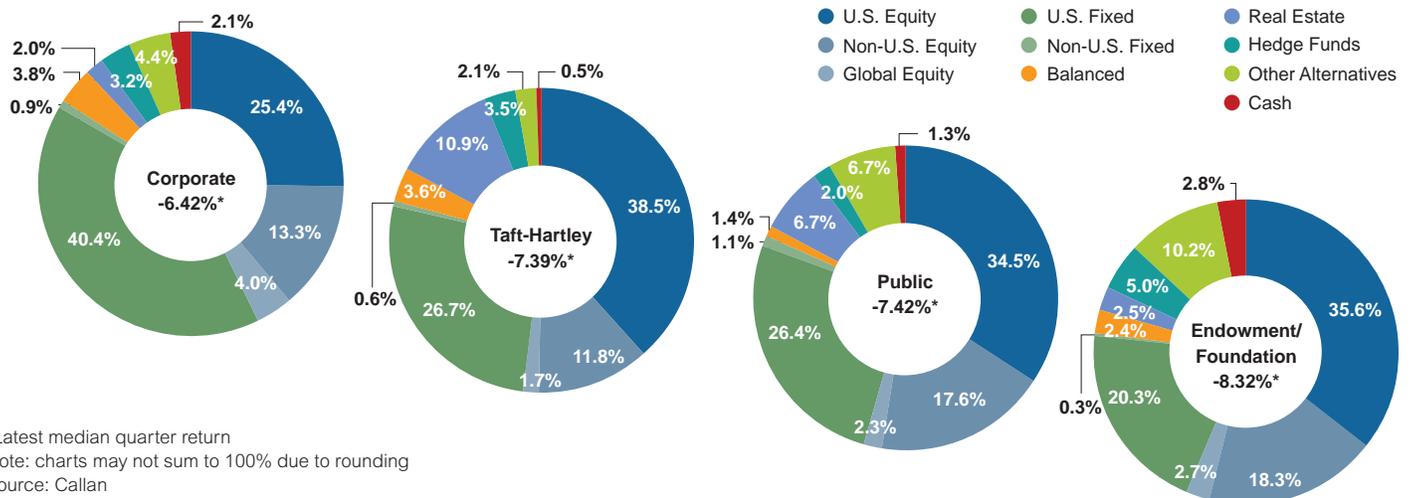
Callan Fund Sponsor Returns for the Quarter



Source: Callan

- The recent sell-off in global equities raised concerns about the impact on the actuarial discount rate for public plans and the spending policy for endowments and foundations. Plans with high return targets may increase risk, so risk mitigation is an important area of focus.
- For fund sponsors, strategic allocation decisions are focused on rising interest rates, anticipation of a market correction, volatility, and continued low future return expectations.
- Fund sponsors continue examining the balance between active and passive investing. Active management strategies

Callan Fund Sponsor Average Asset Allocation



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

- that limit the impact of market drawdowns and preserve capital during adverse circumstances are highly sought out.
- Fees and performance remain key factors in the active versus passive debate.
- The urge to engage in market timing is very great: there is a long-term benefit to higher equity, but investors (and Callan) are nervous about ramping up right now. Sponsors face competing fears: an equity market downturn vs. the fear of missing out (FOMO!).
- Setting capital market expectations is challenging in a volatile market environment. Where do you start? What is the time horizon? Does valuation matter? At what interest rate? Discipline in the face of uncertainty is difficult.

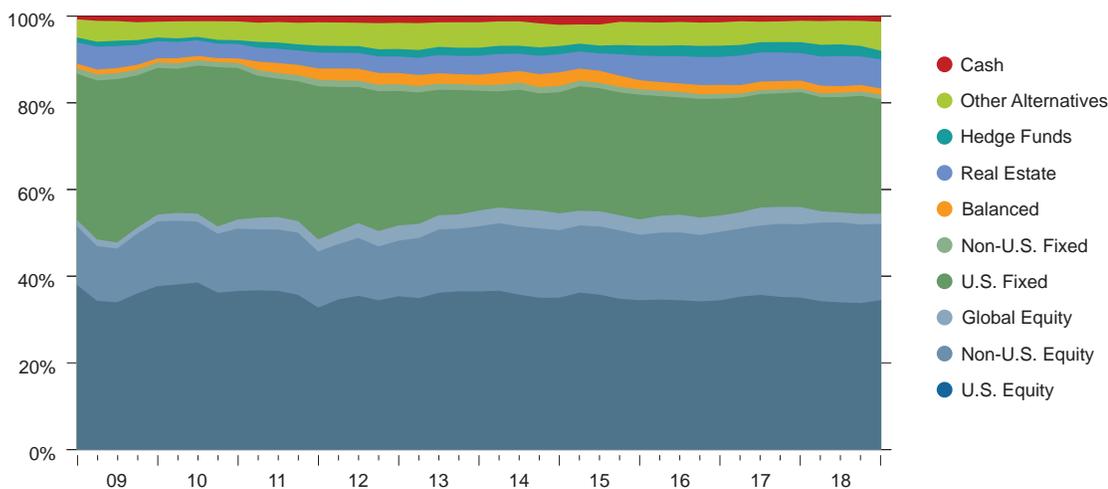
Plan-Level Concerns

- Public plans are focused on asset allocation strategies to reduce public equities and shift into a more diversified real assets portfolio. Return enhancement continues to be the focus of public plans and endowment/foundation funds. As endowments and foundations seek return sources and diversification to mitigate equity risk, less liquid asset classes may benefit.

- Most corporate DB clients embrace de-risking (increasing fixed income and extending duration). Callan expects fund sponsors to diversify existing long bond portfolios with a wider range of fixed income allocations. Callan anticipates allocations to riskier assets (e.g., equities and alternative investments) to decrease as rates rise and funds move forward with de-risking plans. Implementation of de-risking depends largely on interest rate movements this year.
- Public and corporate DB plans view risk control as their key priority. Corporate DB plans also view funded status as a high priority. Endowments/foundations and sovereign wealth funds are focused on evaluating a sustainable distribution rate to balance intergenerational equity.
- Larger public funds are investigating explicit factor strategies to combat concerns about concentration in passive exposures to U.S. equity.
- Defined contribution (DC) plans are increasingly reviewing recordkeepers, fees, and levels of service to better align with plan demographics and participants’ outcomes and experiences.
- The desire for reduced fees in DC plans increased interest in institutional investment vehicles with notably lower fee structures, such as separate accounts, collective investment trusts, and white label funds.

Callan Public Fund Database Average Asset Allocation

(10 Years)



Source: Callan. Callan’s database includes the following groups: public defined benefit, corporate defined benefit, endowments/foundations, 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.

Global Equity

U.S. Equities

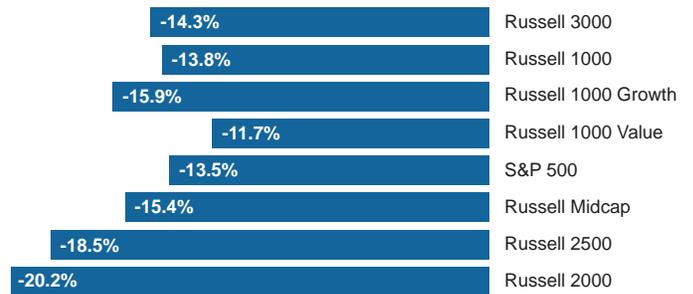
Large Cap ▶ S&P 500: -13.5% | Russell 1000: -13.8%

- Equity markets fell drastically in the fourth quarter, with all sectors in the **S&P 500 Index**, save Utilities (+1.4%), in negative territory.
- The decline was driven by broad-based de-risking.
- Contributing factors included escalated trade tensions, rising interest rates, concern over slowing GDP/earnings growth, low oil prices, and the U.S. government shutdown.
- Anecdotal evidence suggests there was increased selling pressure to fulfill year-end tax loss harvesting goals and to meet hedge funds' redemption requests.
- Markets nosedived following Fed Chairman Jerome Powell's October comments, which noted that monetary policy is a long way from neutral.
- Defensive sectors (Utilities: +1.4%; Real Estate: -3.8%; Consumer Staples: -5.2%) fared best.
- Cyclical sectors (Energy: -23.8%; Tech: -17.3%; Industrials: -17.3%) fared the worst on end-of-cycle fears.
- 2018 marked the first time in 70 years that the S&P 500 finished the year in the red after rising in the first three quarters; the Index fell nearly 20% from its September peak.
- On the positive side, volatility was welcomed by active managers seeking better valuation entry points; the S&P 500 forward P/E went from 16.8 on Sept. 30 to 14.4 on Dec. 31.

Small Cap ▶ Russell 2000: -20.2% | Russell 2000 Growth: -21.7% | Russell 2000 Value: -18.7%

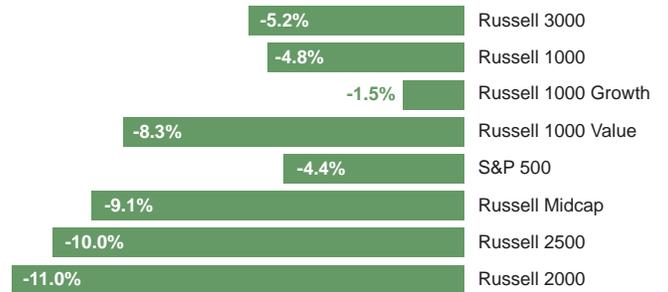
- Small cap stocks were hardest hit as margin pressure, excess leverage, slowing growth, and earnings expectations concerned investors.
- The **Russell 2000 Index** fell over 22% from its Aug. 31 peak.

U.S. Equity: Quarterly Returns



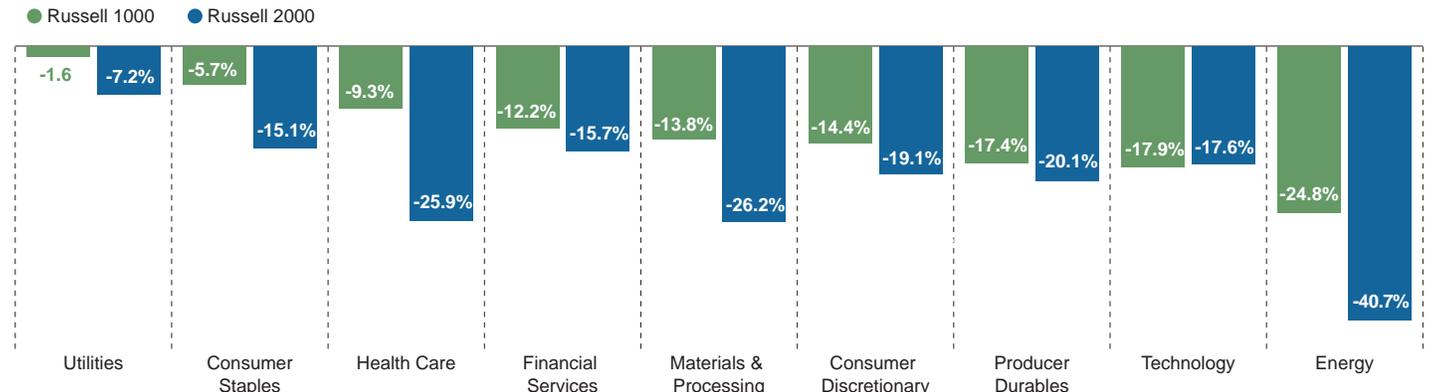
Sources: FTSE Russell and Standard & Poor's

U.S. Equity: One-Year Returns



Sources: FTSE Russell and Standard & Poor's

Quarterly Performance of Select Sectors



Source: FTSE Russell

Growth vs. Value ▶ *Russell 1000 Growth: -15.9% | Russell 1000 Value: -11.7%*

Growth fell further than value within both large and small cap due to its larger weightings in poor-performing sectors.

Non-U.S./Global Equity

Developed ▶ *MSCI EAFE: -12.5% | MSCI Europe: -12.7% | MSCI World ex USA: -12.8%*

- Economic deceleration fueled by the global trade dispute and Brexit impasse drove markets down.
- Global growth concerns and falling oil prices challenged economically sensitive sectors.
- All sectors were in negative territory. Defensive sectors fared better than cyclicals given the risk-off environment.
- Utilities, Real Estate, and Communication Services fared best.
- Energy, Information Technology, and Materials trailed.
- Value and quality outperformed growth and volatility factors as the market rewarded clear earners and stable businesses.
- The dollar rallied against the euro by 1.6% on weak growth and fears of euro zone economic contraction.
- The yen gained against the dollar by 3.5% as investors sought safe haven.

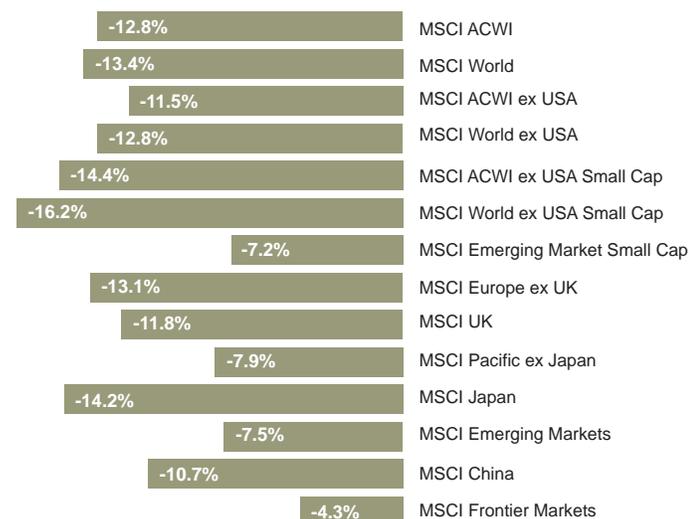
Emerging Markets ▶ *MSCI Emerging Markets Index: -7.5%*

- China (-10.7%) posted its worst quarter since 2015 on the rising dollar, U.S.-China trade tension, and the slowing economy.
- China reported GDP growth of 6.5%, the slowest since 2009.
- Brazil (+13.4%) was the best performer on shifting growth and pension reform sentiment after its presidential election.
- The Asian Tech sector faces heightened regulation and concerns of a consumption slowdown.
- Soft demand challenged Taiwan Semiconductor and Samsung Electronics.
- Defensively oriented Utilities fared best while Health Care, Discretionary, and Tech faltered on fears of a China slowdown.
- Value outpaced growth and volatility factors.

International Small Cap ▶ *MSCI World ex USA Small Cap: -16.2% | MSCI EM Small Cap: -7.2%*

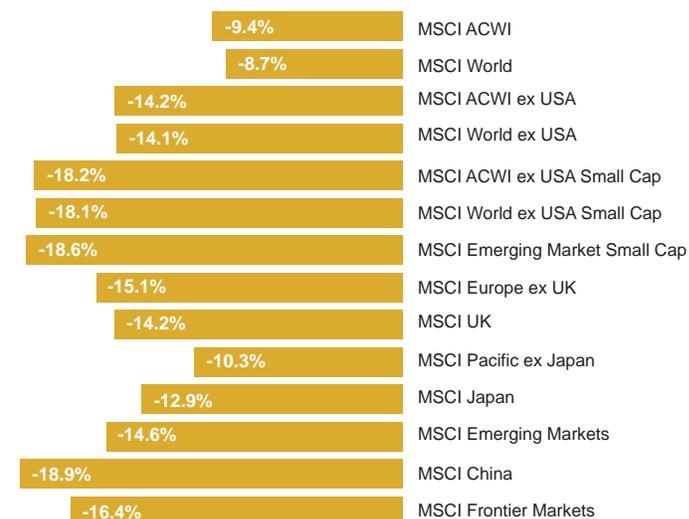
- Non-U.S. developed small cap was also negatively impacted by U.S.-China trade tension and global growth fears.
- All sectors declined, with Energy, Tech, and Industrials faring the worst on falling oil prices and the risk-off environment.
- Emerging market small cap slightly outperformed emerging markets large cap due to Utilities, coupled with the Asian large cap tech sell-off.
- Value outpaced growth.

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



Source: MSCI

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



Source: MSCI

Global Fixed Income

U.S. Fixed Income

Market volatility rose in the last quarter of the year as investors grew increasingly concerned over slowing global economic growth, geo-political uncertainty, and hawkish Fed policy. Safe-haven securities, such as U.S. Treasuries and other developed market sovereign bonds, rallied while risk assets sold off.

U.S. Fixed Income ► *Bloomberg Barclays US Agg: +1.6%*

- A flight to quality lowered the bellwether 10-year Treasury yield to a level not seen since January 2018; the yield fell from a multi-year high of 3.24% in November to end the quarter at 2.69%.
- U.S. Treasuries returned 2.6%.
- TIPS underperformed nominal Treasuries as inflation expectations decreased.
- The yield curve continued to flatten with long-term rates declining faster than short-term rates; the spread between the 2-year and 10-year key rates remained positive though slightly tighter than a quarter ago.
- A portion of the yield curve (two year to five year) inverted for a few weeks during the quarter.

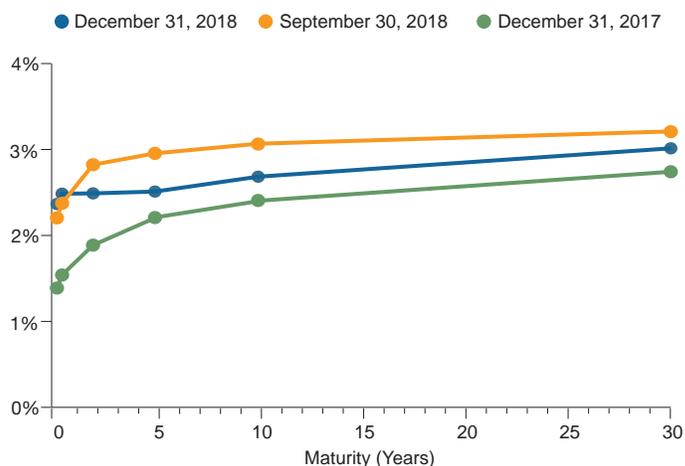
Investment-Grade Corporates ► *Bloomberg Barclays Corporate: -0.2%*

- Prices on investment-grade corporate bonds sank amid concerns over elevated debt leverage.
- Investment-grade spreads widened to +153 bps, a level not seen since July 2016, as a lack of new issuance supply could not offset a lack of demand.
- Headline risk increased on the growing size of the BBB-rated market and the potential implications from ratings downgrades should economic growth slow.
- More than 50% of new issuance came from BBB-rated issuers in 2018.

High Yield ► *Bloomberg Barclays Corporate High Yield: -4.5%*

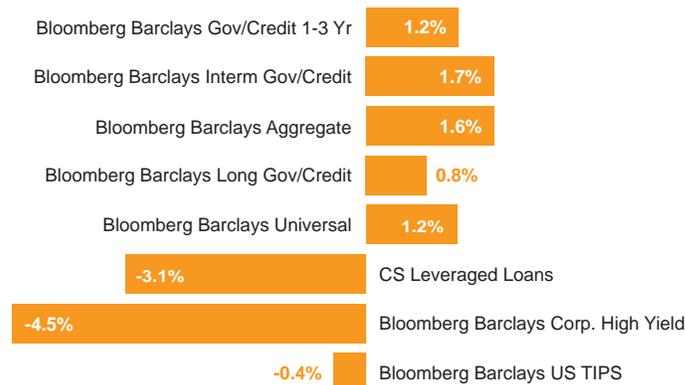
- High yield bond funds experienced \$20 billion in outflows as market volatility increased.
- High yield's average yield-to-worst approached 8%.

U.S. Treasury Yield Curves



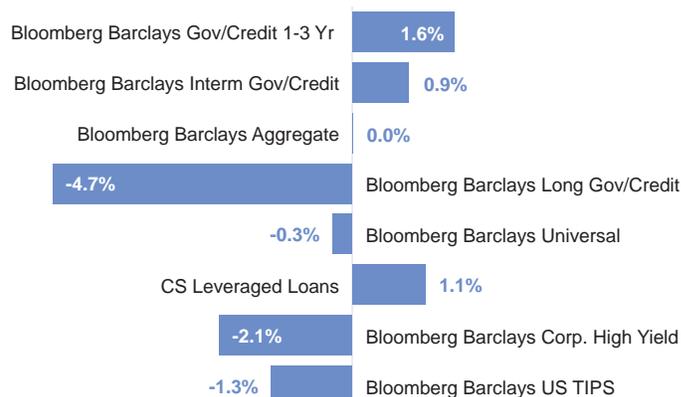
Source: Bloomberg

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

GLOBAL FIXED INCOME (Continued)

- The Energy sector led the selloff amid volatile oil prices in the fourth quarter; the sector makes up approximately 15% of the Index.
- This was the first December in 10 years in which there was no high yield bond issuance; year-over-year, new issuance was down 40% in 2018.

Leveraged Loans ► *S&P/LSTA U.S. Leveraged Loan: -3.5%*

- Leveraged loans experienced retail outflows (\$17 billion) as changing interest rate projections caused the floating rate feature to be less attractive.
- December was the worst monthly performance in seven years and worst December since 2008, with the Index falling 2.6%.
- Demand was weaker than earlier in the year as collateralized loan obligation formation decreased in December.

Non-U.S. Fixed Income

Global Fixed Income ► *Bloomberg Barclays Global Aggregate: +1.2% | Global Aggregate (hdg): +1.7%*

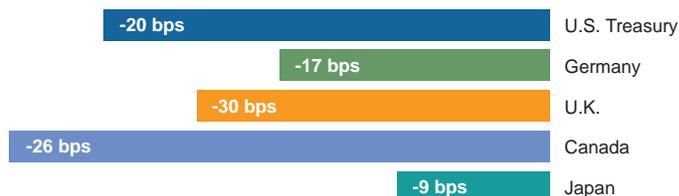
- Other developed market sovereign bonds rallied in tandem with the rally in Treasuries, though the strength in the U.S. dollar proved to be a headwind for unhedged non-U.S. developed assets.

Emerging market debt (\$US) ► *JPM EMBI Global Diversified: -1.3%, (Local currency) ► JPM GBI-EM Global Diversified: +2.1%*

- Various higher-yielding emerging market currencies (Turkey, Argentina, Brazil) appreciated against the greenback, adding to a solid quarter for local emerging market debt.
- Performance was mixed across the EMBI's 60+ countries.

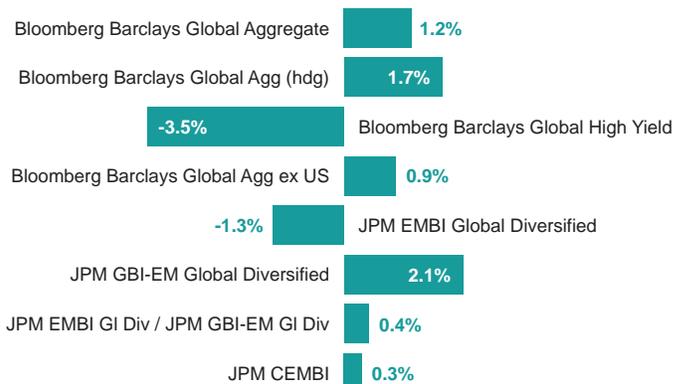
Change in 10-Year Global Government Bond Yields

3Q18 to 4Q18



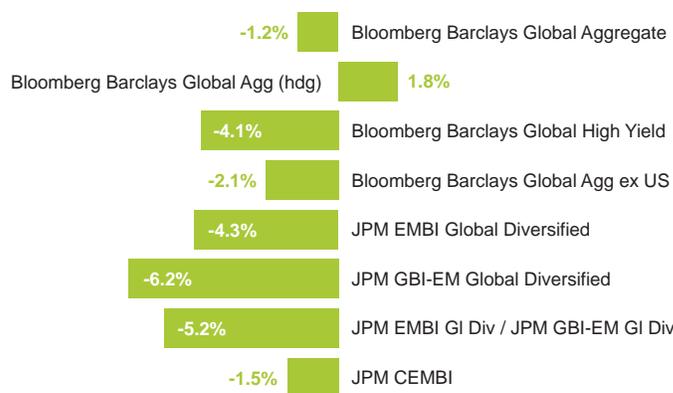
Source: Bloomberg Barclays

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 Healthy in the U.S.; Real Assets Struggled

REAL ESTATE/REAL ASSETS | Kevin Nagy, CAIA, & Kristin Bradbury, CFA

Returns Continue to Moderate

- The **Callan Real Estate ODCE Style Group** rose 1.5% in the fourth quarter and 7.4% for the year, in line with the returns for the **NFI-ODCE Index** over the same periods.
- The **NCREIF Property Index** climbed 1.4% in the quarter and 6.7% for the year.
- U.S. core real estate returns continue to shift toward income with limited appreciation.
- Appreciation is coming from net operating income growth rather than further cap rate compression.
- Industrial real estate remains the best performer.

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. property was 6% in the fourth quarter, near the lowest level since 2001.
- Net operating income has been growing annually and is expected to be the primary return driver going forward.

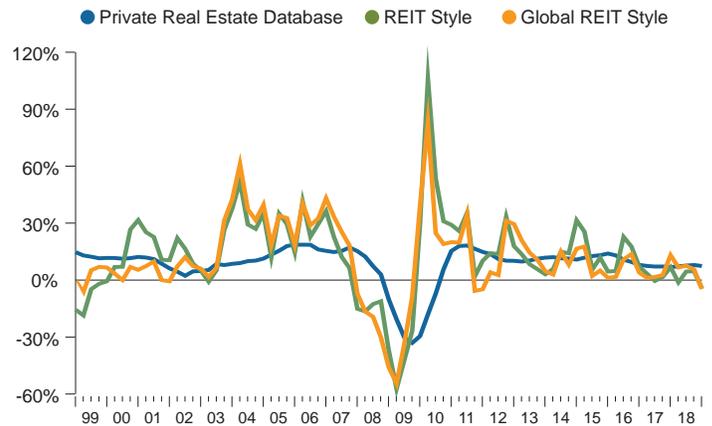
Pricing Remains Expensive in the U.S.

- Transaction volumes fell slightly but are still robust.
- Cap rates continued to fall, indicating full valuations.

REITs Traded Off, Outperformed Global Equities

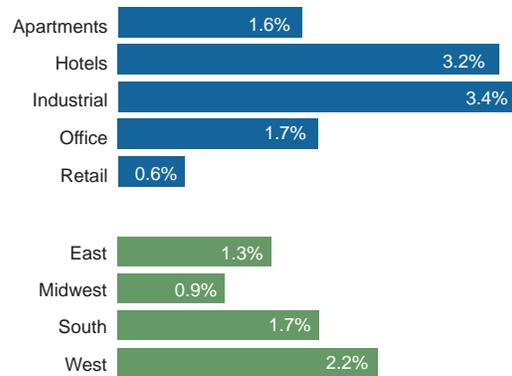
- The **Callan Global Real Estate Style Group** dropped 5.9% in the quarter and 4.7% for the full year, compared to the 5.7% and 5.6% declines for the **FTSE EPRA Nareit Global Developed Real Estate Index**.
- The **Callan Global ex-U.S. Real Estate Style Group** was off 5.5% and 5.1% for the quarter and the year; the **FTSE EPRA Nareit Developed ex US Index** fell 4.9% and 5.8% over the same periods.
- The losses for global REITs compared to the 12.8% plunge for the **MSCI ACWI Index** in the quarter.

Rolling One-Year Returns



Source: Callan

Sector Quarterly Returns by Property Type and Region



Source: NCREIF

- The **Callan REIT Style Group** saw higher losses in the quarter (-6.3%) but performed better than the other REIT indices over the year (-4.3%). Its returns roughly matched those of the **FTSE EPRA Nareit All Equity REITs Index**.
- Both U.S. and non-U.S. REITs are trading at discounts to net asset value.

REAL ESTATE (Continued)

Non-U.S. Markets Seeing Increased Capital Flows

- European real estate markets (ex-U.K.) are gaining momentum due to strong fundamentals in major European cities.
- Asian real estate products are seeing strong fundraising momentum, with an increase in Asia-focused open-end funds.

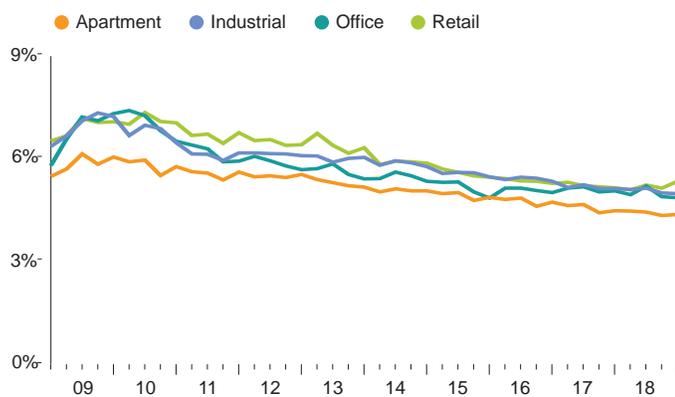
Few Places to Hide in Real Assets

- Gold (**S&P Gold Spot Price Index**: +7.1%) was a rare bright spot amid broad losses for real assets.
- Commodities indices were off sharply. The **Bloomberg Commodity Index** lost 9.4% and the **S&P GSCI**

Commodity Index plunged 22.9%; the deviation between the two indices was largely attributable to the plummeting price of oil (down 40%) from a four-year peak of \$76/barrel in October to close at \$45/barrel on concerns over both supply and waning demand.

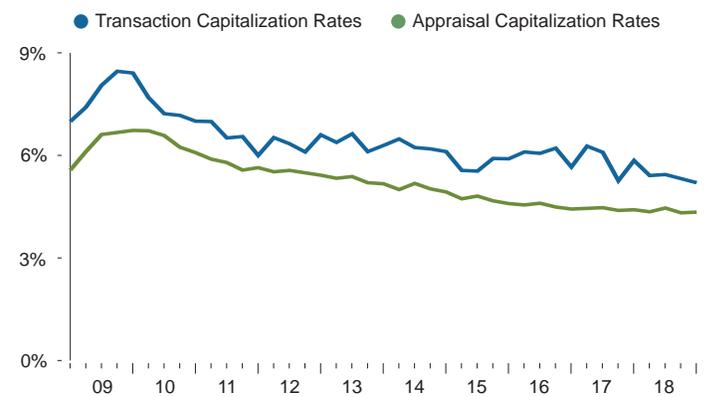
- MLPs could not avoid the knock-on effects of lower oil prices (**Alerian MLP Index**: -17.3%).
- The **Dow Jones Brookfield Infrastructure Index** suffered a decline of 6%.
- TIPS also delivered a negative return as the 10-year break-even spread narrowed to 1.71% from 2.14% as of Sept. 30 on reduced expectations for inflation.

NCREIF Capitalization Rates by Property Type



Source: NCREIF
Note: Capitalization rates 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 December 31, 2018

	Last Quarter	Year to Date	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 15 Years
Private Real Assets							
Real Estate ODCE Style	1.45	7.41	7.41	7.76	9.69	6.00	7.09
NFI-ODCE (value wt net)	1.52	7.36	7.36	7.27	9.41	6.01	7.23
NCREIF Property	1.37	6.72	6.72	7.21	9.33	7.49	8.86
NCREIF Farmland	2.85	6.74	6.74	6.67	8.57	11.16	14.44
NCREIF Timberland	0.97	3.44	3.44	3.22	4.98	3.83	7.23
Public Real Estate							
Global Real Estate Style	-5.86	-4.74	-4.74	3.66	6.08	11.10	8.28
FTSE EPRA Nareit Developed	-5.69	-5.63	-5.63	2.72	4.34	9.65	--
Global ex-U.S. Real Estate Style	-5.53	-5.10	-5.10	4.50	4.99	10.49	7.95
FTSE EPRA Nareit Dev ex US	-4.87	-5.79	-5.79	5.09	3.00	9.24	7.22
U.S. REIT Style	-6.32	-4.32	-4.32	3.09	8.35	13.04	9.12
EPRA Nareit Equity REITs	-6.32	-4.62	-4.62	2.89	7.90	12.12	8.25

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

Downshifting into a Tricky Corner

PRIVATE EQUITY | Gary Robertson

The number of transactions fell modestly for 2018 and in the fourth quarter, reflecting less certainty in more volatile—and trickier—capital markets. However, dollar volumes associated primarily with fundraising, and venture capital (VC) investments and exits, increased. Overall activity remains near record levels.

- **Fundraising** ► In 2018, private equity partnerships holding **final closes** raised \$599 billion globally across 804 partnerships (unless otherwise noted, PitchBook provided all private equity data cited). The amount rose 6% from \$566 billion in 2017, but the number of funds fell 19% from 995. Final closes accounted for \$112 billion in the fourth quarter, down 27% from \$154 billion in the third quarter. The number totaled 164, down 20% from 206.
- **Buyouts** ► New **buyout transactions** for 2018 totaled 7,402 investments, down 4% from 7,738 in 2017. Dollar volume fell to \$630 billion, a 3% drop from \$649 billion. The fourth quarter saw 1,571 new investments, dropping 16% from 1,868 in the third quarter, but dollar volume rose to \$158 billion, a 3% uptick from \$153 billion.
- **VC Investments** ► The year produced 20,632 rounds of **new investment in venture capital (VC) companies**, down 23% from 2017's 26,668. The announced volume of \$253 billion is up 53% from \$165 billion. The fourth quarter saw 3,654 new rounds, 24% down from 4,787 in the third quarter, and dollar volume fell to \$51 billion, a 6% drop.

Funds Closed January 1 to December 31, 2018

Strategy	No. of Funds	Amt (\$mm)	Share
Venture Capital	354	74,373	12%
Growth Equity	59	131,551	22%
Buyouts	190	237,399	40%
Mezzanine Debt	61	54,836	9%
Distressed	14	26,510	4%
Energy	24	21,097	4%
Secondary and Other	63	36,108	6%
Fund-of-funds	39	16,870	3%
Totals	804	598,744	100%

Source: PitchBook
Figures may not total due to rounding.

- **Exits** ► The year saw 145 **buyout-backed IPOs** in 2018, down 37% from 230 in 2017, with proceeds of \$44 billion, down 19%. The fourth quarter saw 21 IPOs, down 16% from the third quarter, with proceeds of \$9 billion, up 50%.
- Venture-backed M&A exits for the year totaled 1,375, down 16% from 1,646 in 2017. Announced dollar volume was \$140 billion, up 43% from \$98 billion in 2017. The quarter had 295 exits, down 9% from 325 in the third quarter. The fourth quarter's total announced value of \$37 billion was down 8%.
- The year saw 190 venture-backed IPOs, down 3% from 2017, raising \$44 billion, up 132% from 2017. The fourth quarter had 33 IPOs, down 40% from the third quarter. The fourth quarter float of \$4 billion plunged 78% from \$18 billion.

Private Equity Performance Database (%) (Pooled Horizon IRRs through September 30, 2018*)

Strategy	3 Months	Year	3 Years	5 Years	10 Years	15 Years	20 Years
All Venture	4.83	21.65	10.97	16.85	11.79	11.09	19.08
Growth Equity	3.65	20.89	15.16	14.39	12.56	13.54	14.14
All Buyouts	3.18	15.95	15.61	14.00	11.42	14.45	12.46
Mezzanine	2.56	11.38	10.99	10.31	9.79	9.72	8.63
Credit Opportunities	2.11	9.64	9.29	7.99	11.52	10.21	10.42
Control Distressed	0.85	7.03	10.75	9.31	10.55	10.96	10.85
All Private Equity	3.37	16.80	13.87	13.79	11.54	13.16	12.96
S&P 500	7.71	17.91	17.31	13.95	11.97	9.65	7.42
Russell 3000	7.12	17.58	17.07	13.46	12.01	9.86	7.82

Note: Private equity returns are net of fees. Sources: Standard & Poor's and Thomson Reuters/Cambridge
*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.

Messy Quarter for Hedge Funds; MACs Struggle

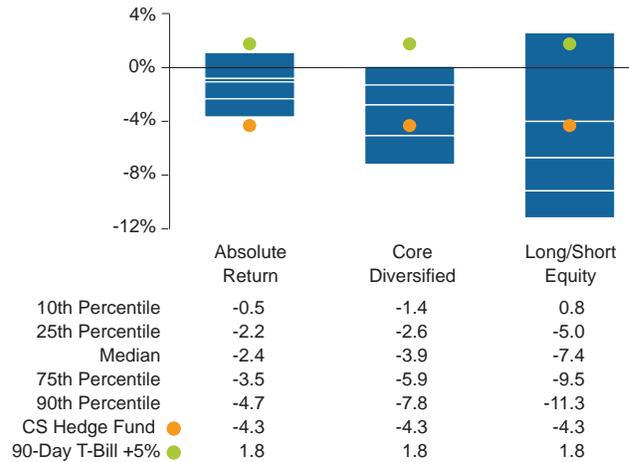
HEDGE FUNDS/MACs | Jim McKee

Hedge Funds: Hot Stuffing Meets Cold Turkey

As the global capital markets reacted to the sharp risk-off sentiment driven by the mounting trade war and slumping China growth, volatile prices and tightening liquidity inside these markets became a heated mess for hedge funds.

- With U.S. small caps and commodities leading markets down, most hedge funds long on risk lost ground, as the **Credit Suisse Hedge Fund Index** melted down 4.3%. For the year, the index finished with a 3.2% loss.
- Heavily exposed to equity beta, *Long/Short Equity* (-6.7%) and *Event-Driven Multi* (-7.7%) lost the most among CS hedge fund strategies.
- After suffering more-than-expected damage in the prior quarter, *Emerging Markets* (-3.3%) fared better with alpha.
- Relative value trades, particularly those further away from liquid stocks, like *Fixed-Income Arb* (-1.3%), were less impacted.

Hedge Fund-of-Funds Style Group Returns



Sources: Callan, Credit Suisse, and Federal Reserve

Callan Database Median and Index Returns* for Periods ended December 31, 2018

Hedge Fund Universe	Quarter	Year	3 Years	5 Years	10 Years	15 Years
Callan Fund-of-Funds Database	-4.87	-1.35	2.19	2.06	5.26	4.56
Callan Absolute Return FOF Style	-2.42	0.71	3.41	2.84	5.78	4.18
Callan Core Diversified FOF Style	-3.92	-1.36	2.08	1.75	5.44	4.80
Callan Long/Short Equity FOF Style	-7.36	-6.14	2.31	2.05	5.21	5.45
Credit Suisse Hedge Fund	-4.30	-3.19	1.64	1.66	5.10	4.77
CS Convertible Arbitrage	-3.21	-2.26	3.04	1.64	7.44	3.50
CS Distressed	-3.20	-1.59	3.95	1.75	6.09	5.78
CS Emerging Markets	-3.25	-10.16	3.13	2.13	6.06	6.01
CS Equity Market Neutral	-4.86	-5.00	-0.57	-0.25	1.61	-0.26
CS Event-Driven Multi	-7.69	-5.19	0.54	-0.83	3.93	4.89
CS Fixed Income Arb	-1.29	1.10	3.94	3.35	7.39	3.84
CS Global Macro	-1.74	-0.11	1.86	1.77	4.84	6.06
CS Long/Short Equity	-6.67	-4.62	1.47	2.69	5.82	5.54
CS Managed Futures	-3.66	-6.67	-3.52	1.04	0.01	2.44
CS Multi-Strategy	-3.74	-1.05	3.34	3.99	7.63	5.78
CS Risk Arbitrage	-0.85	0.17	3.92	2.15	3.40	3.71
HFRI Asset Wtd Composite	-2.73	-1.03	2.77	2.54	5.46	-
90-Day T-Bill + 5%	1.77	6.87	6.02	5.63	5.38	6.33

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

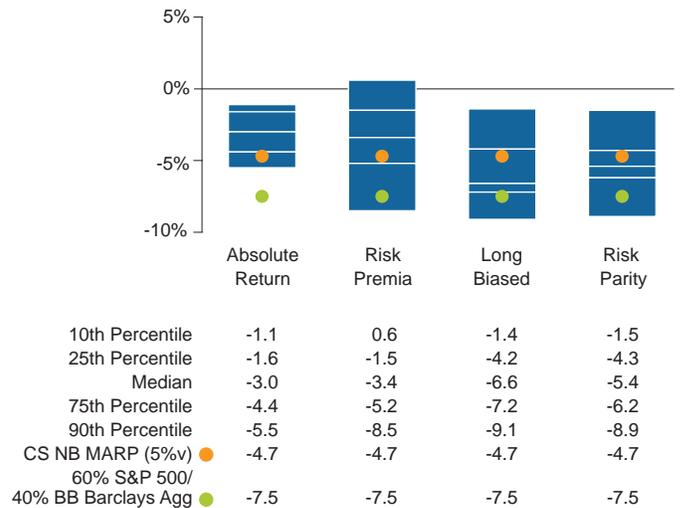
- Also, more process-driven or hard-catalyst strategies, like *Risk Arb* and even *Distressed* (-3.2%), held ground better.
- Reflecting live hedge fund portfolios, the **HFRI FOF Composite Index** (-4.8%) fell marginally more than its unmanaged CS HFI proxy. For the year, it lost 3.9%.
- Hedge fund portfolios with a long bias to U.S. equities and related risks suffered the most, while those with illiquid credits, conservative event-driven, or discretionary macro strategies performed relatively well.

Top-Down MAC Strategies Slump Together

Liquid alternatives to hedge funds have become popular among investors for their attractive risk-adjusted returns that are similarly uncorrelated with traditional stock and bond investments but constructed at a lower cost. The **Callan Multi-Asset Class (MAC) Style Groups** tripped again in the fourth quarter's risk-off mode, but different factors were to blame than in prior quarters. As value-oriented trades gained ground, particularly in equities, commodity momentum lost traction, particularly with heated oil markets suddenly cooling off. The commodity carry trade was also difficult, especially in November for natural gas.

- The **HFR Risk Parity Index** targeting 12% volatility slipped 8.0%, hurt by both commodity and equity exposures. Reflecting a material U.S. equity influence, a global balanced index of 60% stocks and 40% bonds fell 7.2%.
- **CS NB Multi Asset Risk Premia Index** (-4.7%) is an

MAC Style Group Returns

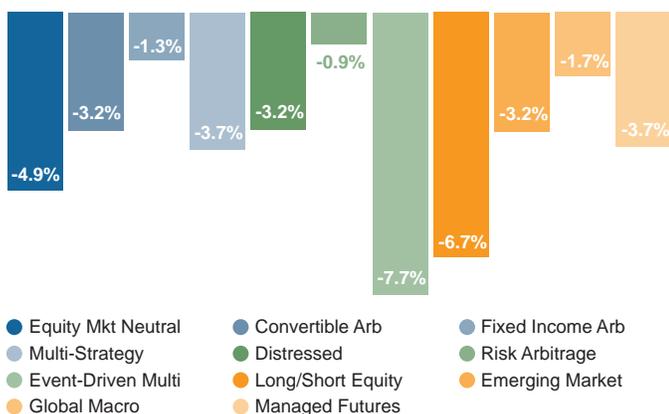


Sources: Bloomberg Barclays, Callan, Credit Suisse, Neuberger Berman, Standard & Poor's

equal risk-weighted index of alternative risk factors (value, carry, momentum, and liquidity) across four capital markets (equity, fixed income, currency, and commodities) targeting 5% volatility.

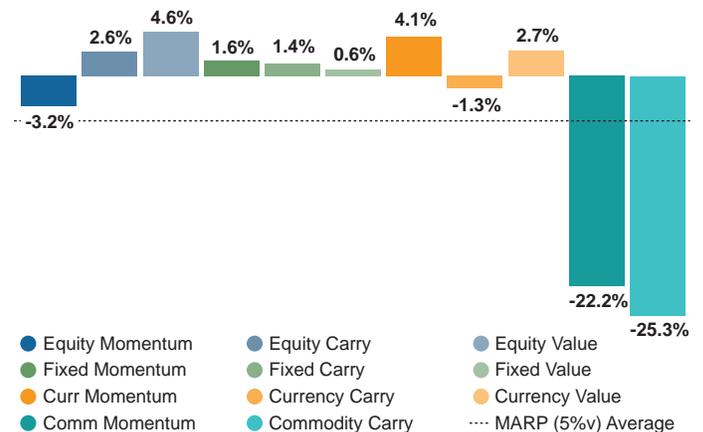
- Within CS NB MARP, *Equity Value* (+4.6%) finally earned positive marks, but such gains were notably offset by both *Commodity Momentum* (-22.2%) and *Commodity Carry* (-25.3%) suffering massive reversals to end the year down deeply in red.

Credit Suisse Hedge Fund Strategy Returns



Source: Credit Suisse

Alternative Risk Factor Breakdown



Source: Credit Suisse Neuberger Berman

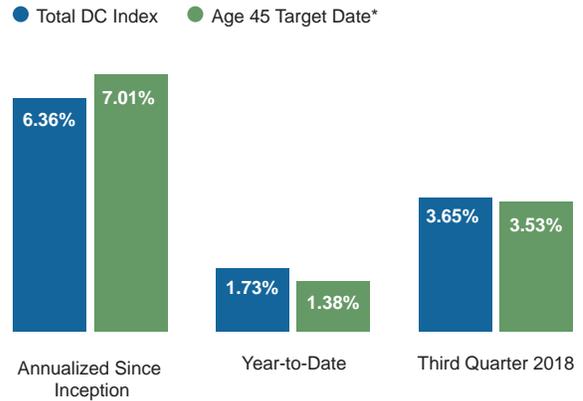
DC Index Tops Age 45 TDF in 3rd Quarter

DEFINED CONTRIBUTION | James Veneruso, CFA, CAIA

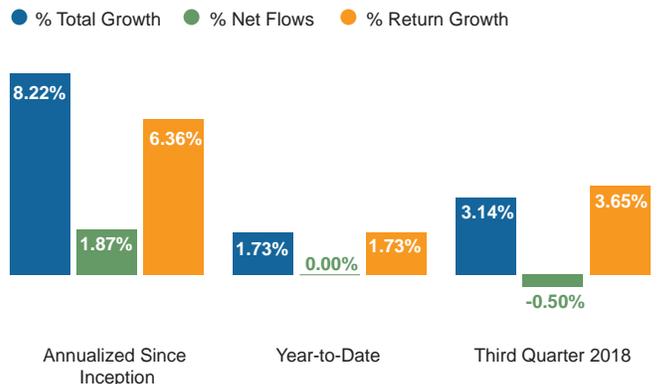
- The Callan DC Index™ gained 3.7% in the third quarter, outpacing the 3.5% rise of the Age 45 Target Date Fund (TDF).
- Some of this outperformance stemmed from gains of U.S. equities in the quarter compared to their overseas counterparts. The average DC plan has a 5.3% allocation to non-U.S. equity and emerging markets, while the Age 45 TDF has an allocation of 25.9%.
- But since inception the DC Index's annual return of 6.4% has trailed the Age 45 TDF by 65 basis points.
- The DC Fee Analysis, showing average total investment management fees, reveals that fees fell across all plan sizes. This was driven by increased use of passive mandates, lower breakpoints, and new lower-fee vehicles and share classes for active options.
- DC plan balances grew by 3.1%, driven completely by market performance. For the first time since the third quarter of 2016, flows into the DC Index were negative.
- TDFs attracted the majority of assets in the quarter, approximately 64 cents of every dollar that flowed into DC funds.
- U.S. large cap, U.S./global balanced, and non-U.S. equities saw material net outflows. Small/mid-cap equity and money market saw sizable inflows.
- Turnover (i.e., net transfer activity levels within DC plans) decreased to 0.1% from 0.4% the previous quarter, well below the historical average at 0.6%.
- The Index's equity allocation hit 71%, modestly above the historical average (68%).
- TDFs maintained their lead with the largest share of DC Index assets (31.7%).
- The share of plans offering a brokerage window increased from 34% a year ago to 42%. The share offering a money market option dropped from 51% to 43%, while stable value rose from 69% to 73%.

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 \$135 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 (Third Quarter 2018) (Top Two and Bottom Two Asset Gatherers)

Asset Class	Flows as % of Total Net Flows
Target Date Funds	64.39%
Money Market	14.12%
Company Stock	-17.44%
U.S. Large Cap	-22.50%
Total Turnover**	0.13%

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

Source: Callan DC Index

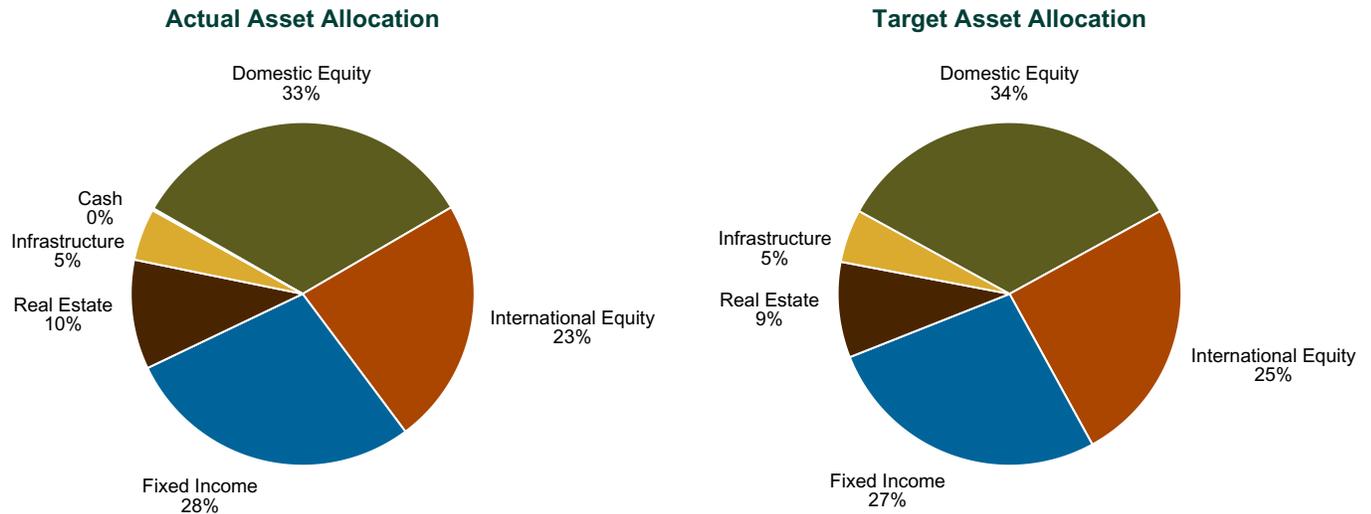
Note: DC Index inception date is January 2006.

* 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.

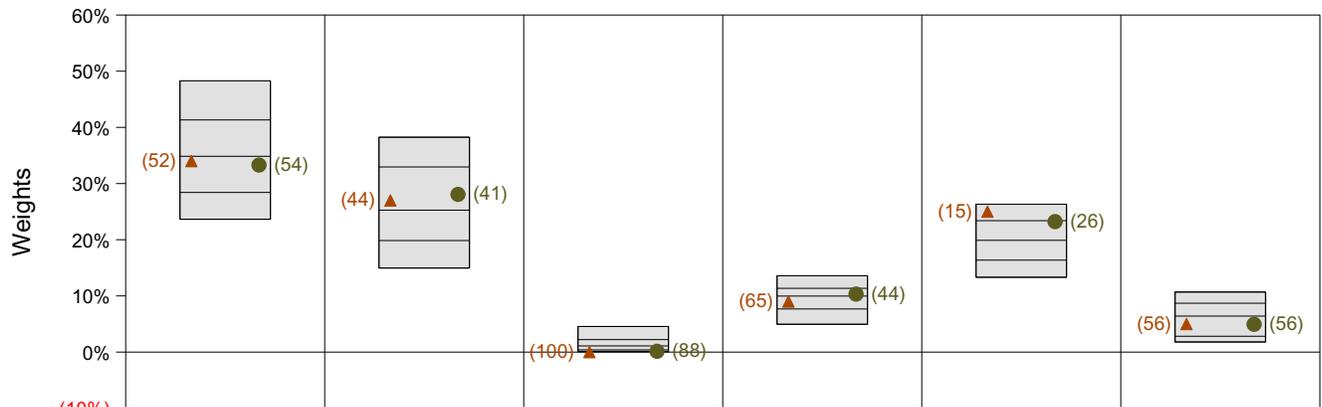
Actual vs Target Asset Allocation As of December 31, 2018

The top left chart shows the Fund's asset allocation as of December 31, 2018. 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.



Asset Class	\$000s Actual	Weight Actual	Target	Percent Difference	\$000s Difference
Domestic Equity	253,598	33.3%	34.0%	(0.7%)	(5,376)
International Equity	176,886	23.2%	25.0%	(1.8%)	(13,536)
Fixed Income	213,804	28.1%	27.0%	1.1%	8,147
Real Estate	78,613	10.3%	9.0%	1.3%	10,061
Infrastructure	37,692	4.9%	5.0%	(0.1%)	(392)
Cash	1,096	0.1%	0.0%	0.1%	1,096
Total	761,689	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	48.27	38.25	4.56	13.58	26.32	10.69
25th Percentile	41.33	32.95	2.22	11.35	23.39	8.70
Median	34.85	25.26	1.10	9.97	19.89	6.41
75th Percentile	28.42	19.86	0.40	7.68	16.37	2.82
90th Percentile	23.64	14.96	0.08	4.95	13.32	1.80
Fund ●	33.29	28.07	0.14	10.32	23.22	4.95
Target ▲	34.00	27.00	0.00	9.00	25.00	5.00
% Group Invested	98.55%	96.38%	78.26%	73.91%	97.10%	20.29%

* 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 December 31, 2018, with the distribution as of September 30, 2018. 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

	December 31, 2018		Net New Inv.	Inv. Return	September 30, 2018	
	Market Value	Weight			Market Value	Weight
Domestic Equity	\$253,598,264	33.29%	\$(17,519,371)	\$(41,110,580)	\$312,228,215	36.98%
Large Cap Equity	\$194,207,023	25.50%	\$(10,871,104)	\$(29,818,718)	\$234,896,845	27.82%
Alliance S&P Index	59,436,256	7.80%	(5,292,216)	(9,658,638)	74,387,109	8.81%
PIMCO StocksPLUS	28,537,507	3.75%	(5,500,000)	(5,390,773)	39,428,279	4.67%
BlackRock Russell 1000 Value	52,873,570	6.94%	0	(6,985,963)	59,859,533	7.09%
T. Rowe Price Large Cap Growth	53,359,690	7.01%	(78,888)	(7,783,345)	61,221,923	7.25%
Small/Mid Cap Equity	\$59,391,241	7.80%	\$(6,648,267)	\$(11,291,862)	\$77,331,370	9.16%
Champlain Mid Cap	30,099,140	3.95%	(6,578,322)	(4,221,271)	40,898,733	4.84%
Pyramis Small Cap	29,292,101	3.85%	(69,945)	(7,070,591)	36,432,637	4.31%
International Equity	\$176,886,167	23.22%	\$(214,068)	\$(27,184,042)	\$204,284,277	24.19%
Causeway International Opportunities (3)	69,923,200	9.18%	(88,893)	(11,028,827)	81,040,921	9.60%
Aberdeen EAFE Plus	73,257,853	9.62%	(125,174)	(7,593,235)	80,976,262	9.59%
American Century Non-US SC [1]	33,705,114	4.43%	0	(8,561,980)	42,267,095	5.01%
Fixed Income	\$213,803,595	28.07%	\$(140,939)	\$1,336,638	\$212,607,897	25.18%
BlackRock U.S. Debt Fund	105,248,032	13.82%	0	1,691,365	103,556,667	12.26%
PIMCO Fixed Income	108,555,563	14.25%	(140,939)	(354,727)	109,051,230	12.91%
Real Estate	\$78,613,249	10.32%	\$(341,535)	\$927,844	\$78,026,940	9.24%
JP Morgan Strategic Property Fund	52,725,315	6.92%	22,119	781,597	51,921,598	6.15%
JP Morgan Income and Growth Fund	25,887,933	3.40%	(363,655)	146,246	26,105,342	3.09%
Infrastructure	\$37,692,088	4.95%	\$(368,537)	\$1,681,015	\$36,379,610	4.31%
Macquarie European Infrastructure	9,771,432	1.28%	(98,484)	205,467	9,664,450	1.14%
SteelRiver Infrastructure	27,920,656	3.67%	(270,053)	1,475,548	26,715,161	3.16%
Cash Composite	\$1,096,081	0.14%	\$214,244	\$6,904	\$874,933	0.10%
Cash	1,096,081	0.14%	214,244	6,904	874,933	0.10%
Total Plan	\$761,689,444	100.0%	\$(18,370,206)	\$(64,342,222)	\$844,401,872	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 December 31, 2018. 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 December 31, 2018

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Gross of Fees					
Domestic Equity	(13.53%)	(2.77%)	10.27%	8.92%	14.08%
Total Domestic Equity Target (1)	(14.61%)	(5.61%)	8.85%	7.78%	13.16%
Large Cap Equity	(12.98%)	(3.03%)	10.06%	8.98%	13.42%
S&P 500 Index	(13.52%)	(4.38%)	9.26%	8.49%	13.12%
Alliance S&P Index	(13.46%)	(4.34%)	9.19%	8.47%	13.10%
PIMCO StocksPLUS S&P 500 Index	(14.36%) (13.52%)	(5.47%) (4.38%)	9.29% 9.26%	8.53% 8.49%	15.80% 13.12%
BlackRock Russell 1000 Value Index	(11.67%)	(8.13%)	6.97%	6.02%	11.31%
Russell 1000 Value Index	(11.72%)	(8.27%)	6.95%	5.95%	11.18%
T. Rowe Price Large Cap Growth	(12.73%)	5.10%	14.42%	12.62%	18.73%
Russell 1000 Growth Index	(15.89%)	(1.51%)	11.15%	10.40%	15.29%
Small/Mid Cap Equity U.S. Equity	(15.23%)	(1.84%)	10.99%	8.72%	16.45%
Russell 2500 Index	(18.49%)	(10.00%)	7.32%	5.15%	13.15%
Champlain Mid Cap Russell MidCap Index	(11.37%) (15.37%)	4.88% (9.06%)	15.19% 7.04%	11.34% 6.26%	15.87% 14.03%
Pyramis Small Cap Russell 2000 Index	(19.42%) (20.20%)	(8.89%) (11.01%)	6.51% 7.36%	5.86% 4.41%	16.30% 11.97%
International Equity	(13.30%)	(17.33%)	4.12%	0.19%	6.07%
MSCI ACWI x US (Net)	(11.46%)	(14.20%)	4.48%	0.68%	6.57%
Causeway International Opportunities (3)	(13.62%)	(18.50%)	2.87%	0.31%	8.49%
Causeway Linked Index (3)	(11.46%)	(14.20%)	3.55%	0.93%	6.53%
Aberdeen EAFE Plus MSCI ACWI x US (Net)	(9.38%) (11.46%)	(14.04%) (14.20%)	5.56% 4.48%	(0.20%) 0.68%	7.20% 6.57%
American Century Non-US SC (4)	(20.05%)	(20.83%)	-	-	-
MSCI ACWI ex US Small Cap	(14.43%)	(18.20%)	3.82%	1.96%	10.02%
Fixed Income	0.63%	(0.33%)	4.47%	3.81%	5.61%
Bimbg Aggregate Index	1.64%	0.01%	2.06%	2.52%	3.48%
BlackRock U.S. Debt Fund	1.63%	0.08%	2.16%	2.65%	3.60%
Bimbg Aggregate Index	1.64%	0.01%	2.06%	2.52%	3.48%
PIMCO Fixed Income Custom Index (2)	(0.32%) (0.37%)	(0.73%) (2.21%)	6.07% 3.68%	4.63% 3.53%	6.93% 5.41%

(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 December 31, 2018. 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 December 31, 2018

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Gross of Fees					
Real Estate	1.19%	7.31%	7.64%	9.77%	6.64%
NFI-ODCE Value Weight Gr	1.76%	8.35%	8.24%	10.41%	7.00%
JP Morgan Strategic Property Fund	1.51%	7.62%	7.72%	9.87%	7.28%
NFI-ODCE Value Weight Gr	1.76%	8.35%	8.24%	10.41%	7.00%
JP Morgan Income and Growth Fund	0.56%	6.70%	7.44%	9.75%	6.70%
NFI-ODCE Value Weight Gr	1.76%	8.35%	8.24%	10.41%	7.00%
Infrastructure	4.65%	9.26%	16.66%	11.85%	9.75%
CPI + 4%	0.29%	5.77%	5.98%	5.33%	5.80%
Macquarie European Infrastructure	2.17%	13.78%	29.31%	15.05%	11.39%
SteelRiver Infrastructure	5.55%	7.76%	8.07%	11.02%	9.51%
CPI + 4%	0.29%	5.77%	5.98%	5.33%	5.80%
Cash Composite	0.51%	1.71%	0.99%	0.60%	0.40%
Total Fund	(7.67%)	(4.39%)	7.41%	6.27%	9.77%
Total Fund Benchmark*	(7.46%)	(4.55%)	5.83%	5.25%	8.97%

* 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.

	6/2018- 12/2018	FY 2018	FY 2017	FY 2016	FY 2015
Gross of Fees					
Domestic Equity	(7.59%)	16.87%	21.35%	1.24%	9.01%
Total Domestic Equity Target (1)	(8.59%)	14.79%	18.34%	2.28%	7.15%
Large Cap Equity	(6.85%)	16.40%	21.12%	1.60%	7.96%
S&P 500 Index	(6.85%)	14.37%	17.90%	3.99%	7.42%
Alliance S&P Index	(6.82%)	14.33%	17.80%	3.97%	7.43%
PIMCO StocksPLUS	(7.55%)	14.13%	19.11%	2.68%	7.57%
S&P 500 Index	(6.85%)	14.37%	17.90%	3.99%	7.42%
BlackRock Russell 1000 Value Index	(6.60%)	6.88%	15.61%	2.75%	4.34%
Russell 1000 Value Index	(6.69%)	6.77%	15.53%	2.86%	4.13%
T. Rowe Price Large Cap Growth	(6.63%)	29.95%	31.65%	(2.64%)	12.35%
Russell 1000 Growth Index	(8.17%)	22.51%	20.42%	3.02%	10.56%
Small/Mid Cap Equity U.S. Equity	(9.86%)	18.33%	21.97%	0.17%	12.68%
Russell 2500 Index	(14.66%)	16.24%	19.84%	(3.67%)	5.92%
Champlain Mid Cap	(3.85%)	18.85%	22.50%	4.64%	10.27%
Russell MidCap Index	(11.14%)	12.33%	16.48%	0.56%	6.63%
Pyramis Small Cap	(16.18%)	17.78%	21.31%	(4.41%)	15.07%
Russell 2000 Index	(17.35%)	17.57%	24.60%	(6.73%)	6.49%
International Equity	(14.09%)	8.64%	20.73%	(9.40%)	(5.79%)
MSCI ACWI x US (Net)	(10.84%)	7.28%	20.45%	(10.24%)	(5.26%)
Causeway International Opportunities (3)	(13.27%)	7.29%	23.39%	(11.66%)	(2.38%)
Causeway Linked Index (3)	(10.84%)	7.28%	20.45%	(9.42%)	(4.22%)
Aberdeen EAFE Plus	(9.84%)	3.38%	18.30%	(7.60%)	(10.16%)
MSCI ACWI x US (Net)	(10.84%)	7.28%	20.45%	(10.24%)	(5.26%)
American Century Non-US SC	(23.13%)	23.86%	21.46%	-	-
MSCI ACWI ex US Small Cap	(15.72%)	10.57%	20.32%	(5.46%)	(3.07%)
Fixed Income	1.33%	0.43%	4.58%	6.39%	0.78%
Blmbg Aggregate Index	1.65%	(0.40%)	(0.31%)	6.00%	1.86%
BlackRock U.S. Debt Fund	1.69%	(0.31%)	(0.21%)	6.13%	1.99%
Blmbg Aggregate Index	1.65%	(0.40%)	(0.31%)	6.00%	1.86%
PIMCO Fixed Income	0.97%	1.16%	7.99%	6.55%	0.05%
Custom Index (2)	0.77%	(1.05%)	3.83%	7.28%	0.75%

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

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

(3) Causeway International Value transitioned to International Opportunities in May 2016; as such, the index has been changed accordingly from EAFE to ACWI ex-US (Net Div).

Investment Manager Returns

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

	6/2018- 12/2018	FY 2018	FY 2017	FY 2016	FY 2015
Gross of Fees					
Real Estate	3.13%	7.72%	8.07%	10.80%	13.92%
NFI-ODCE Value Weight Gr	3.88%	8.44%	7.87%	11.82%	14.43%
JP Morgan Strategic Property Fund	3.35%	7.80%	7.94%	11.10%	13.37%
NFI-ODCE Value Weight Gr	3.88%	8.44%	7.87%	11.82%	14.43%
JP Morgan Income and Growth Fund	2.70%	7.54%	8.27%	10.06%	16.19%
NFI-ODCE Value Weight Gr	3.88%	8.44%	7.87%	11.82%	14.43%
Infrastructure	8.80%	18.95%	12.69%	12.61%	(2.75%)
CPI + 4%	1.42%	7.09%	5.50%	4.64%	3.62%
Macquarie European Infrastructure	4.91%	59.87%	20.04%	6.82%	(9.64%)
SteelRiver Infrastructure	10.23%	(2.94%)	7.09%	17.75%	5.97%
CPI + 4%	1.42%	7.09%	5.50%	4.64%	3.62%
Cash Composite	0.97%	1.22%	0.68%	0.12%	0.00%
Total Fund	(5.14%)	9.81%	14.77%	2.33%	4.63%
Total Fund Benchmark*	(4.95%)	7.96%	12.04%	1.82%	4.34%

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

Investment Manager Returns

The table below details the rates of return for the Fund's investment managers over various time periods ended December 31, 2018. 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 December 31, 2018

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Net of Fees					
Domestic Equity	(13.60%)	(3.04%)	9.93%	8.60%	13.69%
Total Domestic Equity Target (1)	(14.61%)	(5.61%)	8.85%	7.78%	13.16%
Large Cap Equity	(13.01%)	(3.15%)	9.90%	8.82%	13.19%
S&P 500 Index	(13.52%)	(4.38%)	9.26%	8.49%	13.12%
Alliance S&P Index	(13.47%)	(4.38%)	9.15%	8.43%	13.05%
PIMCO StocksPLUS	(14.36%)	(5.47%)	9.29%	8.53%	15.69%
S&P 500 Index	(13.52%)	(4.38%)	9.26%	8.49%	13.12%
BlackRock Russell 1000 Value Index	(11.67%)	(8.16%)	6.93%	5.99%	11.28%
Russell 1000 Value Index	(11.72%)	(8.27%)	6.95%	5.95%	11.18%
T. Rowe Price Large Cap Growth	(12.85%)	4.69%	13.88%	12.11%	18.17%
Russell 1000 Growth Index	(15.89%)	(1.51%)	11.15%	10.40%	15.29%
Small/Mid Cap Equity U.S. Equity	(15.41%)	(2.59%)	10.11%	7.86%	15.54%
Russell 2500 Index	(18.49%)	(10.00%)	7.32%	5.15%	13.15%
Champlain Mid Cap	(11.57%)	3.94%	14.19%	10.39%	14.90%
Russell MidCap Index	(15.37%)	(9.06%)	7.04%	6.26%	14.03%
Pyramis Small Cap	(19.59%)	(9.47%)	5.74%	5.10%	15.46%
Russell 2000 Index	(20.20%)	(11.01%)	7.36%	4.41%	11.97%
International Equity	(13.41%)	(17.69%)	3.64%	(0.38%)	5.37%
MSCI ACWI x US (Net)	(11.46%)	(14.20%)	4.48%	0.68%	6.57%
Causeway International Opportunities (3)	(13.70%)	(18.84%)	2.41%	(0.21%)	7.85%
Causeway Linked Index (3)	(11.46%)	(14.20%)	3.55%	0.93%	6.53%
Aberdeen EAFE Plus	(9.53%)	(14.53%)	4.90%	(0.90%)	6.41%
MSCI ACWI x US (Net)	(11.46%)	(14.20%)	4.48%	0.68%	6.57%
American Century Non-US SC	(20.26%)	(21.65%)	-	-	-
MSCI ACWI ex US Small Cap	(14.43%)	(18.20%)	3.82%	1.96%	10.02%
Fixed Income	0.57%	(0.60%)	4.17%	3.50%	5.31%
Blmbg Aggregate Index	1.64%	0.01%	2.06%	2.52%	3.48%
BlackRock U.S. Debt Fund	1.63%	0.05%	2.11%	2.60%	3.57%
Blmbg Aggregate Index	1.64%	0.01%	2.06%	2.52%	3.48%
PIMCO Fixed Income	(0.45%)	(1.22%)	5.56%	4.13%	6.47%
Custom Index (2)	(0.37%)	(2.21%)	3.68%	3.53%	5.41%

(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 December 31, 2018. 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 December 31, 2018

	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
Net of Fees					
Real Estate	0.94%	6.19%	6.56%	8.64%	5.46%
NFI-ODCE Equal Weight Net	1.39%	7.30%	7.53%	9.60%	5.92%
JP Morgan Strategic Property Fund	1.26%	6.49%	6.64%	8.78%	6.22%
NFI-ODCE Equal Weight Net	1.39%	7.30%	7.53%	9.60%	5.92%
JP Morgan Income and Growth Fund	0.30%	5.59%	6.36%	8.48%	5.23%
NFI-ODCE Equal Weight Net	1.39%	7.30%	7.53%	9.60%	5.92%
Infrastructure	4.26%	7.99%	12.23%	8.84%	7.32%
CPI + 4%	0.29%	5.77%	5.98%	5.33%	5.80%
Macquarie European Infrastructure	1.15%	9.75%	18.52%	8.84%	7.45%
SteelRiver Infrastructure	5.39%	7.43%	7.60%	10.18%	8.06%
CPI + 4%	0.29%	5.77%	5.98%	5.33%	5.80%
Cash Composite	0.51%	1.71%	0.99%	0.60%	0.40%
Total Fund	(7.77%)	(4.79%)	6.75%	5.69%	9.18%
Total Fund Benchmark*	(7.46%)	(4.55%)	5.83%	5.25%	8.97%

* 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.

	6/2018- 12/2018	FY 2018	FY 2017	FY 2016	FY 2015
Net of Fees					
Domestic Equity	(7.74%)	16.55%	20.96%	0.94%	8.72%
Total Domestic Equity Target (1)	(8.59%)	14.79%	18.34%	2.28%	7.15%
Large Cap Equity	(6.92%)	16.25%	20.92%	1.44%	7.83%
S&P 500 Index	(6.85%)	14.37%	17.90%	3.99%	7.42%
Alliance S&P Index	(6.84%)	14.29%	17.76%	3.93%	7.40%
PIMCO StocksPLUS	(7.55%)	14.13%	19.11%	2.68%	7.57%
S&P 500 Index	(6.85%)	14.37%	17.90%	3.99%	7.42%
BlackRock Russell 1000 Value Index	(6.61%)	6.82%	15.59%	2.71%	4.30%
Russell 1000 Value Index	(6.69%)	6.77%	15.53%	2.86%	4.13%
T. Rowe Price Large Cap Growth	(6.89%)	29.47%	30.97%	(3.13%)	11.93%
Russell 1000 Growth Index	(8.17%)	22.51%	20.42%	3.02%	10.56%
Small/Mid Cap Equity U.S. Equity	(10.22%)	17.44%	20.95%	(0.61%)	11.80%
Russell 2500 Index	(14.66%)	16.24%	19.84%	(3.67%)	5.92%
Champlain Mid Cap	(4.26%)	17.80%	21.43%	3.76%	9.33%
Russell MidCap Index	(11.14%)	12.33%	16.48%	0.56%	6.63%
Pyramis Small Cap	(16.51%)	17.06%	20.34%	(5.10%)	14.24%
Russell 2000 Index	(17.35%)	17.57%	24.60%	(6.73%)	6.49%
International Equity	(14.23%)	8.12%	20.24%	(10.04%)	(6.46%)
MSCI ACWI x US (Net)	(10.84%)	7.28%	20.45%	(10.24%)	(5.26%)
Causeway International Opportunities (3)	(13.43%)	6.84%	22.89%	(12.24%)	(3.01%)
Causeway Linked Index (3)	(10.84%)	7.28%	20.45%	(9.42%)	(4.22%)
Aberdeen EAFE Plus	(9.99%)	2.61%	17.60%	(8.32%)	(10.90%)
MSCI ACWI x US (Net)	(10.84%)	7.28%	20.45%	(10.24%)	(5.26%)
American Century Non-US SC	(23.51%)	22.61%	20.31%	-	-
MSCI ACWI ex US Small Cap	(15.72%)	10.57%	20.32%	(5.46%)	(3.07%)
Fixed Income	1.20%	0.14%	4.27%	6.05%	0.45%
Blmbg Aggregate Index	1.65%	(0.40%)	(0.31%)	6.00%	1.86%
BlackRock U.S. Debt Fund	1.69%	(0.38%)	(0.25%)	6.07%	1.94%
Blmbg Aggregate Index	1.65%	(0.40%)	(0.31%)	6.00%	1.86%
PIMCO Fixed Income	0.73%	0.65%	7.49%	6.04%	(0.43%)
Custom Index (2)	0.77%	(1.05%)	3.83%	7.28%	0.75%

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

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

(3) Causeway International Value transitioned to International Opportunities in May 2016; as such, the index has been changed accordingly from EAFE to ACWI ex-US (Net Div).

Investment Manager Returns

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

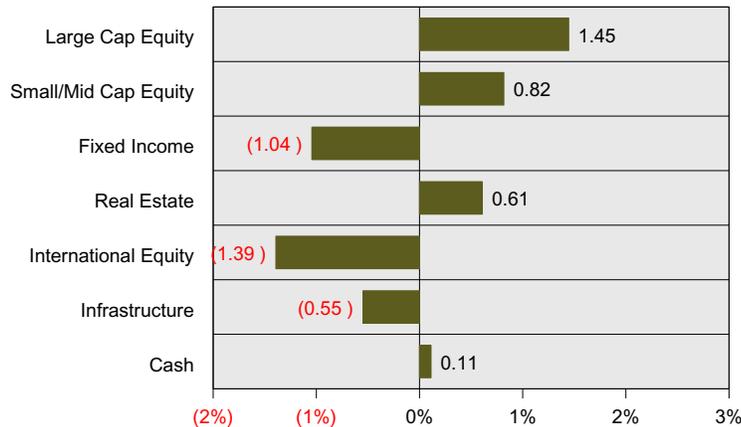
	6/2018- 12/2018	FY 2018	FY 2017	FY 2016	FY 2015
Net of Fees					
Real Estate	2.62%	6.59%	7.07%	9.64%	12.74%
NFI-ODCE Equal Weight Net	3.29%	7.68%	7.23%	11.24%	13.64%
JP Morgan Strategic Property Fund	2.84%	6.68%	6.88%	10.02%	12.28%
NFI-ODCE Equal Weight Net	3.29%	7.68%	7.23%	11.24%	13.64%
JP Morgan Income and Growth Fund	2.16%	6.43%	7.37%	8.69%	14.74%
NFI-ODCE Equal Weight Net	3.29%	7.68%	7.23%	11.24%	13.64%
Infrastructure	8.03%	8.04%	11.42%	12.30%	(3.82%)
CPI + 4%	1.42%	7.09%	5.50%	4.64%	3.62%
Macquarie European Infrastructure	3.00%	27.95%	17.65%	6.82%	(10.56%)
SteelRiver Infrastructure	9.89%	(3.21%)	6.64%	17.13%	4.67%
CPI + 4%	1.42%	7.09%	5.50%	4.64%	3.62%
Cash Composite	0.97%	1.22%	0.68%	0.12%	(0.00%)
Total Fund	(5.34%)	8.77%	14.26%	1.89%	4.17%
Total Fund Benchmark*	(4.95%)	7.96%	12.04%	1.82%	4.34%

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

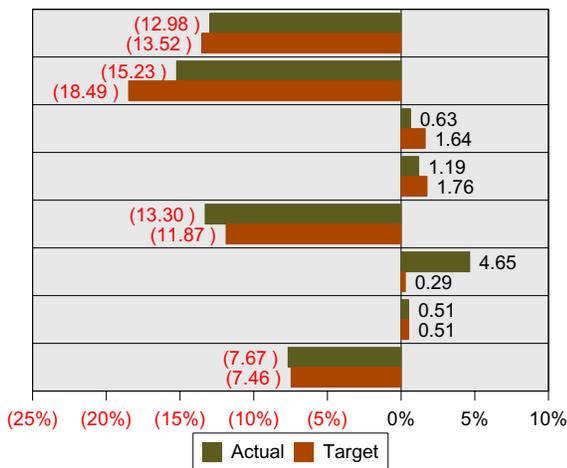
Quarterly Style Attribution - December 31, 2018

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.

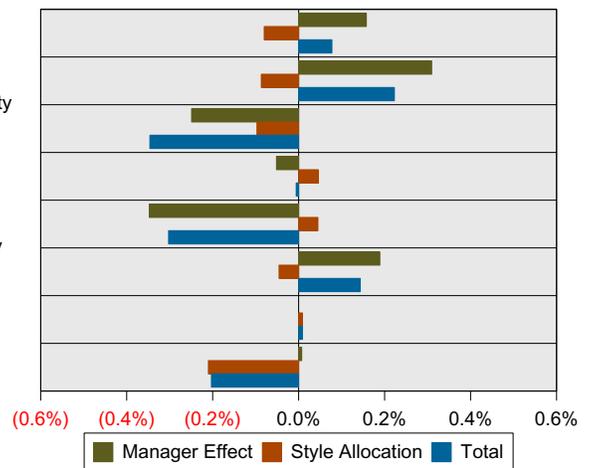
Style Class Under or Overweighting



Actual vs Target Returns



Relative Attribution by Style Class



Relative Attribution Effects for Quarter ended December 31, 2018

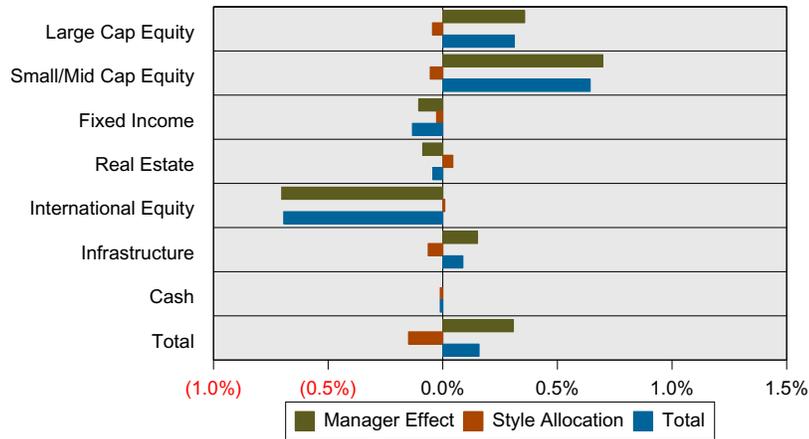
Style Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Style Allocation	Total Relative Return
Large Cap Equity	27%	26%	(12.98%)	(13.52%)	0.16%	(0.08%)	0.08%
Small/Mid Cap Equity	9%	8%	(15.23%)	(18.49%)	0.31%	(0.09%)	0.22%
Fixed Income	26%	27%	0.63%	1.64%	(0.25%)	(0.10%)	(0.35%)
Real Estate	10%	9%	1.19%	1.76%	(0.05%)	0.05%	(0.01%)
International Equity	24%	25%	(13.30%)	(11.87%)	(0.35%)	0.04%	(0.30%)
Infrastructure	4%	5%	4.65%	0.29%	0.19%	(0.05%)	0.14%
Cash	0%	0%	0.51%	0.51%	0.00%	0.01%	0.01%
Total			(7.67%)	(7.46%)	0.01%	(0.21%)	(0.20%)

* 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%.

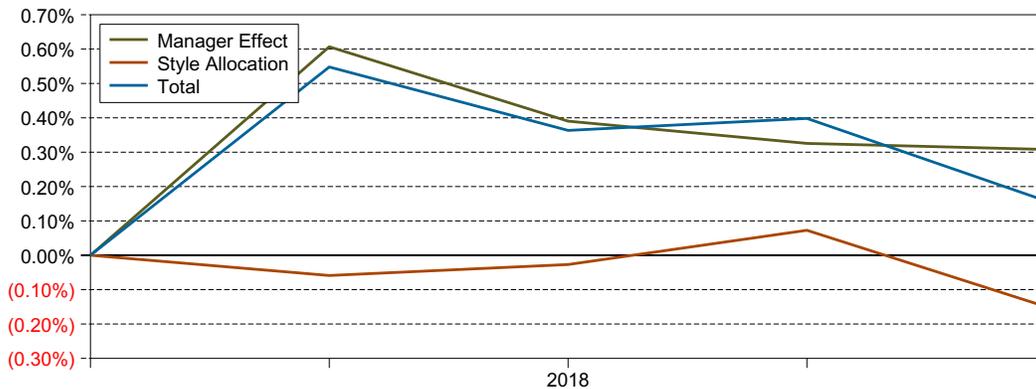
Cumulative Style Relative Attribution - December 31, 2018

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

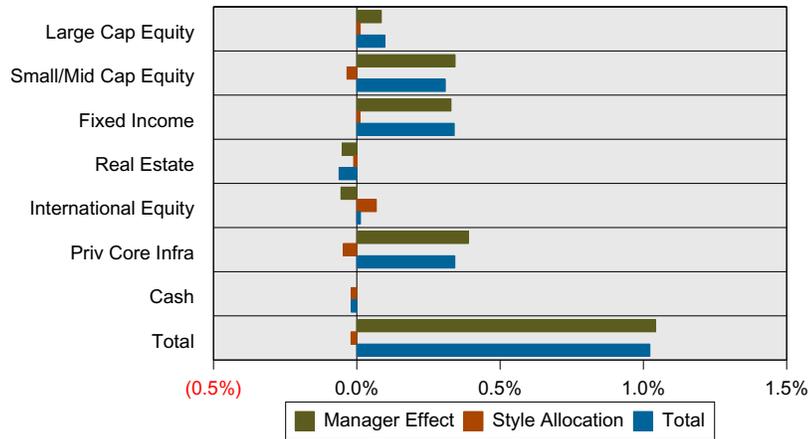
Style Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Style Allocation	Total Relative Return
Large Cap Equity	27%	26%	(3.03%)	(4.38%)	0.36%	(0.05%)	0.31%
Small/Mid Cap Equity	9%	8%	(1.84%)	(10.00%)	0.70%	(0.05%)	0.64%
Fixed Income	25%	27%	(0.33%)	0.01%	(0.11%)	(0.03%)	(0.13%)
Real Estate	9%	9%	7.31%	8.35%	(0.09%)	0.04%	(0.04%)
International Equity	25%	25%	(17.33%)	(14.76%)	(0.70%)	0.01%	(0.69%)
Infrastructure	4%	5%	9.26%	5.77%	0.15%	(0.06%)	0.09%
Cash	0%	0%	1.71%	1.71%	0.00%	(0.01%)	(0.01%)
Total			(4.39%)	(4.55%)	0.31%	(0.15%)	0.16%

* 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%.

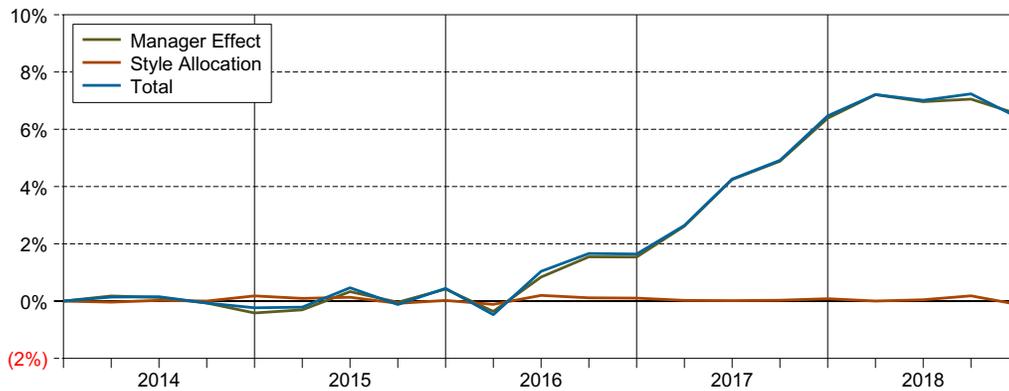
Cumulative Style Relative Attribution - December 31, 2018

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

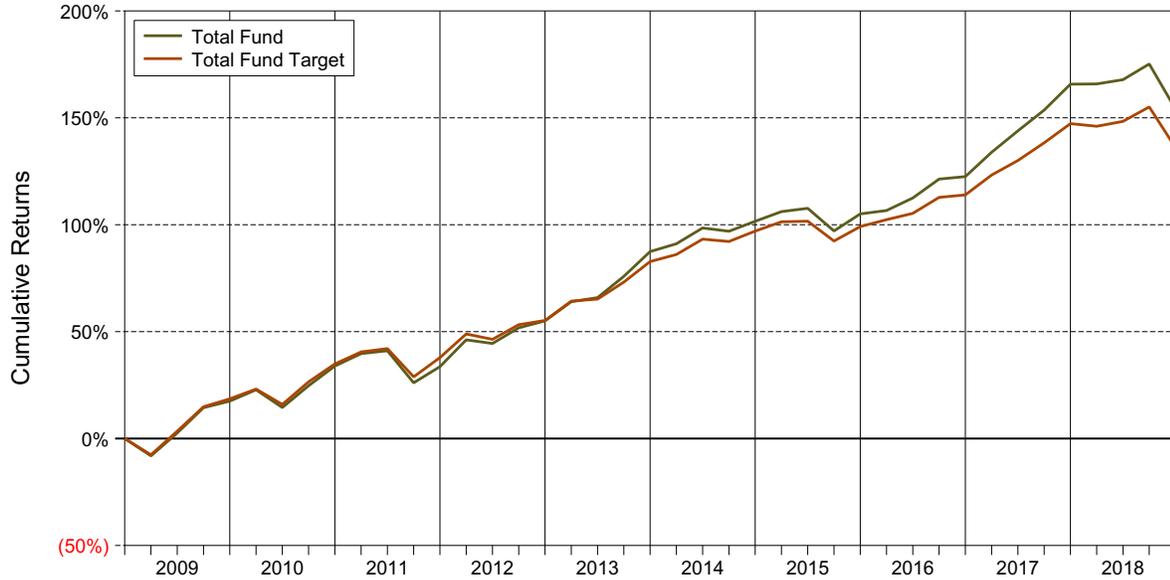
Style Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Style Allocation	Total Relative Return
Large Cap Equity	32%	31%	8.98%	8.49%	0.09%	0.01%	0.10%
Small/Mid Cap Equity	10%	9%	8.72%	5.15%	0.34%	(0.03%)	0.31%
Fixed Income	24%	27%	3.81%	2.52%	0.33%	0.01%	0.34%
Real Estate	9%	9%	9.77%	10.41%	(0.05%)	(0.01%)	(0.06%)
International Equity	19%	20%	0.19%	0.59%	(0.06%)	0.07%	0.01%
Priv Core Infra	6%	5%	11.85%	5.33%	0.39%	(0.05%)	0.34%
Cash	0%	0%	0.60%	0.60%	0.00%	(0.02%)	(0.02%)
Total			6.27%	5.25%	+ 1.04%	(0.02%)	1.02%

* 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%.

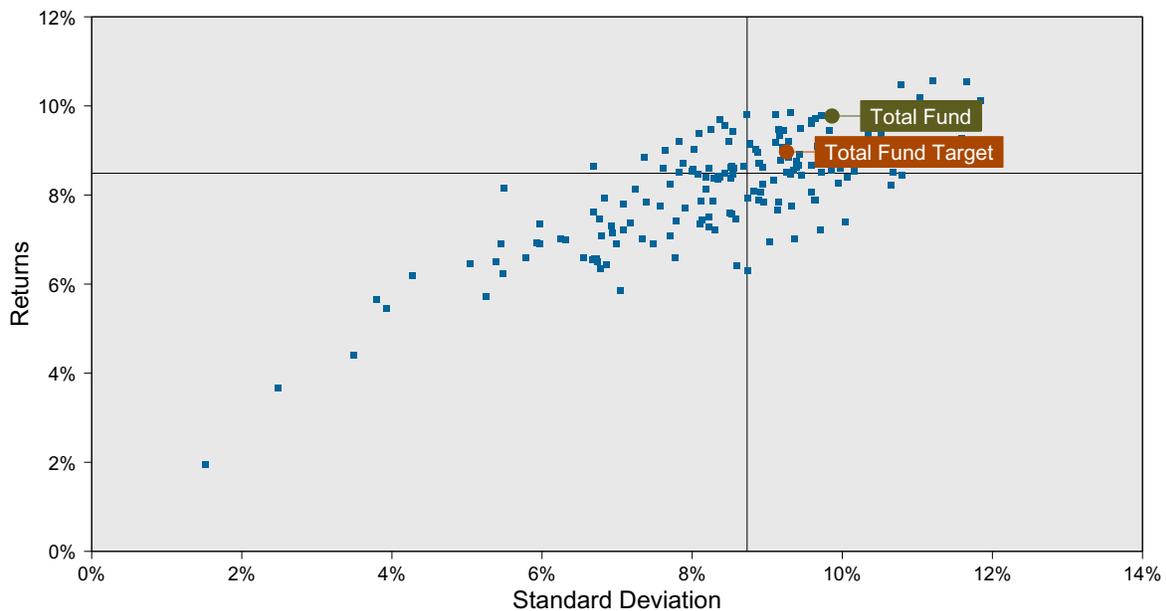
Cumulative Performance Relative to Target

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



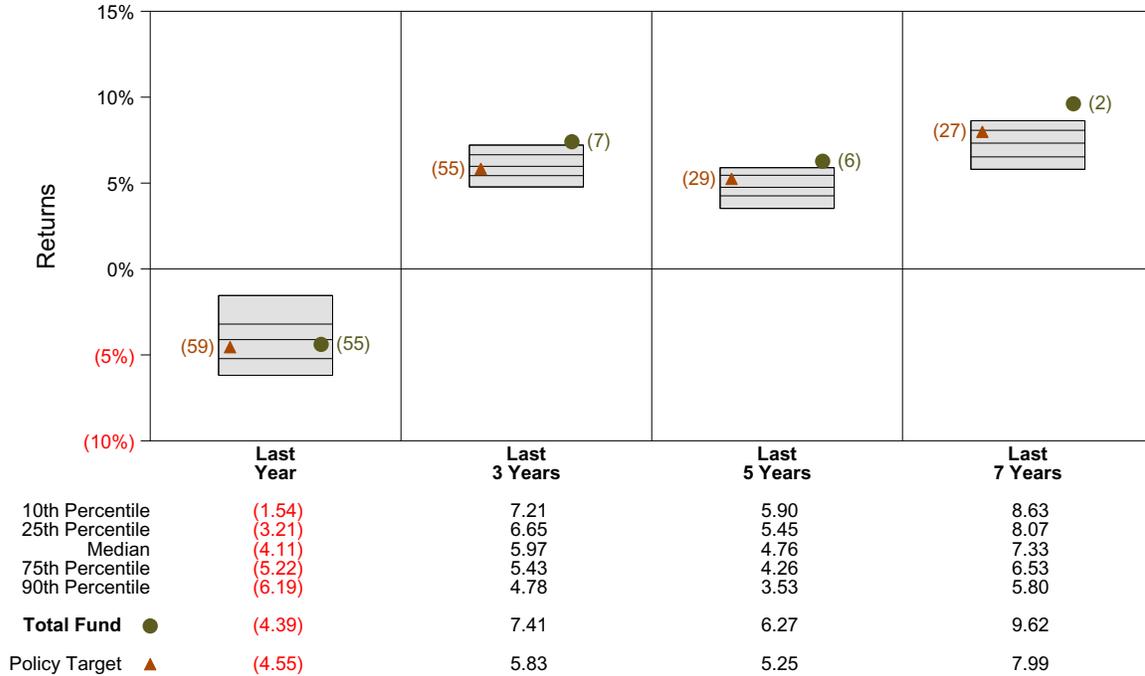
Squares represent membership of the Callan Public Fund Sponsor Database

* 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%.

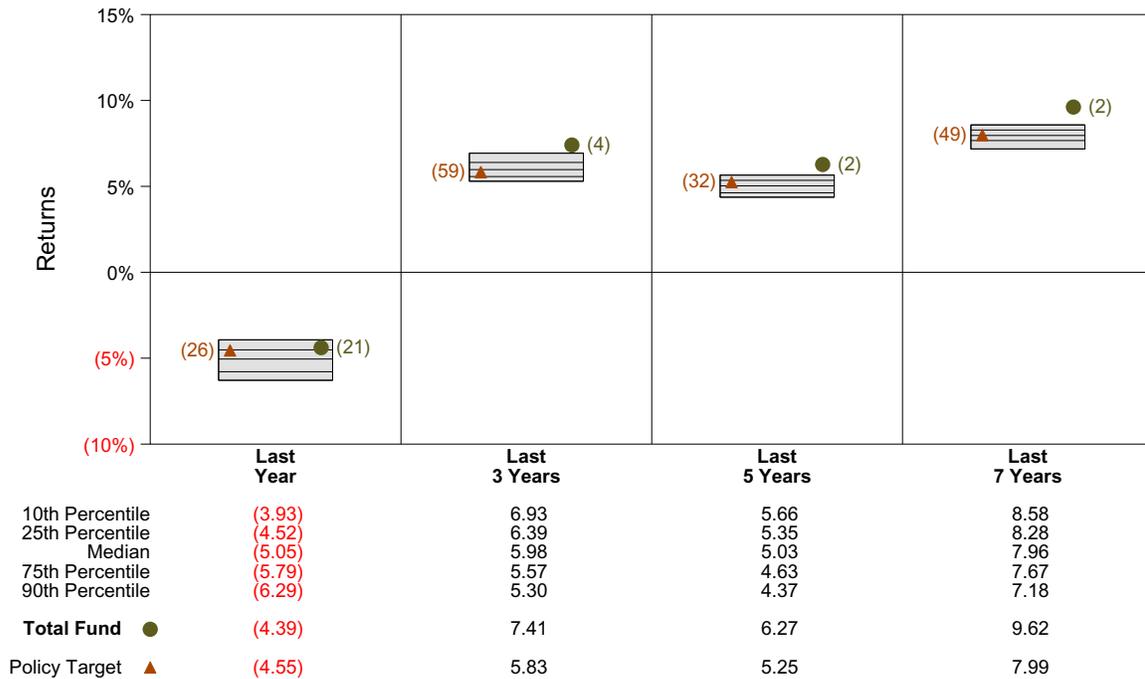
Total Fund Ranking

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 December 31, 2018. 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



Asset Allocation Adjusted Ranking



* 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 December 31, 2018

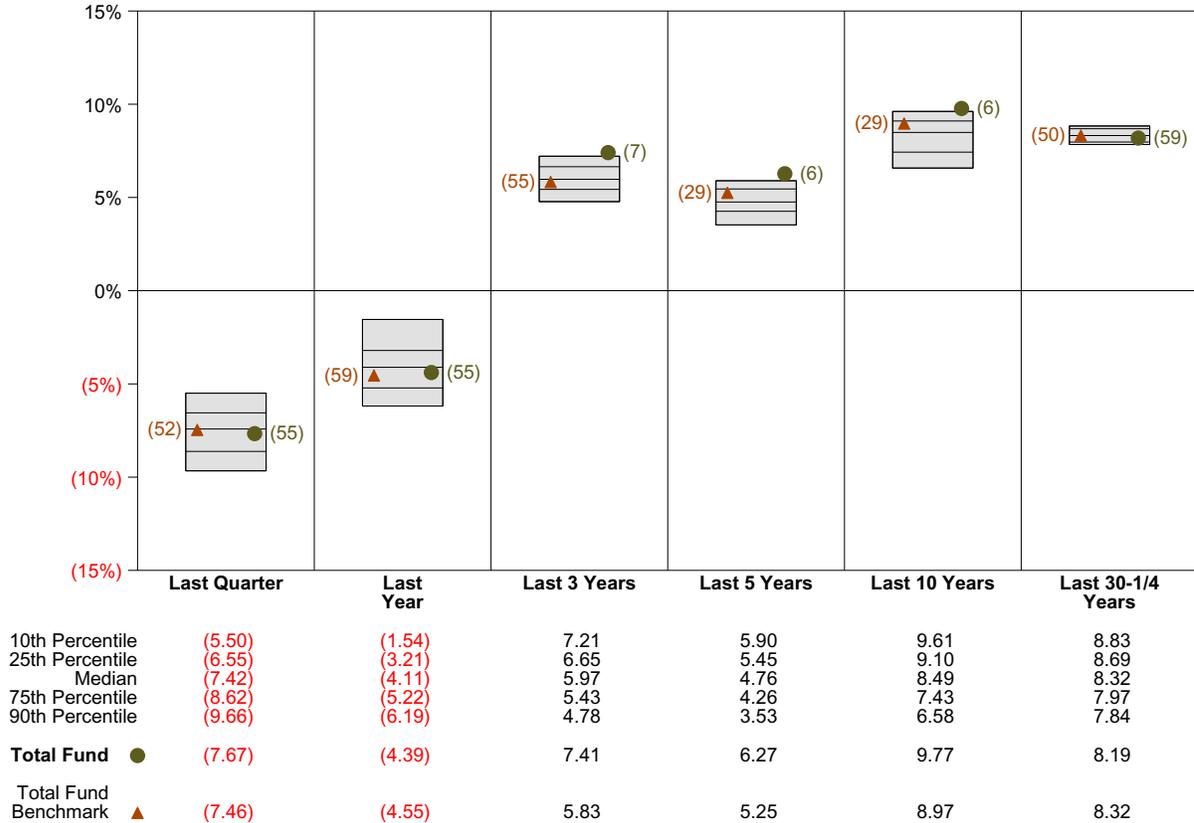
Investment Philosophy

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

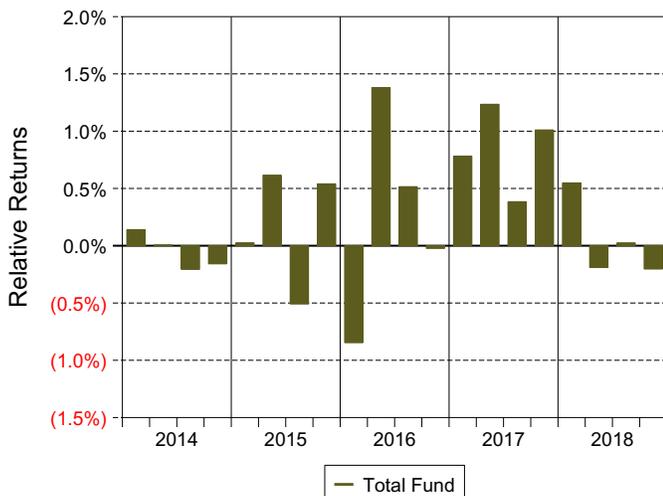
Quarterly Summary and Highlights

- Total Fund's portfolio posted a (7.67)% return for the quarter placing it in the 55 percentile of the Callan Public Fund Sponsor Database group for the quarter and in the 55 percentile for the last year.
- Total Fund's portfolio underperformed the Total Fund Benchmark by 0.20% for the quarter and outperformed the Total Fund Benchmark for the year by 0.16%.

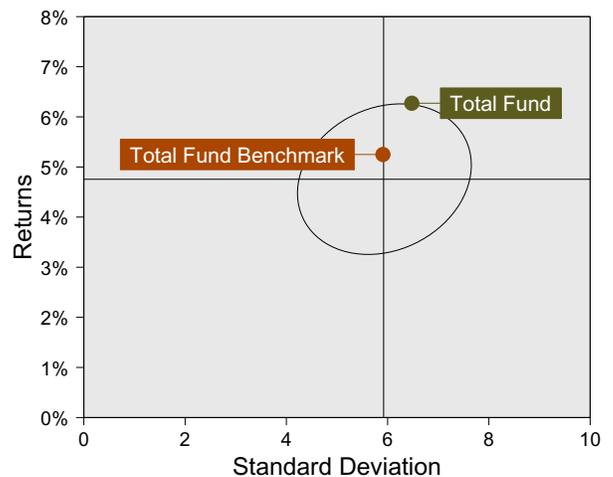
Performance vs Callan Public Fund Sponsor Database (Gross)



Relative Return vs Total Fund Benchmark



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



Domestic Equity

Period Ended December 31, 2018

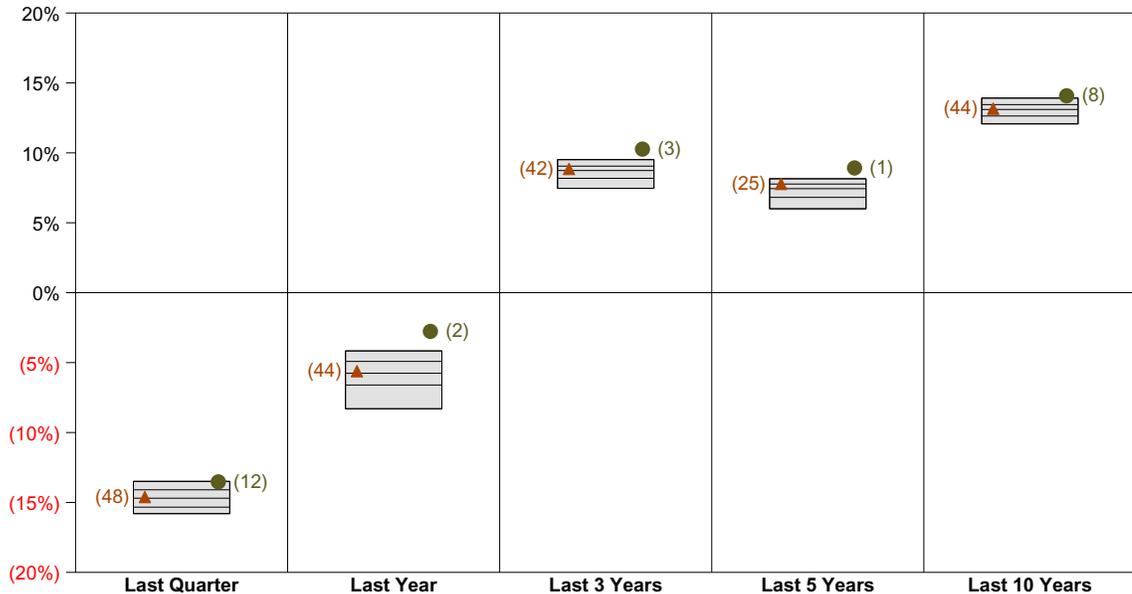
Investment Philosophy

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

Quarterly Summary and Highlights

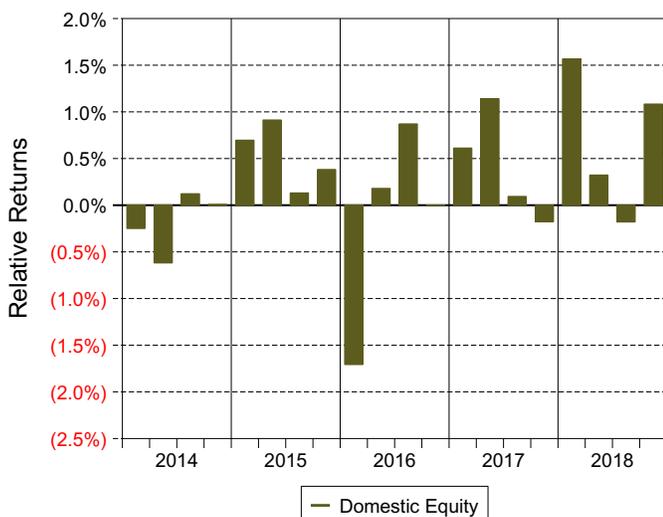
- Domestic Equity's portfolio posted a (13.53)% return for the quarter placing it in the 12 percentile of the Public Fund - Domestic Equity group for the quarter and in the 2 percentile for the last year.
- Domestic Equity's portfolio outperformed the Total Domestic Equity Target by 1.08% for the quarter and outperformed the Total Domestic Equity Target for the year by 2.84%.

Performance vs Public Fund - Domestic Equity (Gross)

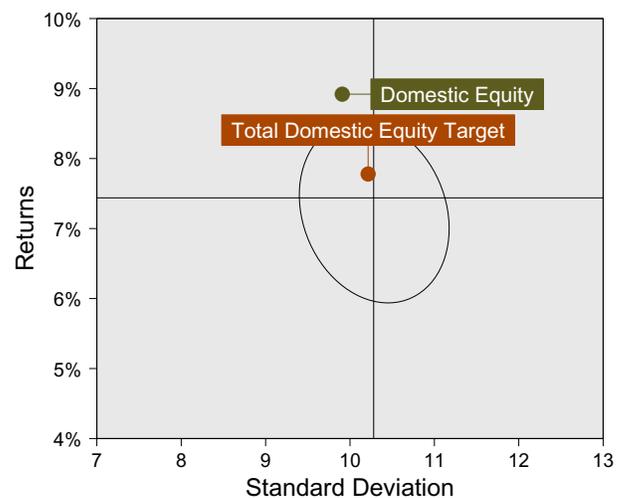


10th Percentile	(13.49)	(4.16)	9.51	8.15	13.92
25th Percentile	(14.10)	(4.91)	9.05	7.77	13.45
Median	(14.70)	(5.76)	8.73	7.44	13.10
75th Percentile	(15.34)	(6.60)	8.18	6.82	12.64
90th Percentile	(15.80)	(8.30)	7.46	6.00	12.07
Domestic Equity ●	(13.53)	(2.77)	10.27	8.92	14.08
Total Domestic Equity Target ▲	(14.61)	(5.61)	8.85	7.78	13.16

Relative Returns vs Total Domestic Equity Target



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

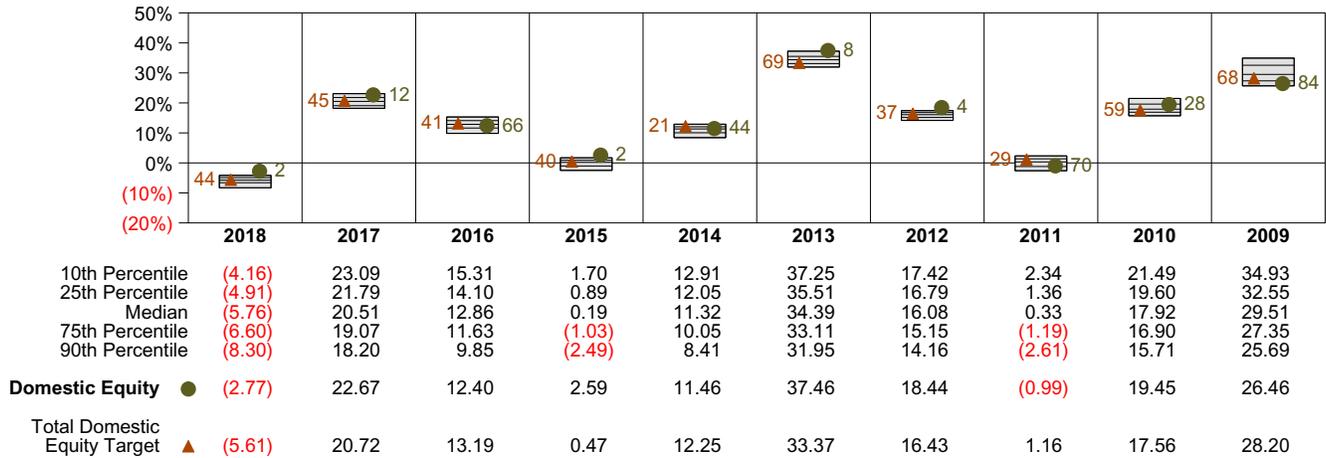


Domestic Equity Return Analysis Summary

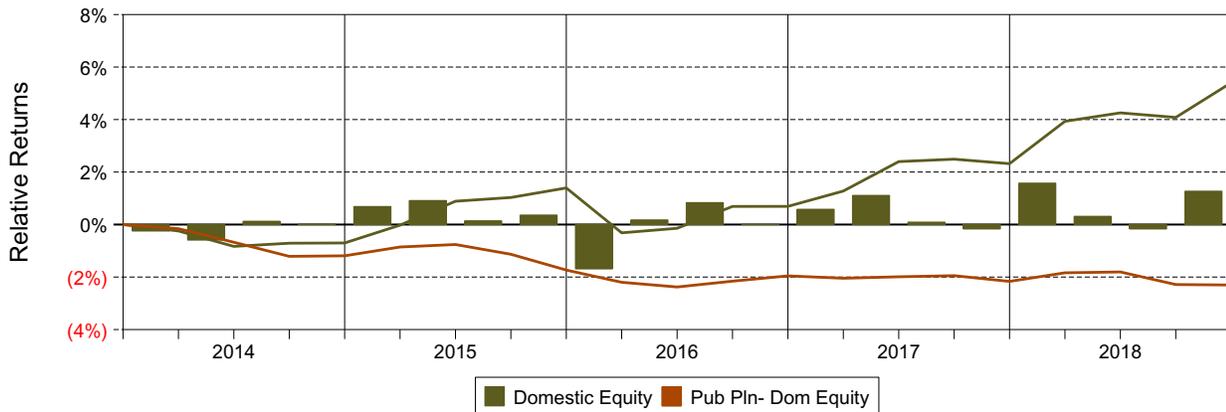
Return Analysis

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.

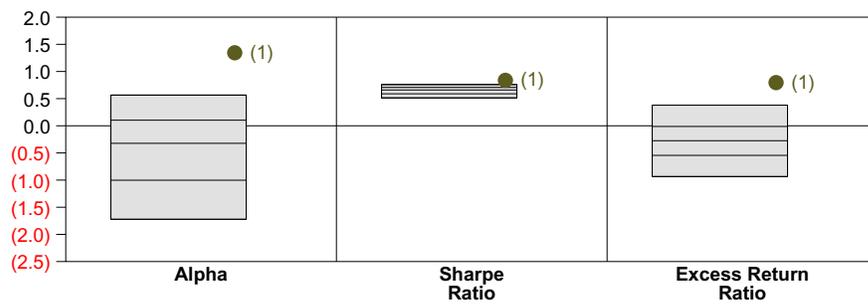
Performance vs Public Fund - Domestic Equity (Gross)



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 December 31, 2018



Alliance S&P Index Period Ended December 31, 2018

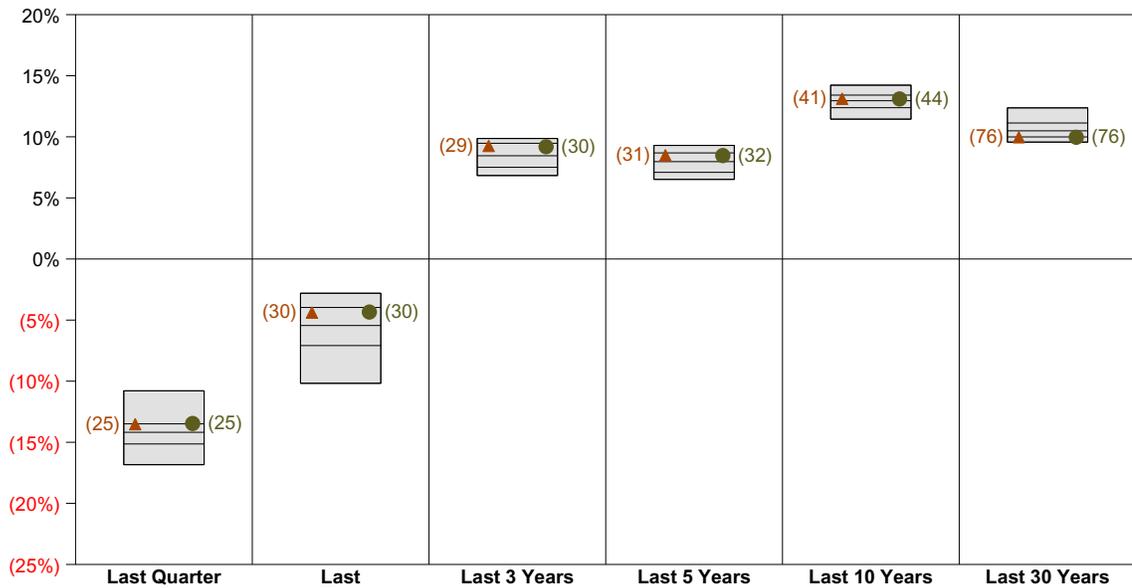
Investment Philosophy

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

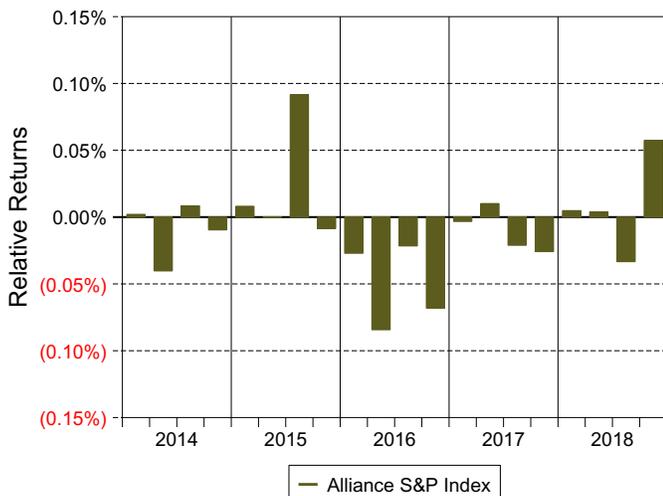
- Alliance S&P Index's portfolio posted a (13.46)% return for the quarter placing it in the 25 percentile of the Callan Large Cap Core group for the quarter and in the 30 percentile for the last year.
- Alliance S&P Index's portfolio outperformed the S&P 500 Index by 0.06% for the quarter and outperformed the S&P 500 Index for the year by 0.04%.

Performance vs Callan Large Cap Core (Gross)

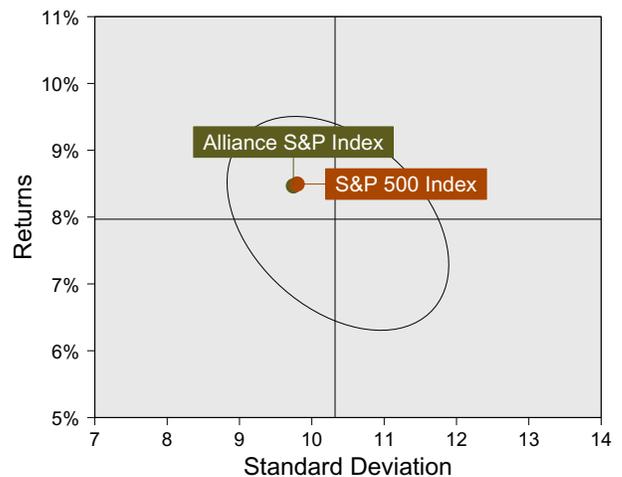


10th Percentile	(10.79)	(2.80)	9.86	9.30	14.23	12.37
25th Percentile	(13.49)	(3.97)	9.47	8.68	13.41	11.13
Median	(14.18)	(5.44)	8.45	7.97	12.95	10.49
75th Percentile	(15.14)	(7.09)	7.51	7.09	12.38	9.99
90th Percentile	(16.83)	(10.17)	6.83	6.52	11.45	9.57
Alliance S&P Index ●	(13.46)	(4.34)	9.19	8.47	13.10	9.96
S&P 500 Index ▲	(13.52)	(4.38)	9.26	8.49	13.12	9.97

Relative Return vs S&P 500 Index



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

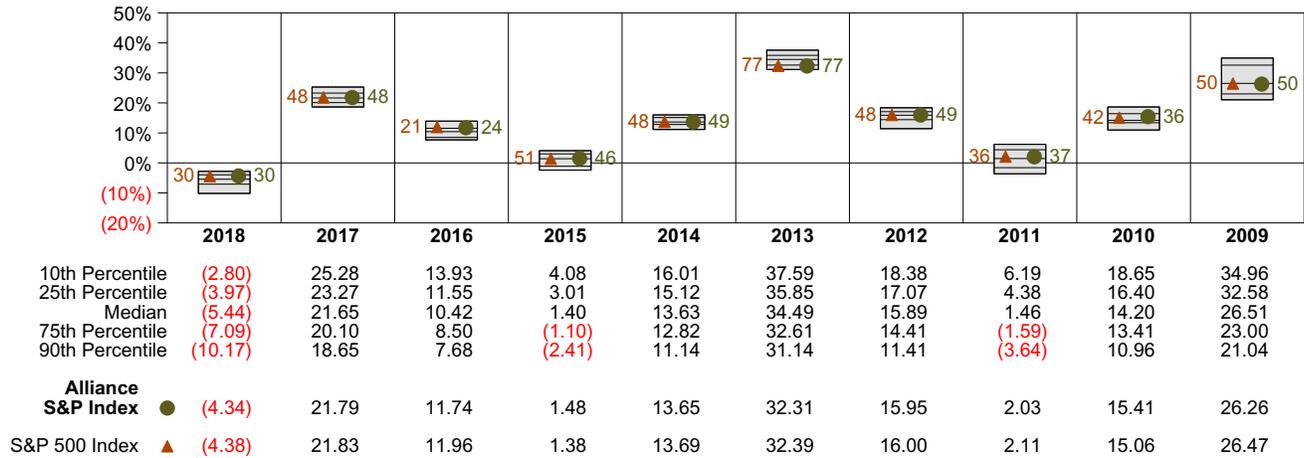


Alliance S&P Index Return Analysis Summary

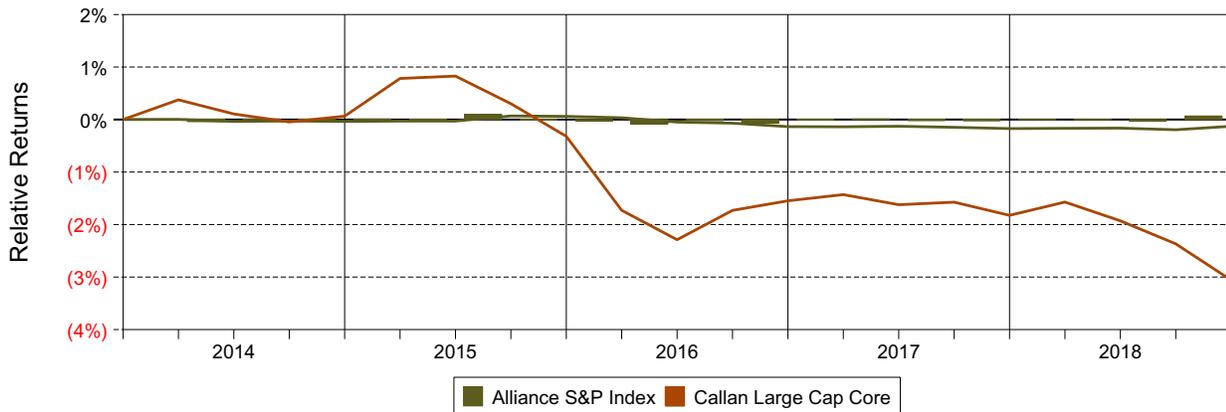
Return Analysis

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.

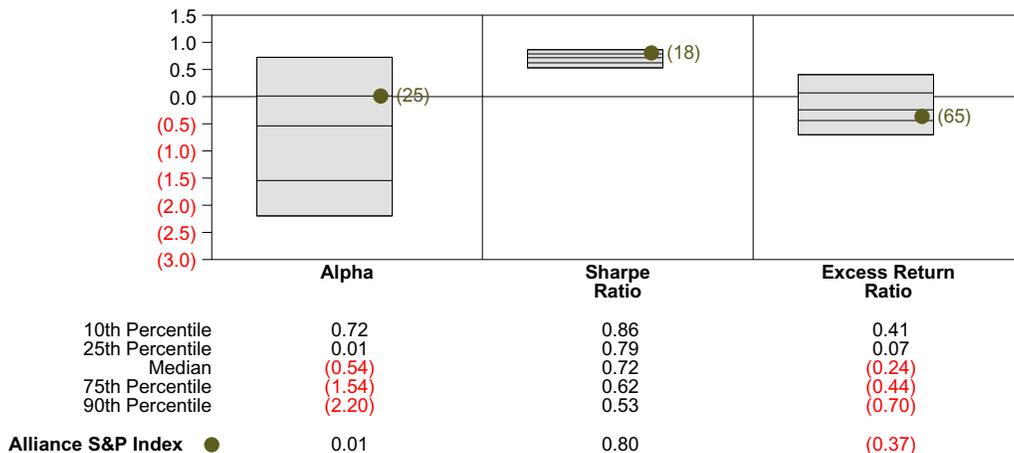
Performance vs Callan Large Cap Core (Gross)



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 December 31, 2018



PIMCO StocksPLUS

Period Ended December 31, 2018

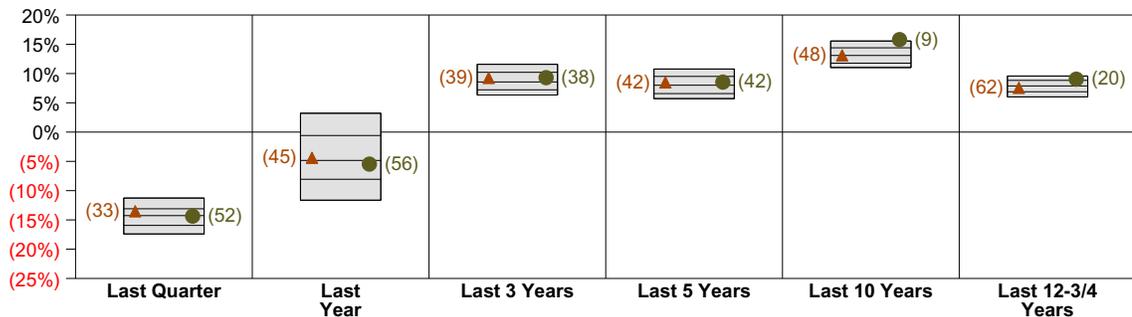
Investment Philosophy

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

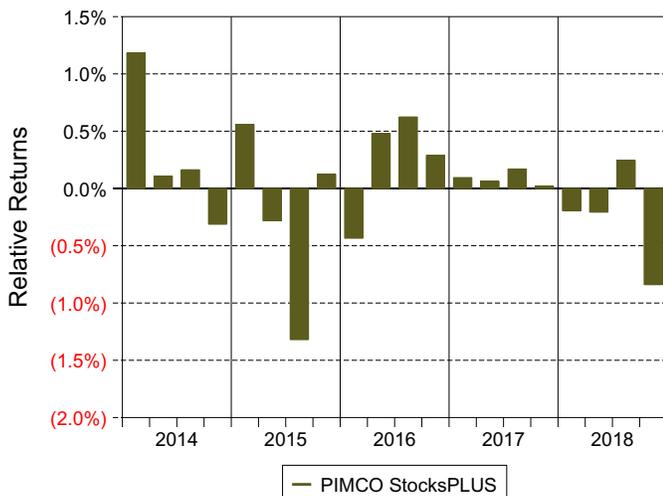
- PIMCO StocksPLUS's portfolio posted a (14.36)% return for the quarter placing it in the 52 percentile of the Callan Large Capitalization group for the quarter and in the 56 percentile for the last year.
- PIMCO StocksPLUS's portfolio underperformed the S&P 500 Index by 0.84% for the quarter and underperformed the S&P 500 Index for the year by 1.09%.

Performance vs Callan Large Capitalization (Gross)

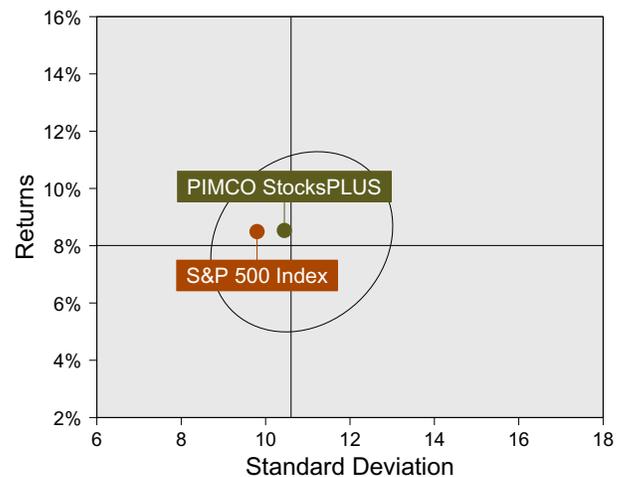


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 12-3/4 Years
10th Percentile	(11.27)	3.22	11.58	10.77	15.55	9.57
25th Percentile	(13.10)	(0.58)	10.21	9.51	14.39	8.83
Median	(14.26)	(4.84)	8.56	8.01	13.09	7.88
75th Percentile	(15.94)	(8.06)	7.22	6.58	11.78	6.89
90th Percentile	(17.40)	(11.63)	6.34	5.71	11.02	6.01
PIMCO StocksPLUS ●	(14.36)	(5.47)	9.29	8.53	15.80	9.04
S&P 500 Index ▲	(13.52)	(4.38)	9.26	8.49	13.12	7.56

Relative Return vs S&P 500 Index



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

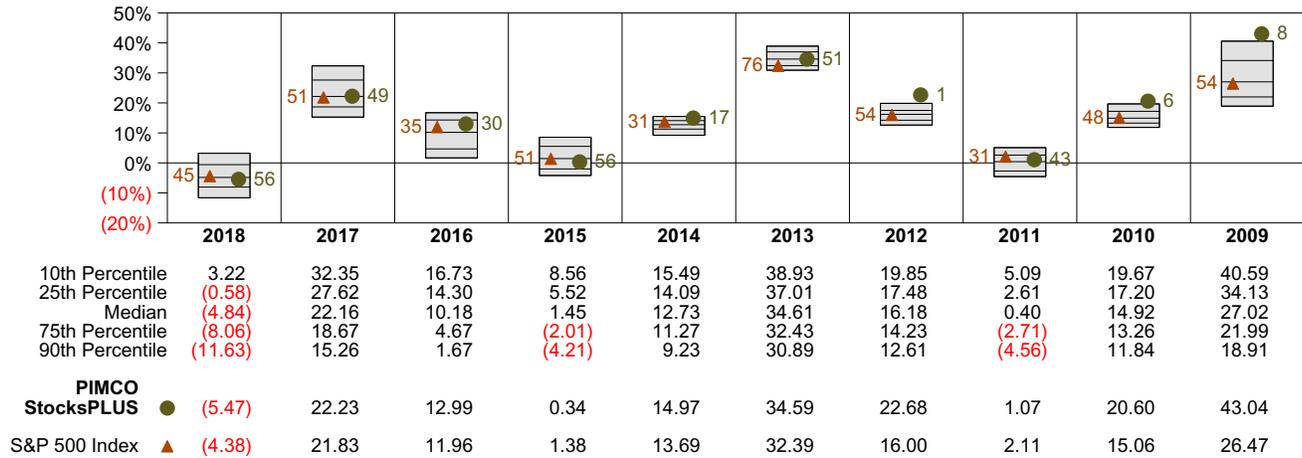


PIMCO StocksPLUS Return Analysis Summary

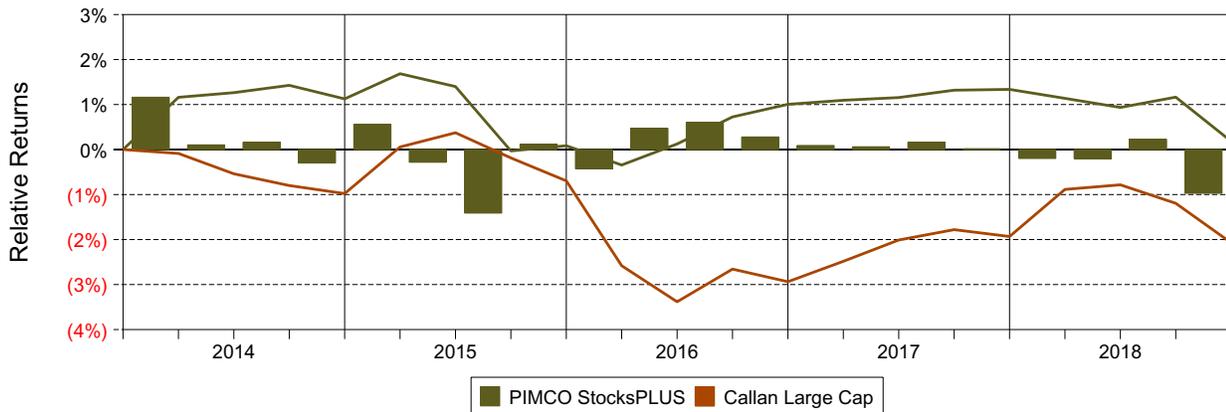
Return Analysis

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.

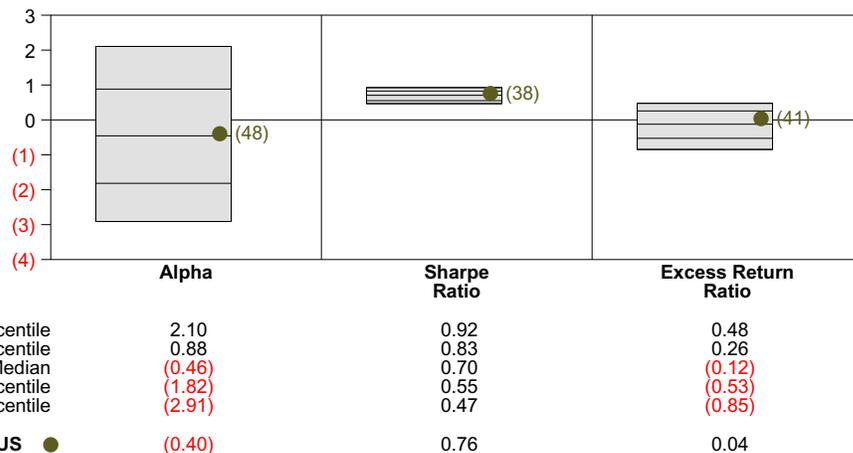
Performance vs Callan Large Capitalization (Gross)



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 December 31, 2018



BlackRock Russell 1000 Value Period Ended December 31, 2018

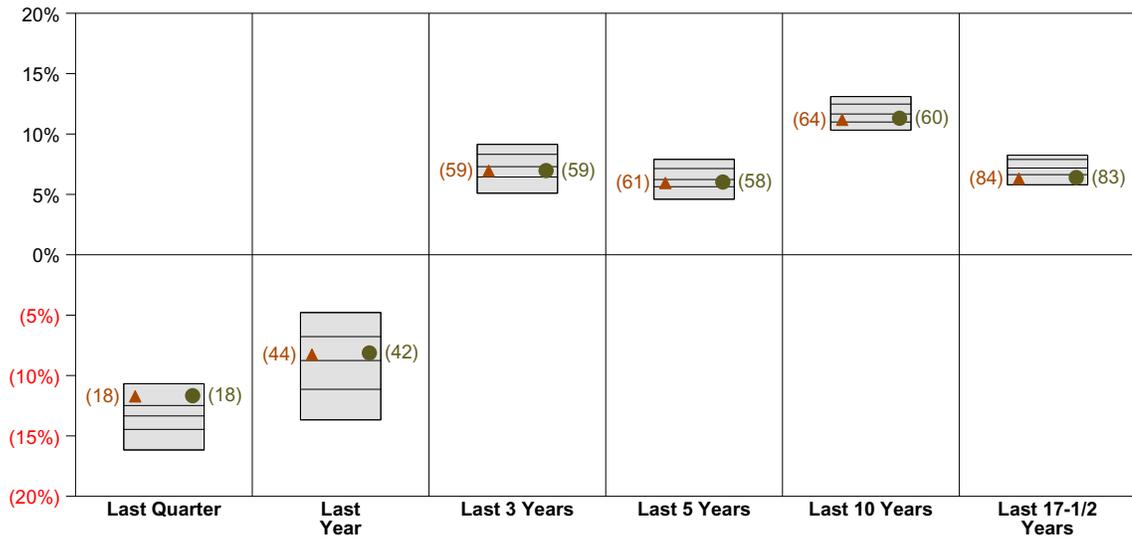
Investment Philosophy

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

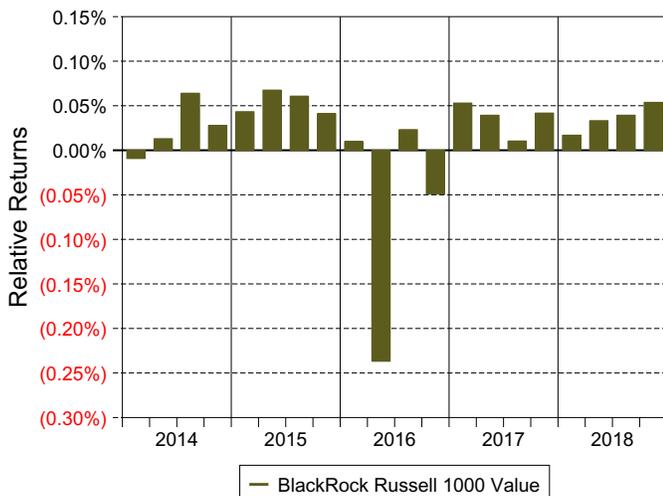
- BlackRock Russell 1000 Value's portfolio posted a (11.67)% return for the quarter placing it in the 18 percentile of the Callan Large Cap Value group for the quarter and in the 42 percentile for the last year.
- BlackRock Russell 1000 Value's portfolio outperformed the Russell 1000 Value Index by 0.05% for the quarter and outperformed the Russell 1000 Value Index for the year by 0.14%.

Performance vs Callan Large Cap Value (Gross)

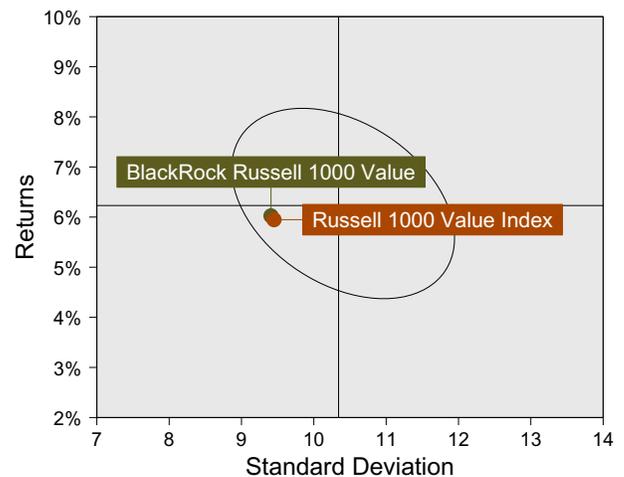


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 17-1/2 Years
10th Percentile	(10.68)	(4.79)	9.15	7.90	13.10	8.25
25th Percentile	(12.49)	(6.78)	8.32	7.14	12.48	7.89
Median	(13.35)	(8.76)	7.30	6.23	11.66	7.18
75th Percentile	(14.46)	(11.14)	6.44	5.64	11.00	6.64
90th Percentile	(16.16)	(13.67)	5.10	4.60	10.32	5.79
BlackRock Russell 1000 Value	● (11.67)	● (8.13)	6.97	6.02	11.31	6.40
Russell 1000 Value Index	▲ (11.72)	▲ (8.27)	6.95	5.95	11.18	6.30

Relative Return vs Russell 1000 Value Index



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

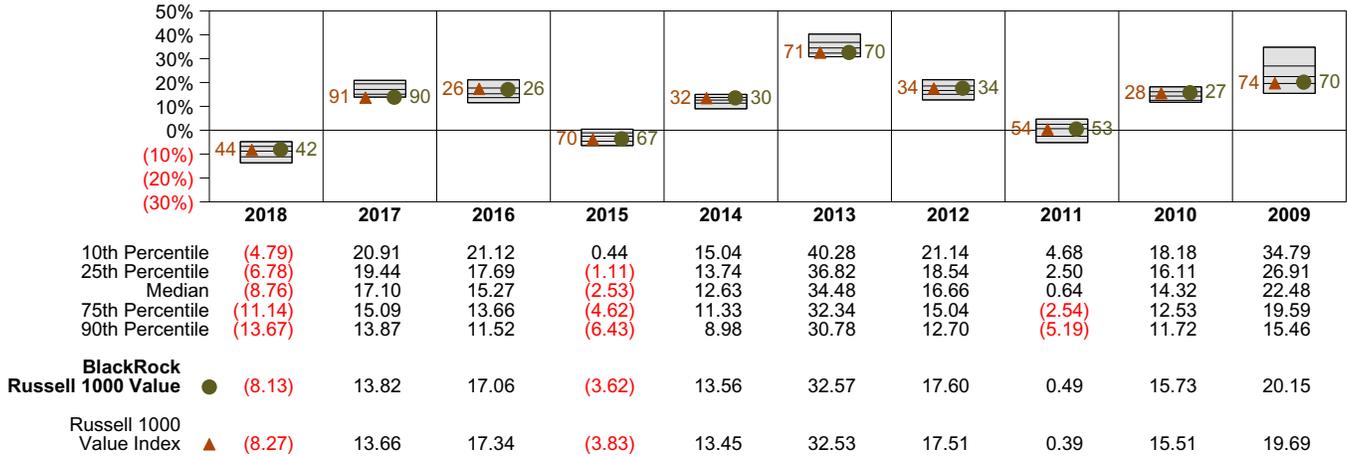


BlackRock Russell 1000 Value Return Analysis Summary

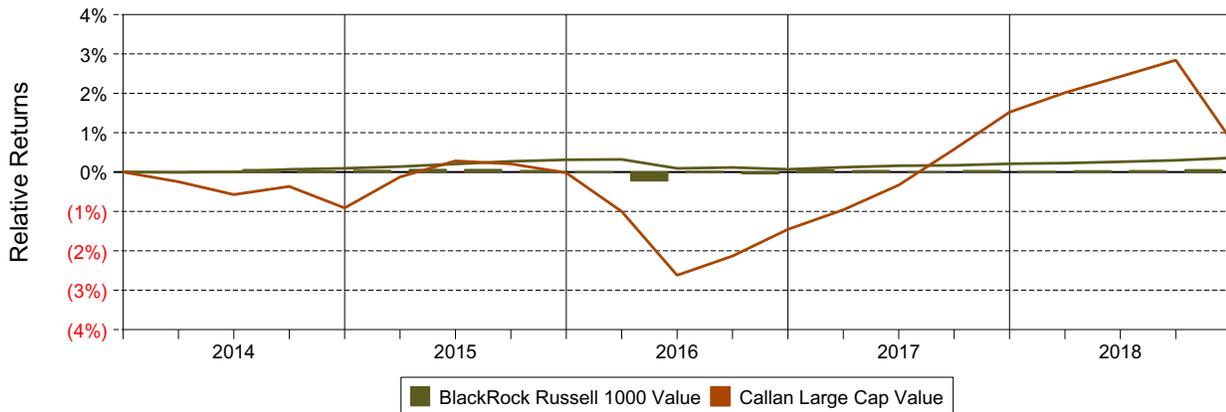
Return Analysis

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.

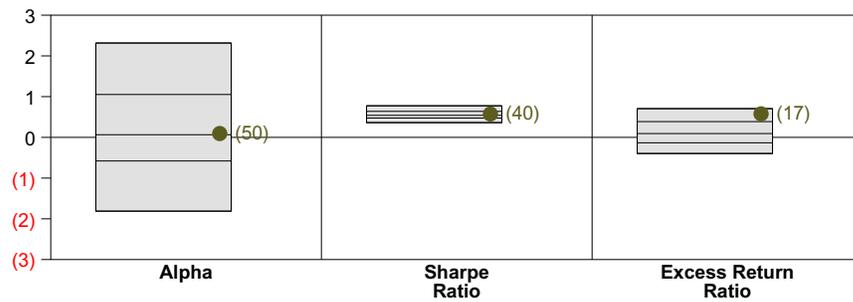
Performance vs Callan Large Cap Value (Gross)



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 December 31, 2018



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.32	0.78	0.70
25th Percentile	1.05	0.64	0.39
Median	0.06	0.54	0.09
75th Percentile	(0.58)	0.47	(0.13)
90th Percentile	(1.81)	0.36	(0.40)
BlackRock Russell 1000 Value	0.09	0.57	0.58

T. Rowe Price Large Cap Growth Period Ended December 31, 2018

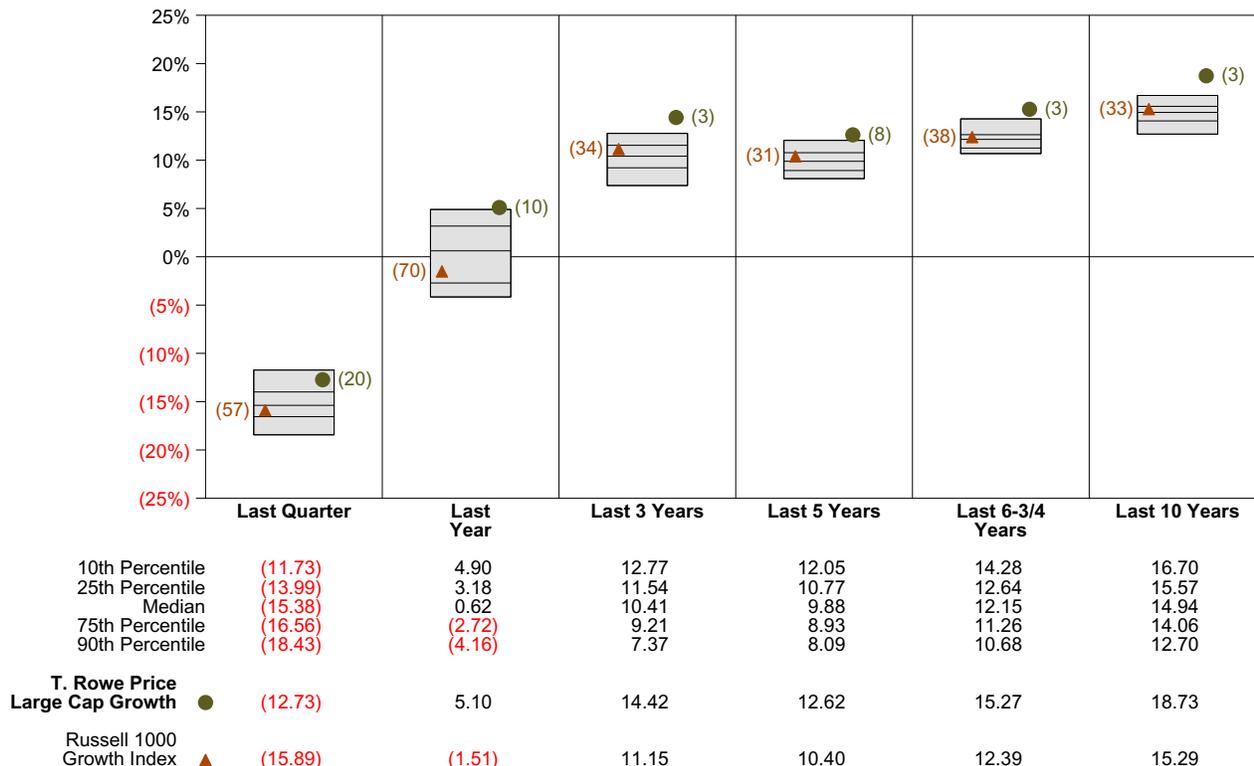
Investment Philosophy

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.

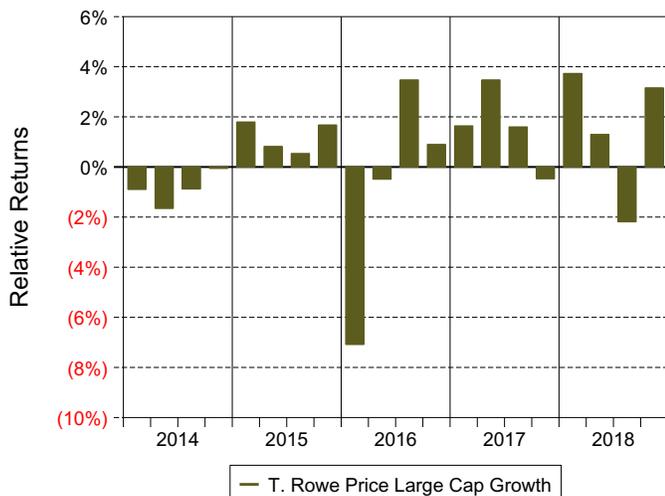
Quarterly Summary and Highlights

- T. Rowe Price Large Cap Growth's portfolio posted a (12.73)% return for the quarter placing it in the 20 percentile of the Callan Large Cap Growth group for the quarter and in the 10 percentile for the last year.
- T. Rowe Price Large Cap Growth's portfolio outperformed the Russell 1000 Growth Index by 3.16% for the quarter and outperformed the Russell 1000 Growth Index for the year by 6.61%.

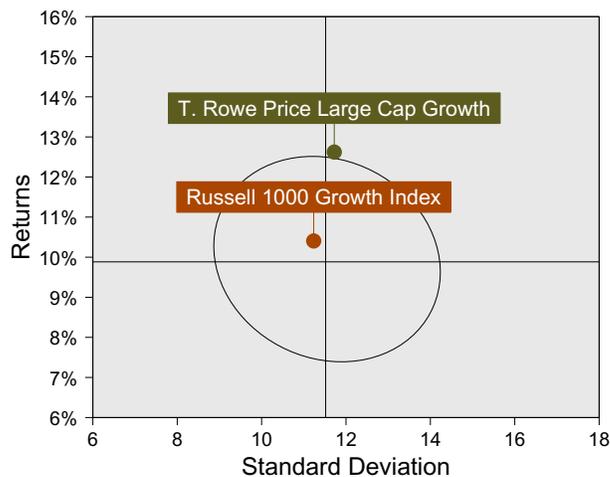
Performance vs Callan Large Cap Growth (Gross)



Relative Return vs Russell 1000 Growth Index



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

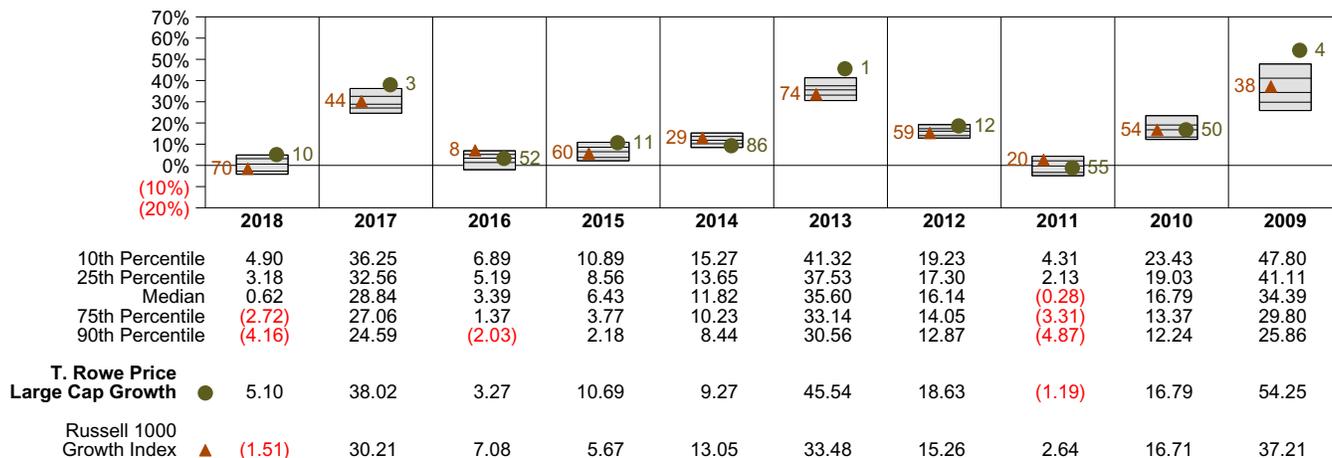


T. Rowe Price Large Cap Growth Return Analysis Summary

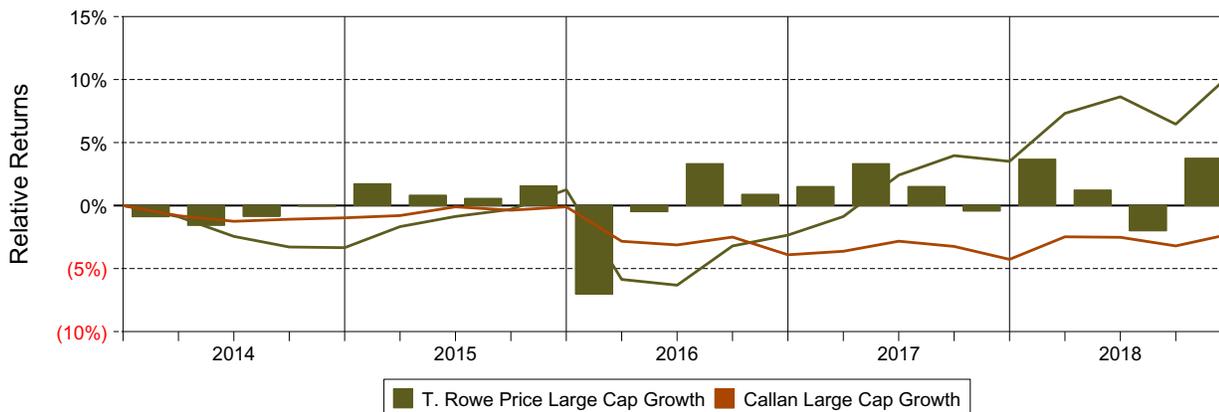
Return Analysis

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.

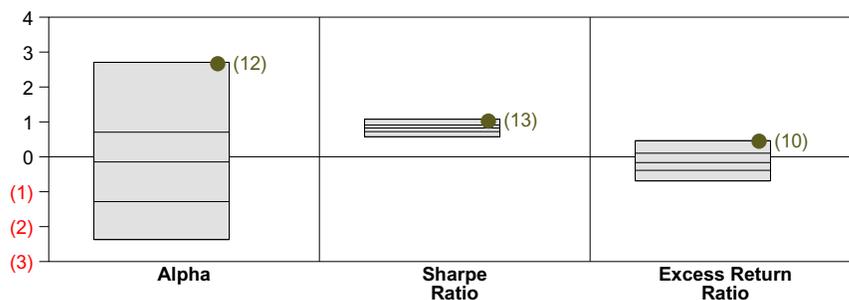
Performance vs Callan Large Cap Growth (Gross)



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 December 31, 2018



10th Percentile	2.71	1.08	0.46
25th Percentile	0.71	0.91	0.10
Median	(0.15)	0.82	(0.17)
75th Percentile	(1.28)	0.72	(0.39)
90th Percentile	(2.37)	0.57	(0.69)
T. Rowe Price Large Cap Growth	● 2.67	1.02	0.45

Champlain Mid Cap Period Ended December 31, 2018

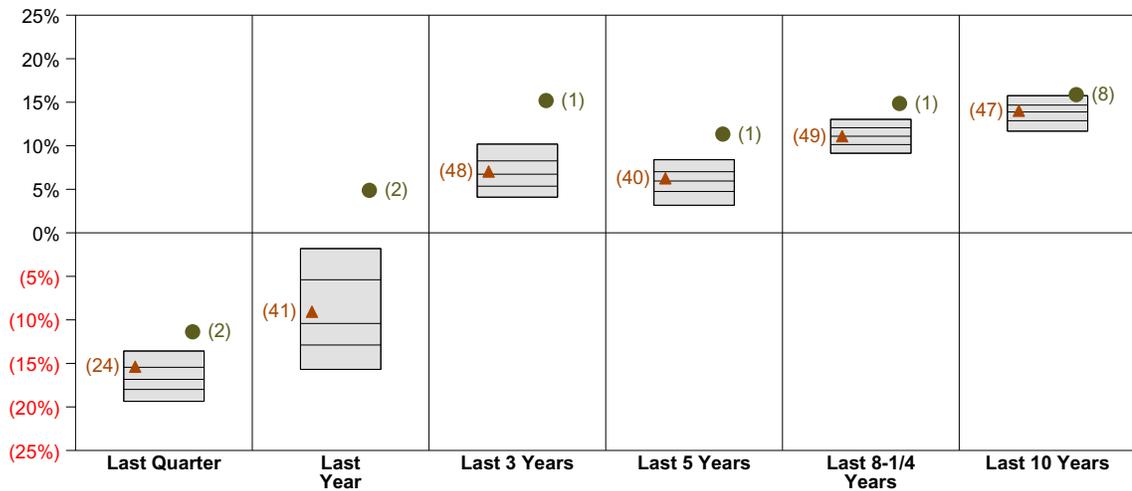
Investment Philosophy

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

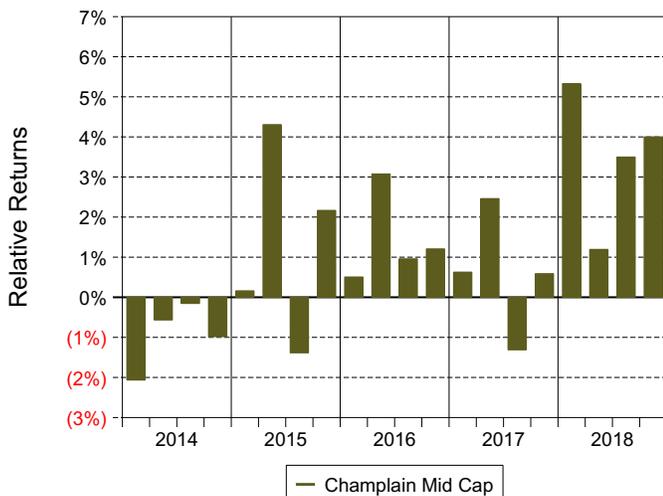
- Champlain Mid Cap's portfolio posted a (11.37)% return for the quarter placing it in the 2 percentile of the Callan Mid Capitalization group for the quarter and in the 2 percentile for the last year.
- Champlain Mid Cap's portfolio outperformed the Russell MidCap Index by 4.00% for the quarter and outperformed the Russell MidCap Index for the year by 13.94%.

Performance vs Callan Mid Capitalization (Gross)

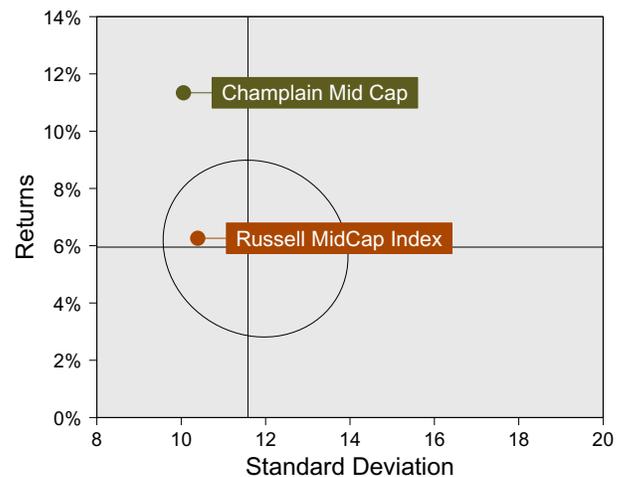


10th Percentile	(13.58)	(1.81)	10.19	8.40	13.04	15.76
25th Percentile	(15.45)	(5.39)	8.26	7.02	12.07	14.67
Median	(16.83)	(10.41)	6.73	5.95	11.09	13.88
75th Percentile	(17.99)	(12.89)	5.36	4.75	10.14	12.87
90th Percentile	(19.36)	(15.69)	4.09	3.17	9.14	11.68
Champlain Mid Cap	● (11.37)	4.88	15.19	11.34	14.86	15.87
Russell MidCap Index	▲ (15.37)	(9.06)	7.04	6.26	11.10	14.03

Relative Return vs Russell MidCap Index



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

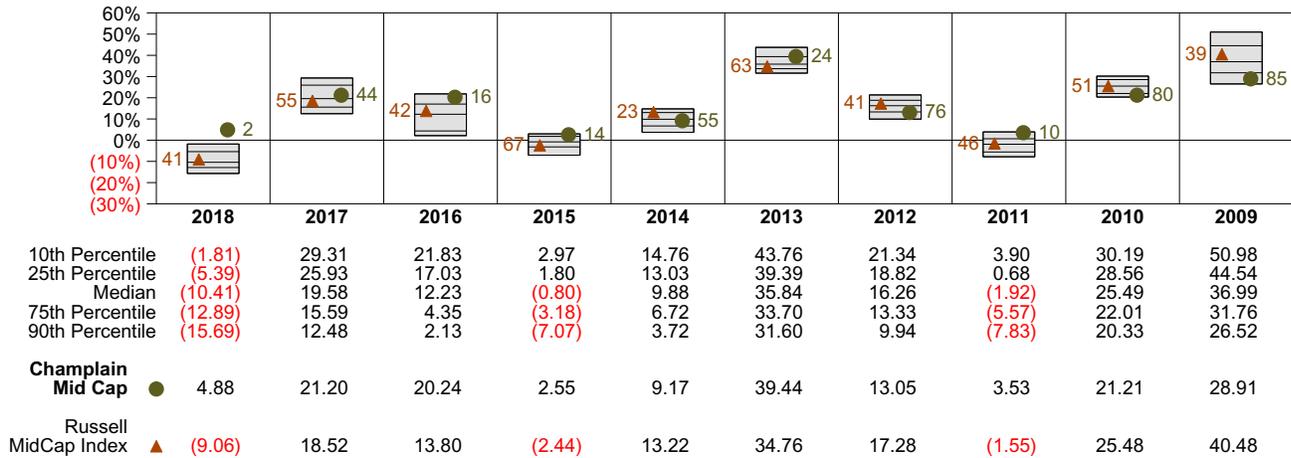


Champlain Mid Cap Return Analysis Summary

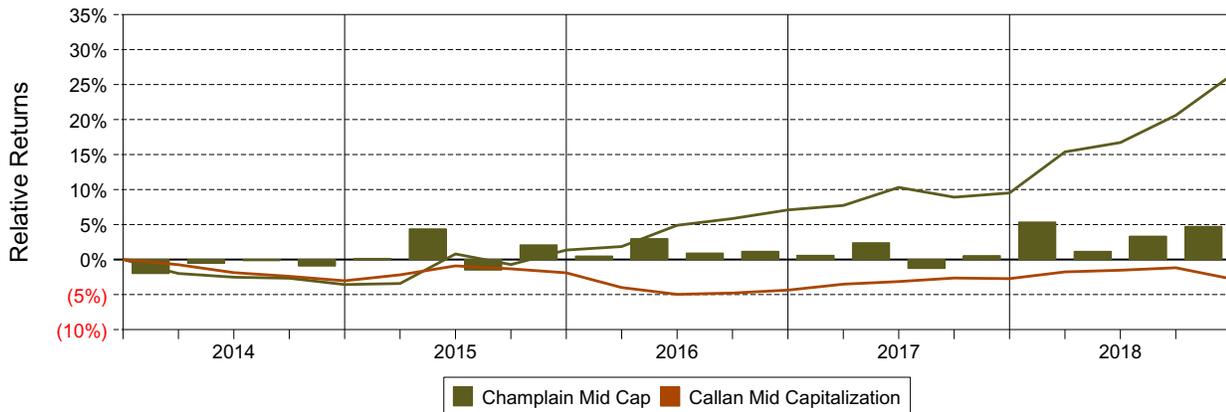
Return Analysis

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.

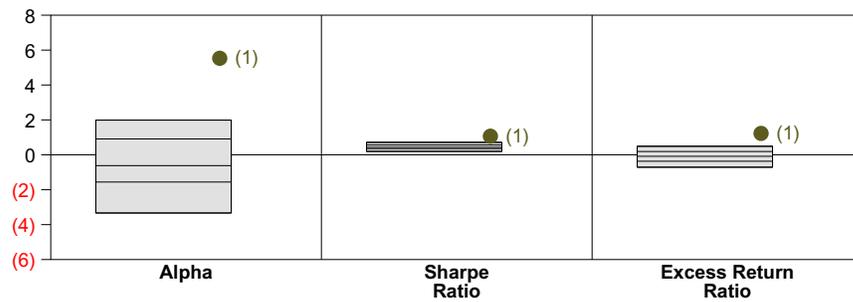
Performance vs Callan Mid Capitalization (Gross)



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 December 31, 2018



10th Percentile	1.99	0.71	0.49
25th Percentile	0.91	0.56	0.19
Median	(0.62)	0.43	(0.08)
75th Percentile	(1.56)	0.35	(0.37)
90th Percentile	(3.33)	0.20	(0.71)
Champlain Mid Cap	5.53	1.07	1.23

Pyramis Small Cap Period Ended December 31, 2018

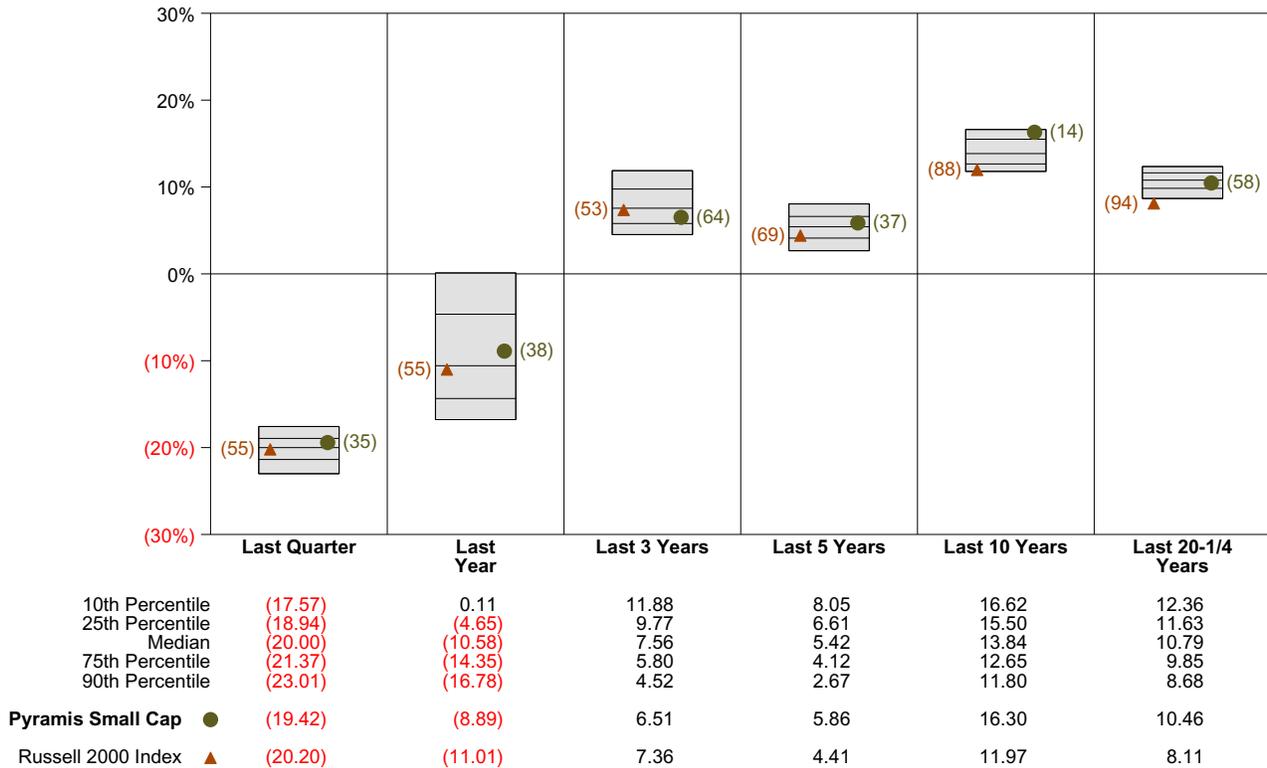
Investment Philosophy

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.

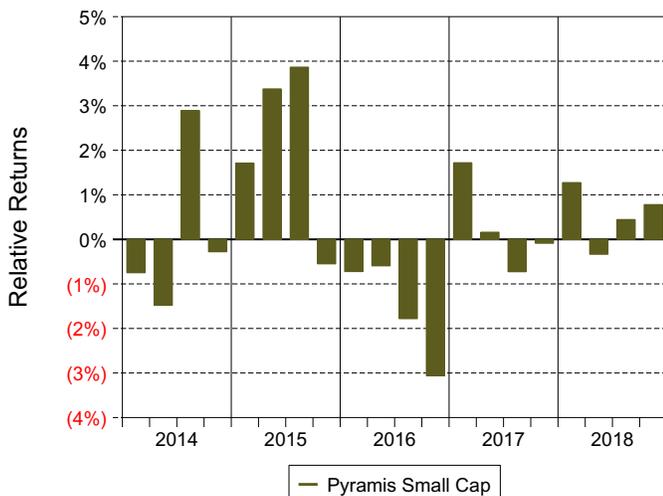
Quarterly Summary and Highlights

- Pyramis Small Cap's portfolio posted a (19.42)% return for the quarter placing it in the 35 percentile of the Callan Small Capitalization group for the quarter and in the 38 percentile for the last year.
- Pyramis Small Cap's portfolio outperformed the Russell 2000 Index by 0.78% for the quarter and outperformed the Russell 2000 Index for the year by 2.12%.

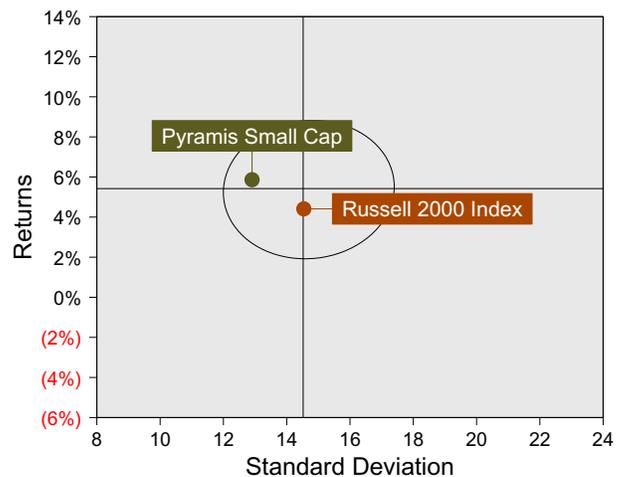
Performance vs Callan Small Capitalization (Gross)



Relative Return vs Russell 2000 Index



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

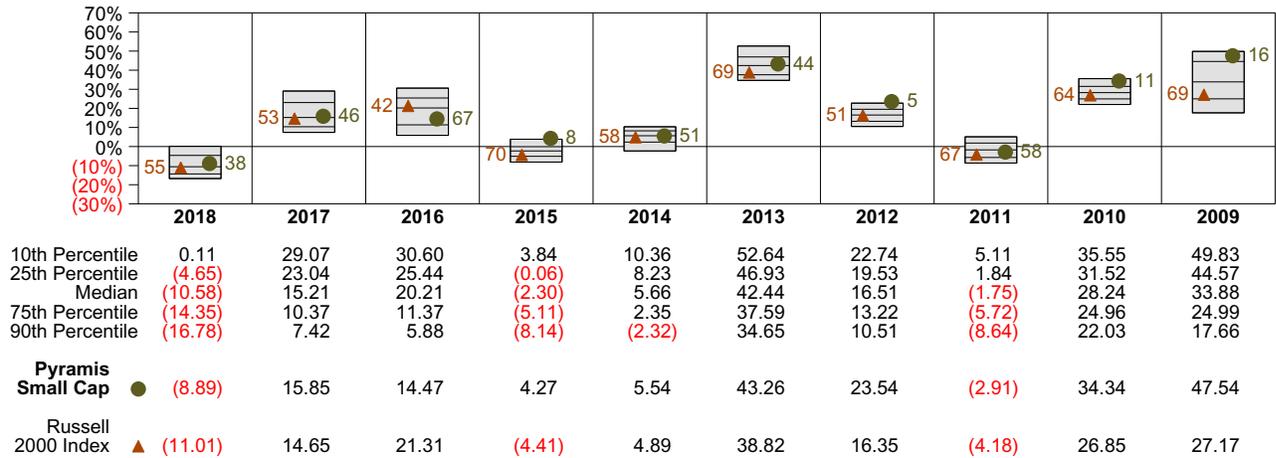


Pyramis Small Cap Return Analysis Summary

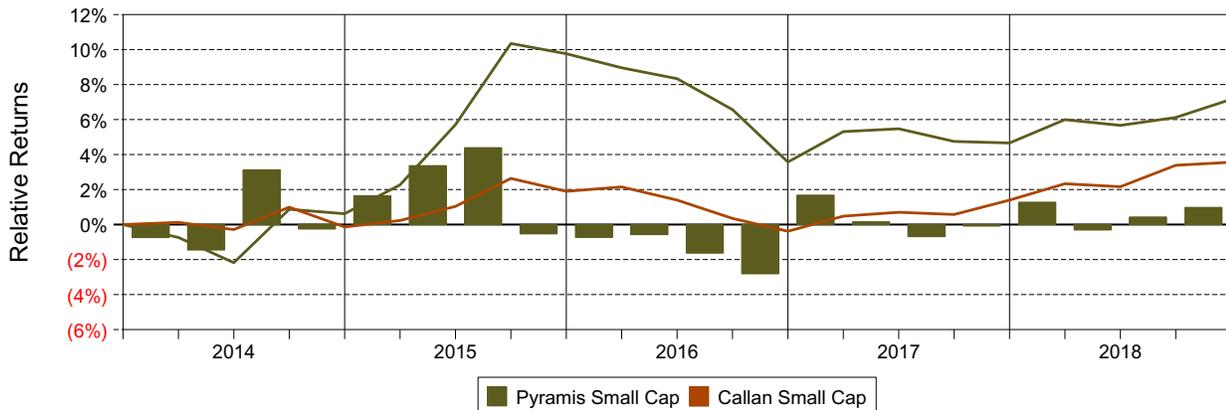
Return Analysis

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.

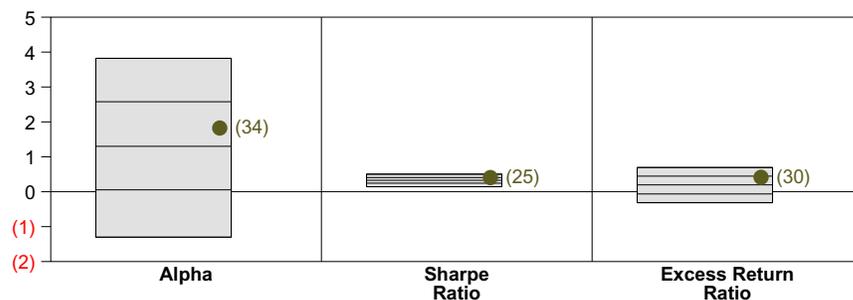
Performance vs Callan Small Capitalization (Gross)



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 December 31, 2018



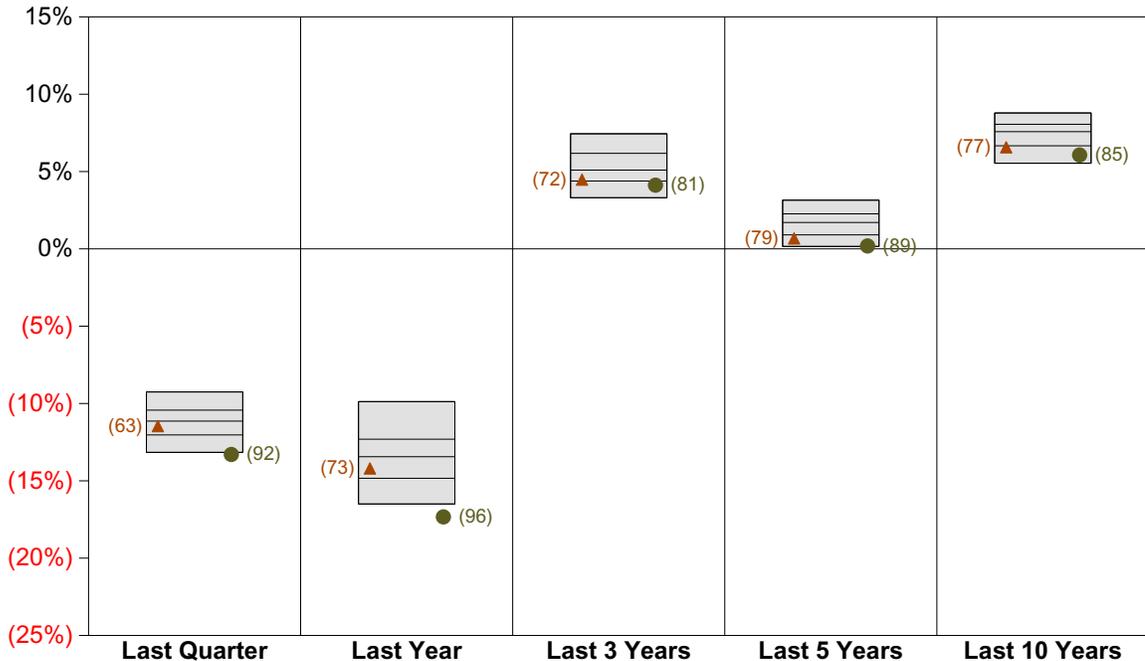
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	3.82	0.50	0.69
25th Percentile	2.58	0.41	0.45
Median	1.30	0.33	0.20
75th Percentile	0.05	0.25	(0.06)
90th Percentile	(1.30)	0.14	(0.31)
Pyramis Small Cap	1.82	0.41	0.41

International Equity Period Ended December 31, 2018

Quarterly Summary and Highlights

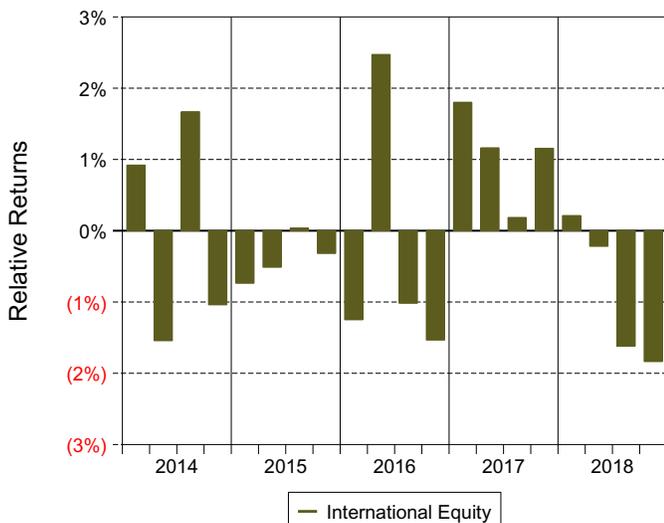
- International Equity's portfolio posted a (13.30)% return for the quarter placing it in the 92 percentile of the Public Fund - International Equity group for the quarter and in the 96 percentile for the last year.
- International Equity's portfolio underperformed the MSCI ACWI ex US by 1.83% for the quarter and underperformed the MSCI ACWI ex US for the year by 3.14%.

Performance vs Public Fund - International Equity (Gross)

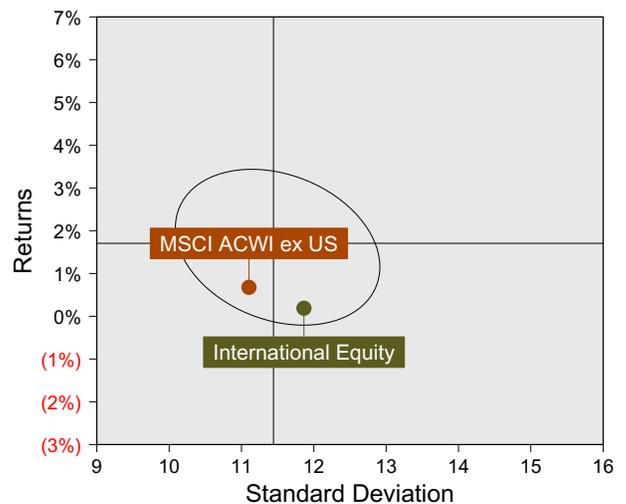


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	(9.25)	(9.88)	7.44	3.15	8.79
25th Percentile	(10.43)	(12.31)	6.18	2.27	8.06
Median	(11.14)	(13.44)	5.09	1.71	7.58
75th Percentile	(12.03)	(14.83)	4.39	0.91	6.66
90th Percentile	(13.16)	(16.50)	3.31	0.16	5.54
International Equity ●	(13.30)	(17.33)	4.12	0.19	6.07
MSCI ACWI ex US ▲	(11.46)	(14.20)	4.48	0.68	6.57

Relative Return vs MSCI ACWI ex US



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

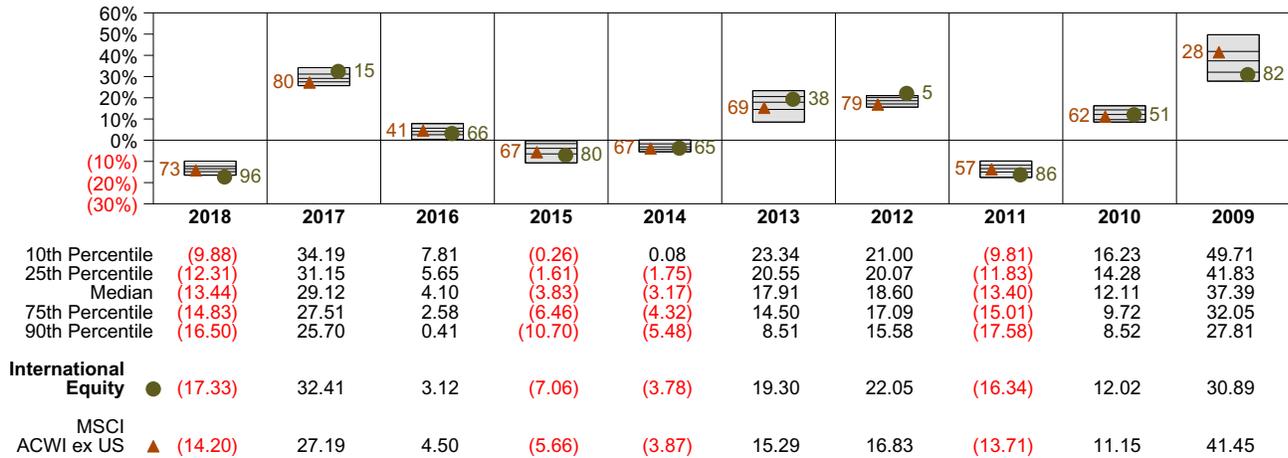


International Equity Return Analysis Summary

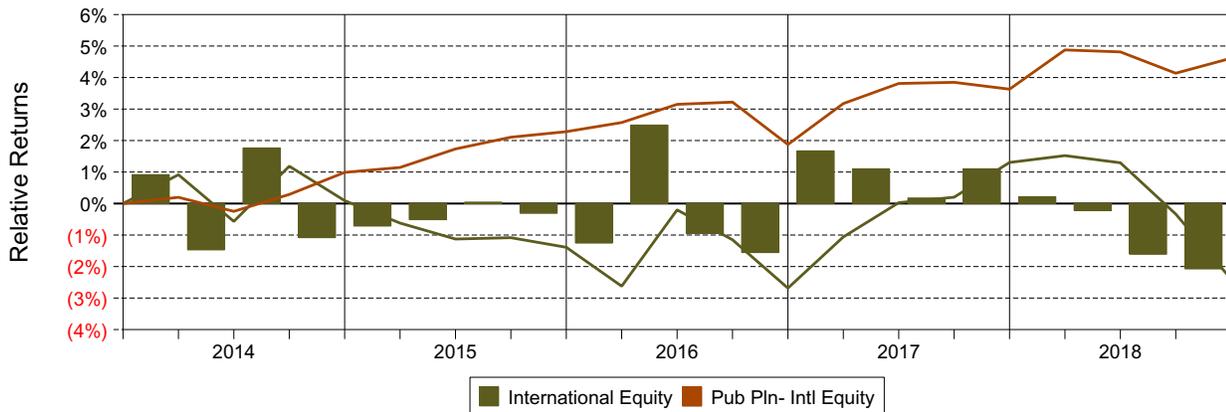
Return Analysis

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.

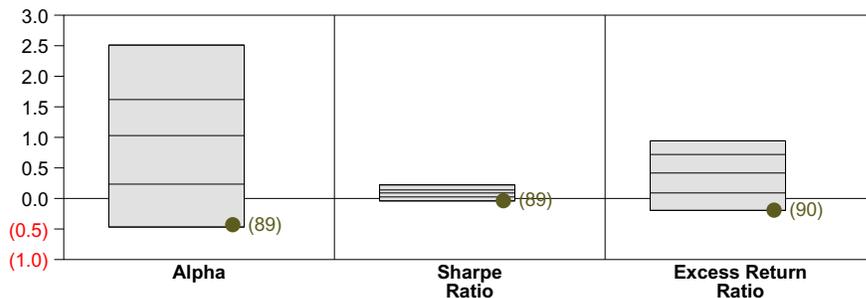
Performance vs Public Fund - International Equity (Gross)



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 December 31, 2018



Causeway International Opportunities Period Ended December 31, 2018

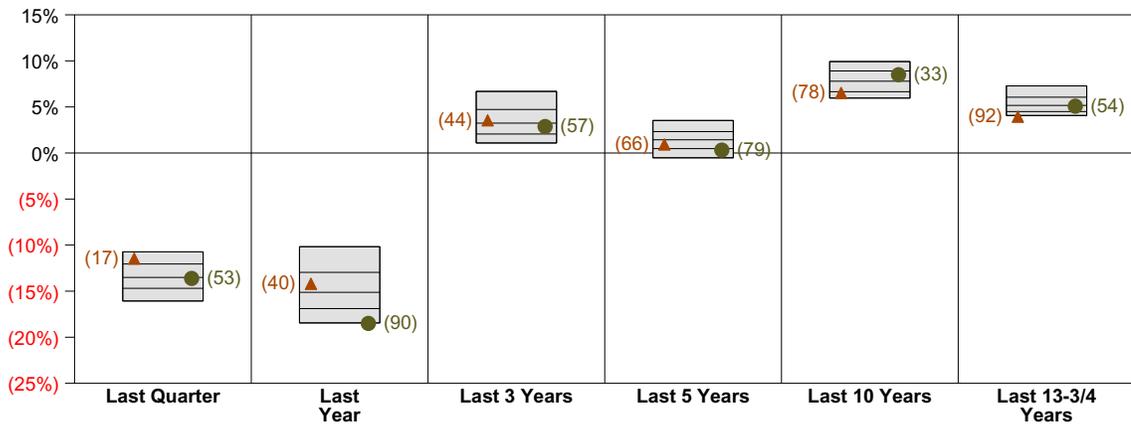
Investment Philosophy

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

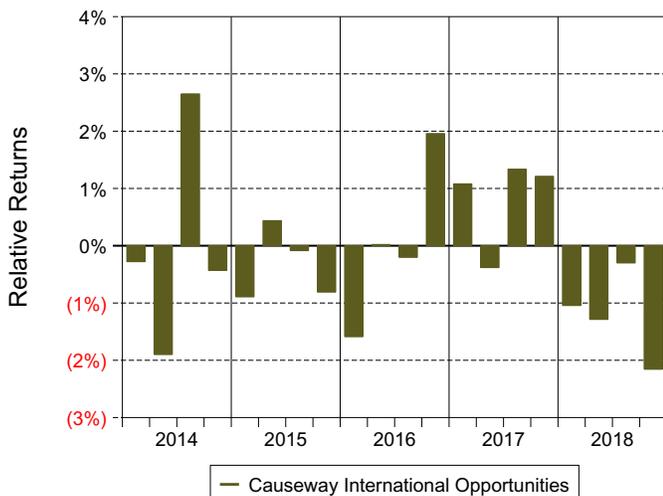
- Causeway International Opportunities's portfolio posted a (13.62)% return for the quarter placing it in the 53 percentile of the Callan Non-US Equity group for the quarter and in the 90 percentile for the last year.
- Causeway International Opportunities's portfolio underperformed the Causeway Linked Index by 2.16% for the quarter and underperformed the Causeway Linked Index for the year by 4.31%.

Performance vs Callan Non-US Equity (Gross)

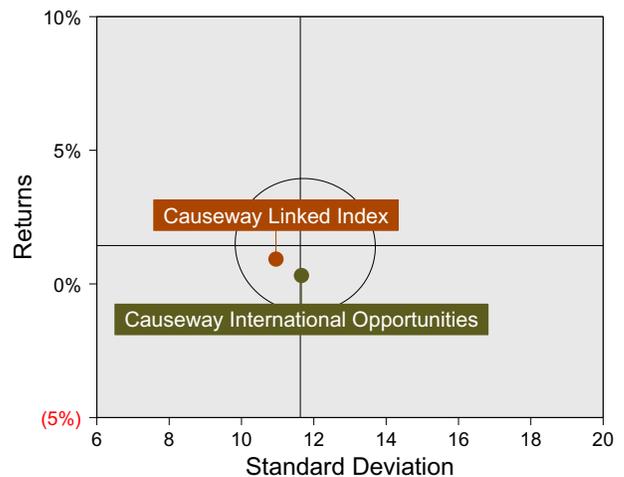


Causeway International Opportunities ● (13.62) (18.50) 2.87 0.31 8.49 5.08
Causeway Linked Index ▲ (11.46) (14.20) 3.55 0.93 6.53 3.94

Relative Return vs Causeway Linked Index



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

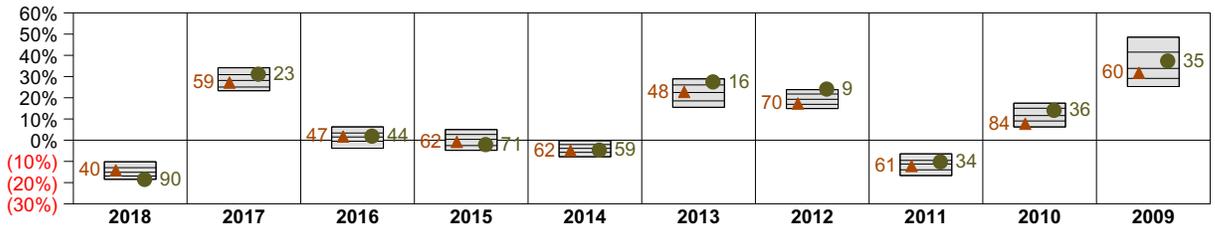


Causeway International Opportunities Return Analysis Summary

Return Analysis

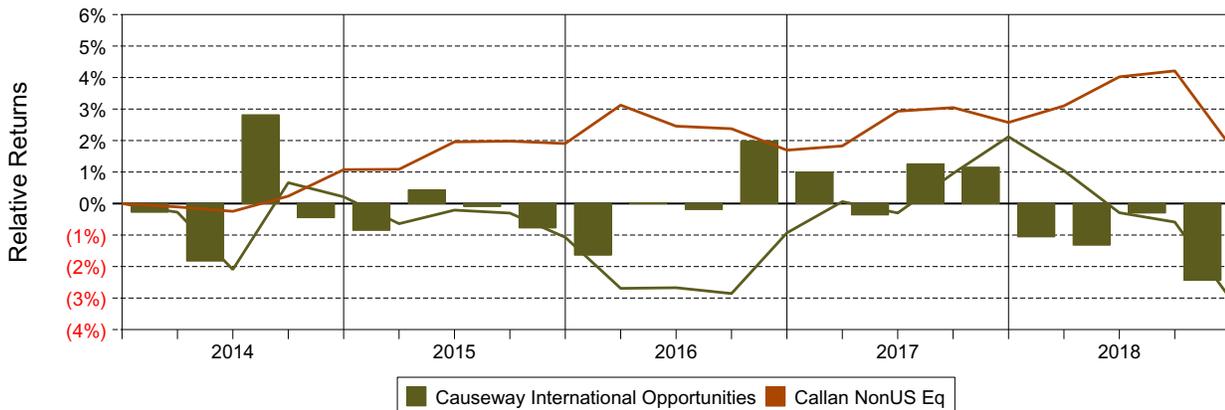
The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate 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)

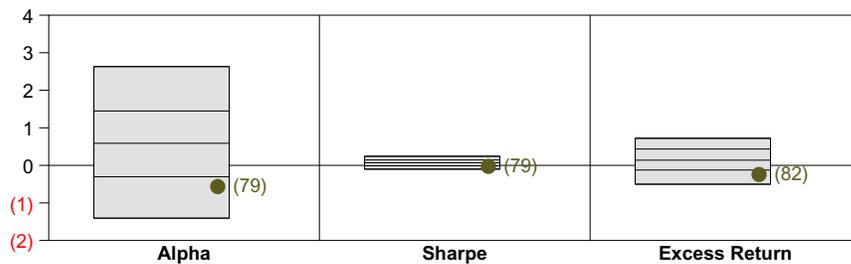


Year	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009
10th Percentile	(10.17)	34.14	6.28	5.00	(0.22)	28.92	23.83	(6.44)	17.45	48.56
25th Percentile	(12.96)	30.88	3.39	2.71	(2.04)	26.05	21.76	(9.53)	15.07	41.51
Median	(15.13)	28.16	1.50	0.40	(3.85)	22.49	19.28	(11.24)	11.62	33.83
75th Percentile	(16.89)	25.06	(0.49)	(2.53)	(5.73)	18.53	16.91	(13.97)	9.05	29.12
90th Percentile	(18.45)	23.31	(3.79)	(4.77)	(7.82)	15.49	14.91	(16.68)	6.24	25.28
Causeway International Opportunities	(18.50)	31.11	1.88	(2.09)	(4.70)	27.47	24.10	(10.24)	14.06	37.35
Causeway Linked Index	(14.20)	27.19	1.74	(0.81)	(4.90)	22.78	17.32	(12.14)	7.75	31.78

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 December 31, 2018



Measure	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.63	0.24	0.72
25th Percentile	1.45	0.14	0.44
Median	0.59	0.07	0.14
75th Percentile	(0.30)	(0.01)	(0.12)
90th Percentile	(1.41)	(0.10)	(0.50)
Causeway International Opportunities	(0.57)	(0.03)	(0.24)

Aberdeen EAFE Plus Period Ended December 31, 2018

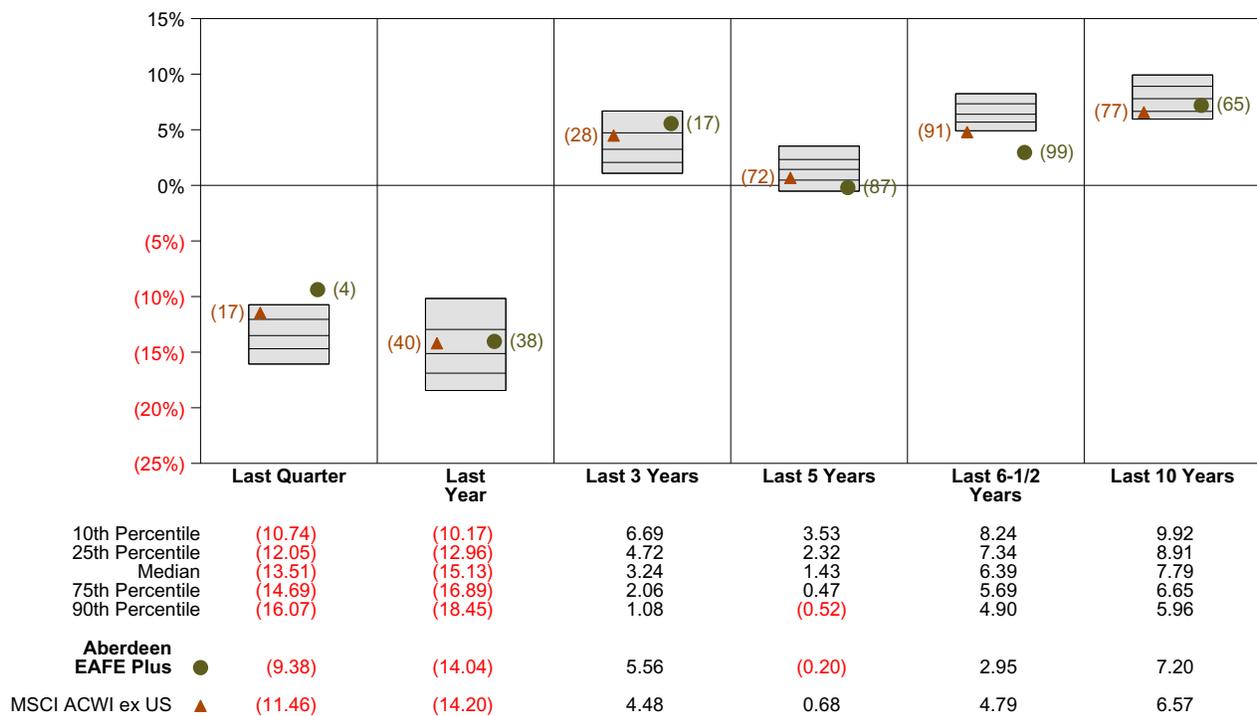
Investment Philosophy

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.

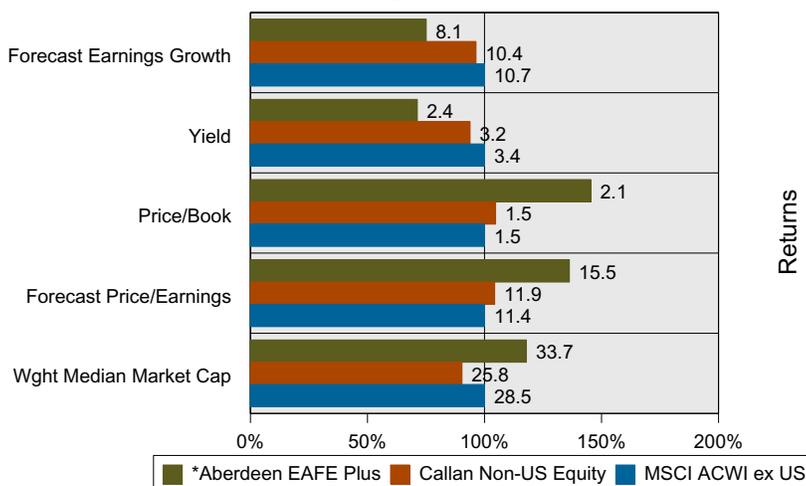
Quarterly Summary and Highlights

- Aberdeen EAFE Plus's portfolio posted a (9.38)% return for the quarter placing it in the 4 percentile of the Callan Non-US Equity group for the quarter and in the 38 percentile for the last year.
- Aberdeen EAFE Plus's portfolio outperformed the MSCI ACWI ex US by 2.08% for the quarter and outperformed the MSCI ACWI ex US for the year by 0.16%.

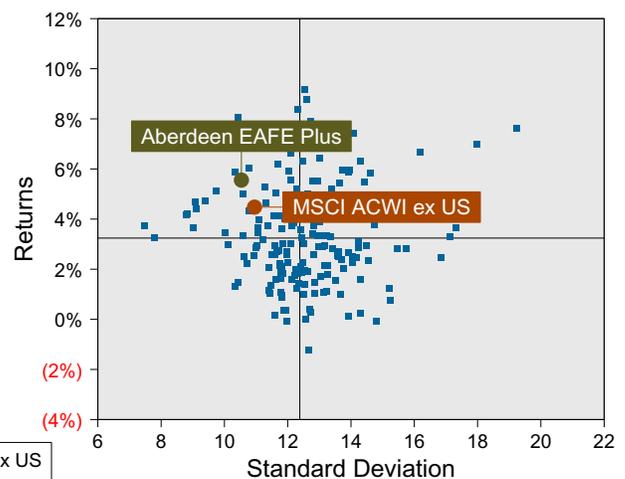
Performance vs Callan Non-US Equity (Gross)



Portfolio Characteristics as a Percentage of the MSCI ACWI ex US



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



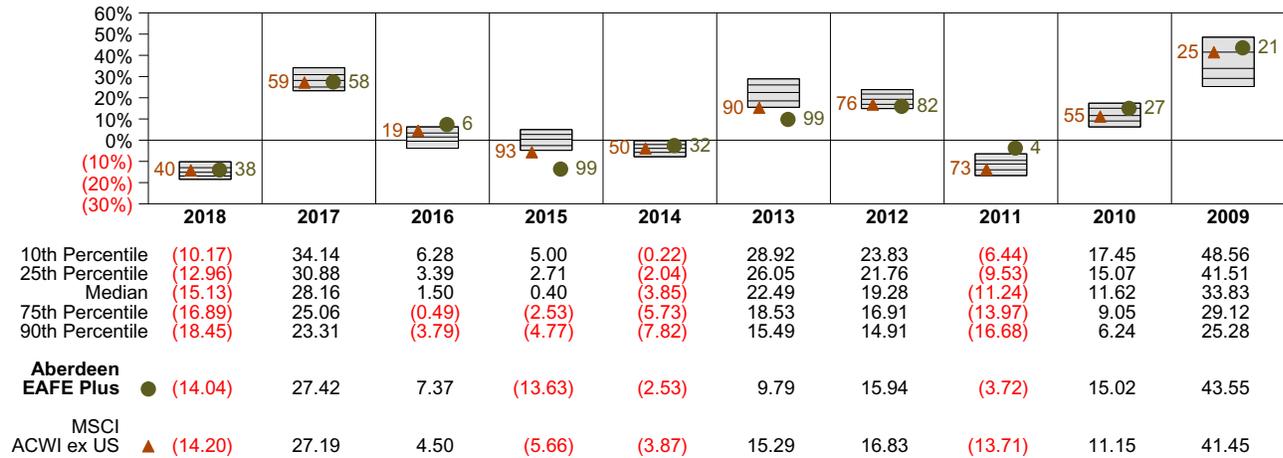
* 12/31/18 portfolio characteristics generated using most recently available holdings (9/30/18) modified based on a "buy-and-hold" assumption (repriced and adjusted for corporate actions). Analysis is then done using current market and company financial data.

Aberdeen EAFE Plus Return Analysis Summary

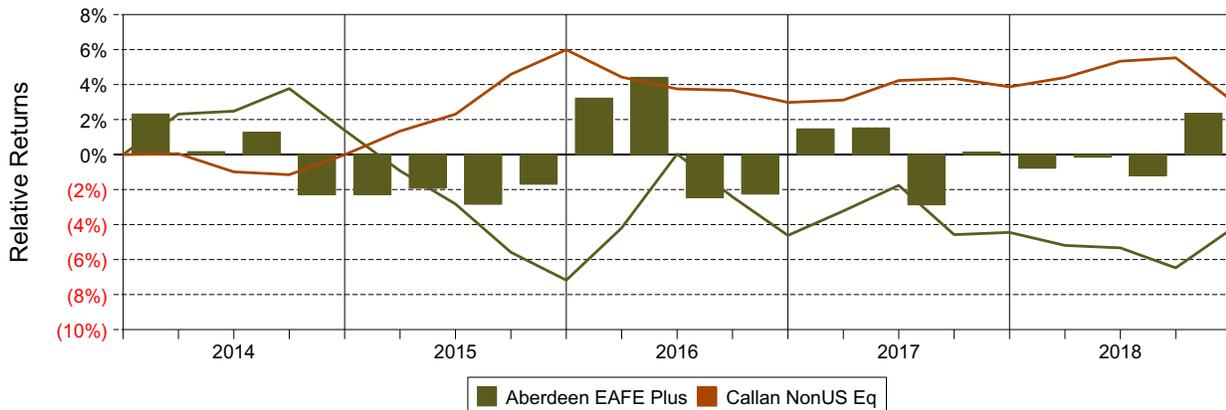
Return Analysis

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.

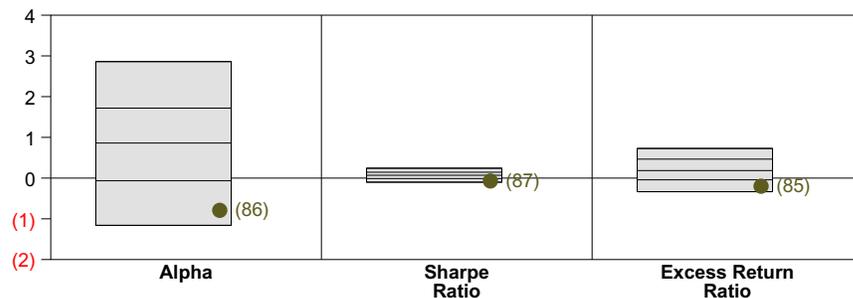
Performance vs Callan Non-US Equity (Gross)



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 December 31, 2018



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	2.86	0.24	0.73
25th Percentile	1.72	0.14	0.47
Median	0.86	0.07	0.18
75th Percentile	(0.07)	(0.01)	(0.04)
90th Percentile	(1.16)	(0.10)	(0.33)
Aberdeen EAFE Plus	● (0.79)	(0.07)	(0.20)

American Century Non-US SC Period Ended December 31, 2018

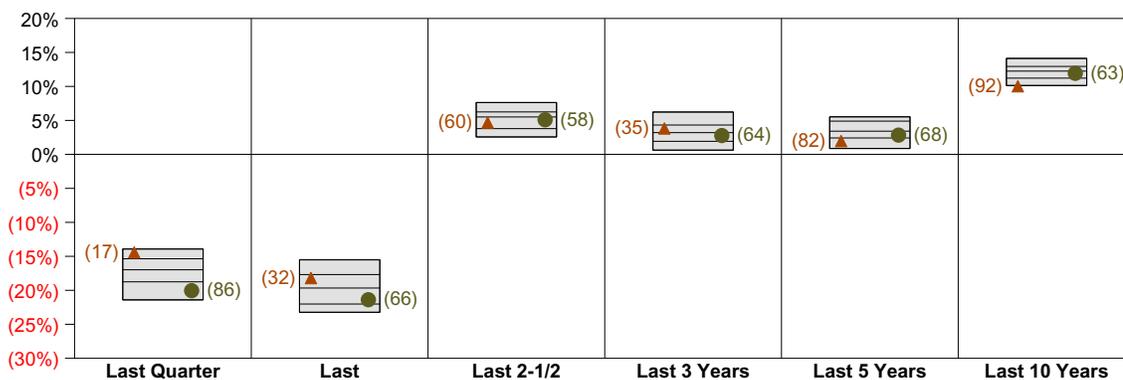
Investment Philosophy

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

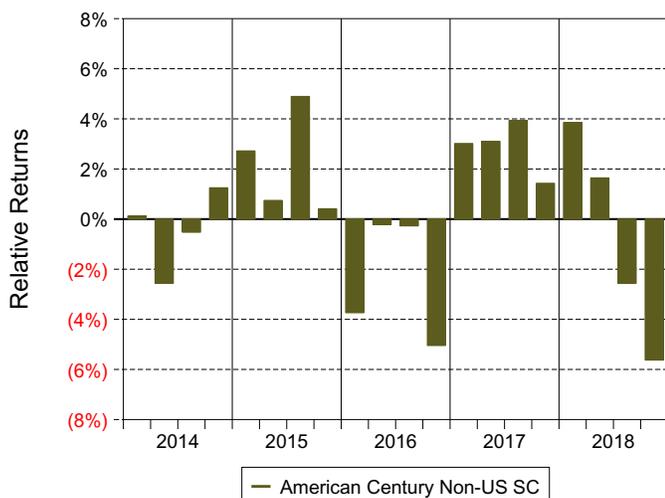
- American Century Non-US SC's portfolio posted a (20.05)% return for the quarter placing it in the 86 percentile of the Callan International Small Cap group for the quarter and in the 66 percentile for the last year.
- American Century Non-US SC's portfolio underperformed the MSCI ACWI ex US Small Cap by 5.62% for the quarter and underperformed the MSCI ACWI ex US Small Cap for the year by 3.19%.

Performance vs Callan International Small Cap (Gross)

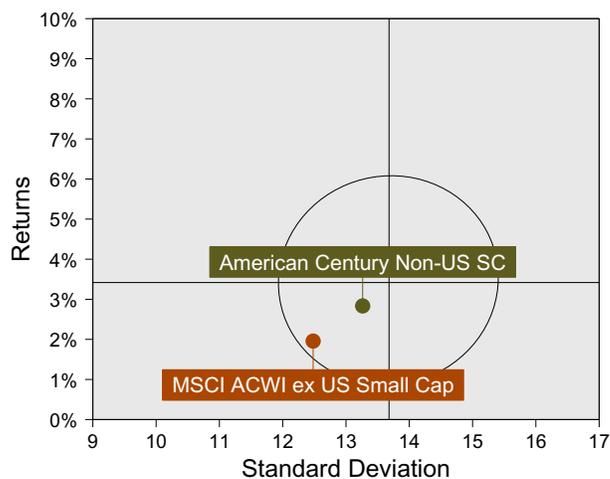


	Last Quarter	Last Year	Last 2-1/2 Years	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	(13.92)	(15.52)	7.63	6.23	5.53	14.12
25th Percentile	(15.36)	(17.68)	6.25	4.32	4.90	12.94
Median	(16.98)	(19.66)	5.51	3.20	3.42	12.25
75th Percentile	(18.75)	(22.02)	3.79	1.92	2.42	11.22
90th Percentile	(21.41)	(23.23)	2.57	0.63	0.87	10.13
American Century Non-US SC	(20.05)	(21.39)	5.09	2.77	2.83	11.92
MSCI ACWI ex US Small Cap	(14.43)	(18.20)	4.68	3.82	1.96	10.02

Relative Returns vs MSCI ACWI ex US Small Cap



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

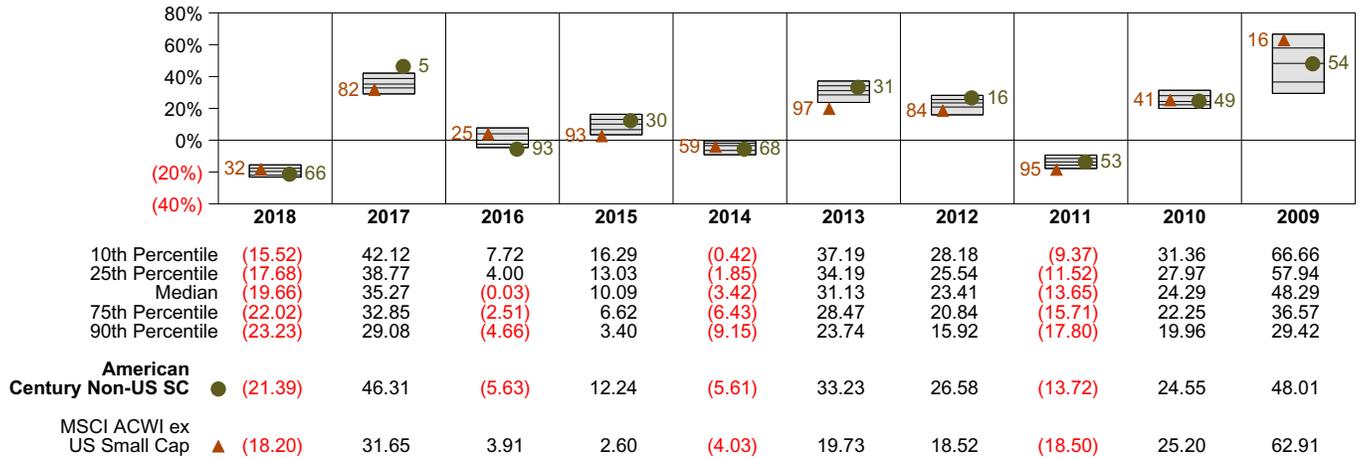


American Century Non-US SC Return Analysis Summary

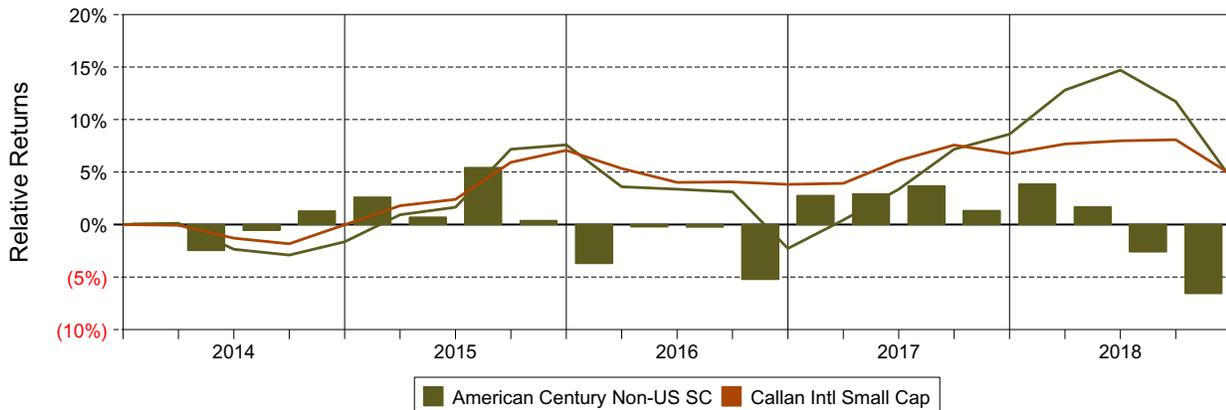
Return Analysis

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.

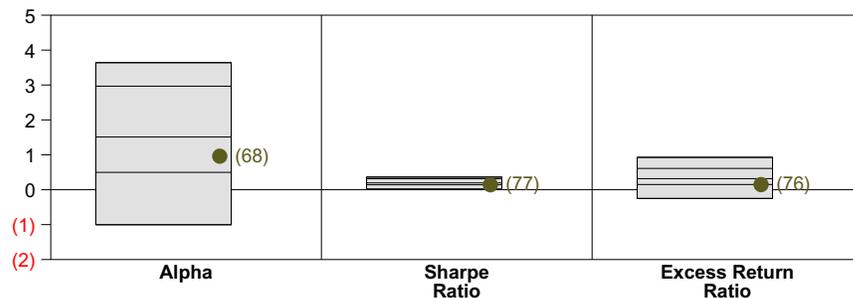
Performance vs Callan International Small Cap (Gross)



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 December 31, 2018



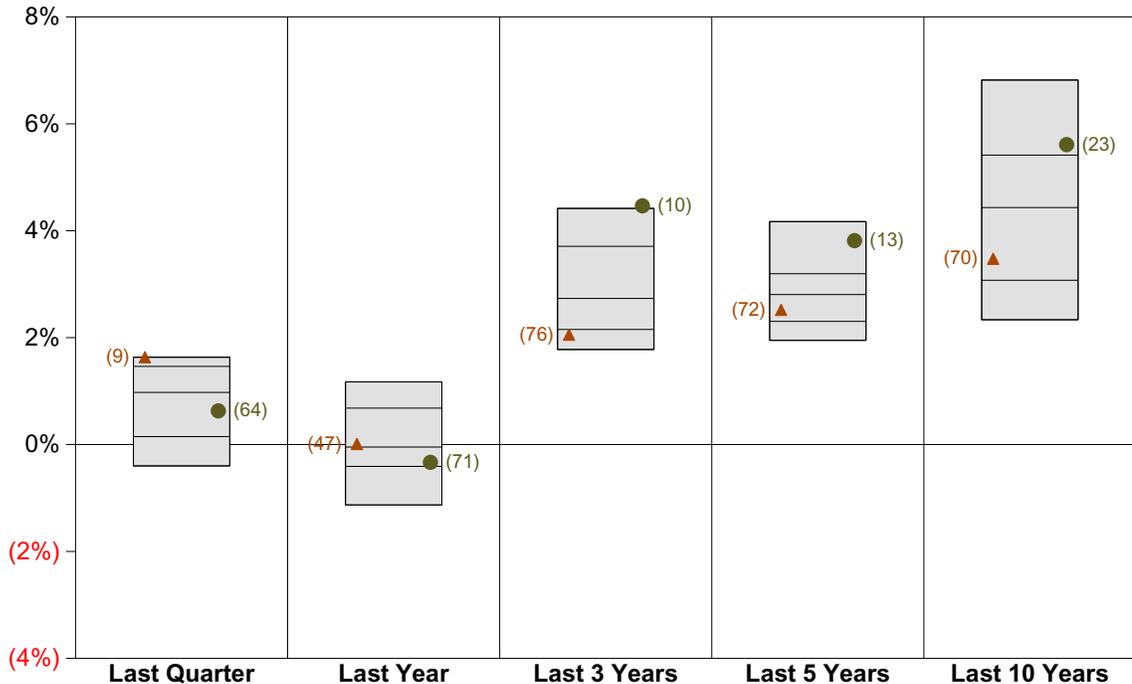
	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	3.64	0.36	0.93
25th Percentile	2.97	0.31	0.61
Median	1.51	0.20	0.32
75th Percentile	0.50	0.14	0.15
90th Percentile	(1.00)	0.02	(0.25)
American Century Non-US SC	0.96	0.14	0.15

Fixed Income Period Ended December 31, 2018

Quarterly Summary and Highlights

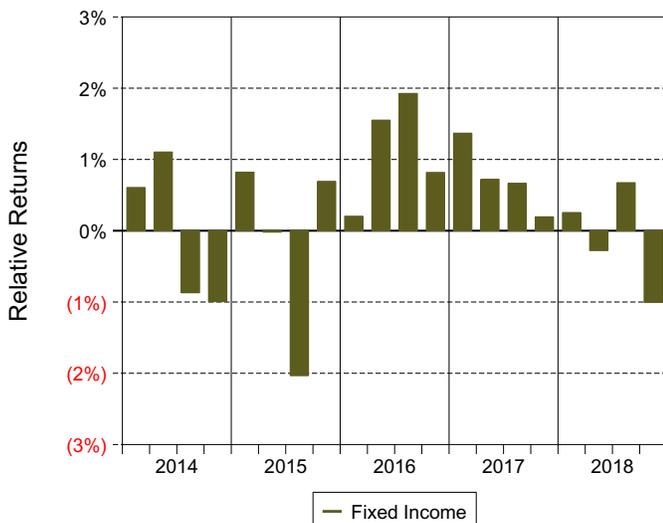
- Fixed Income's portfolio posted a 0.63% return for the quarter placing it in the 64 percentile of the Public Fund - Domestic Fixed group for the quarter and in the 71 percentile for the last year.
- Fixed Income's portfolio underperformed the Blmbg Aggregate Index by 1.01% for the quarter and underperformed the Blmbg Aggregate Index for the year by 0.34%.

Performance vs Public Fund - Domestic Fixed (Gross)

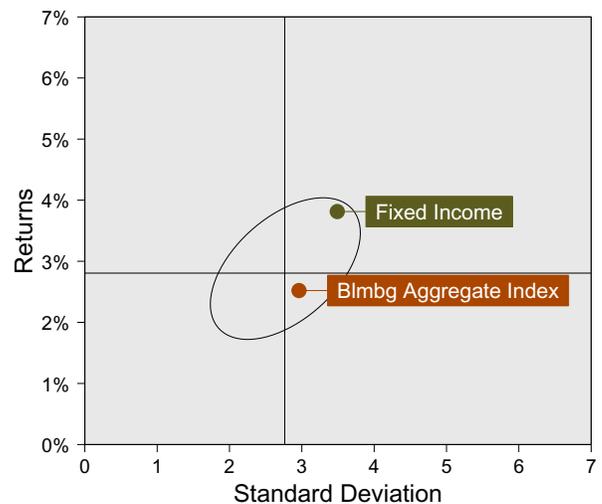


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
10th Percentile	1.63	1.17	4.42	4.17	6.82
25th Percentile	1.46	0.68	3.71	3.20	5.41
Median	0.98	(0.05)	2.73	2.81	4.43
75th Percentile	0.15	(0.41)	2.15	2.30	3.07
90th Percentile	(0.40)	(1.13)	1.78	1.95	2.33
Fixed Income ●	0.63	(0.33)	4.47	3.81	5.61
Blmbg Aggregate Index ▲	1.64	0.01	2.06	2.52	3.48

Relative Return vs Blmbg Aggregate Index



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

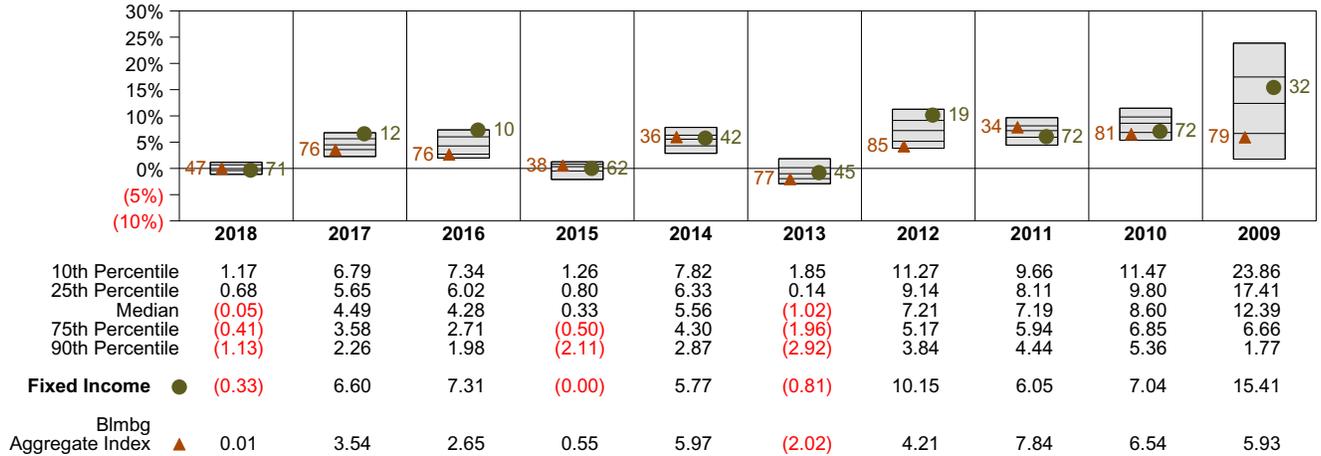


Fixed Income Return Analysis Summary

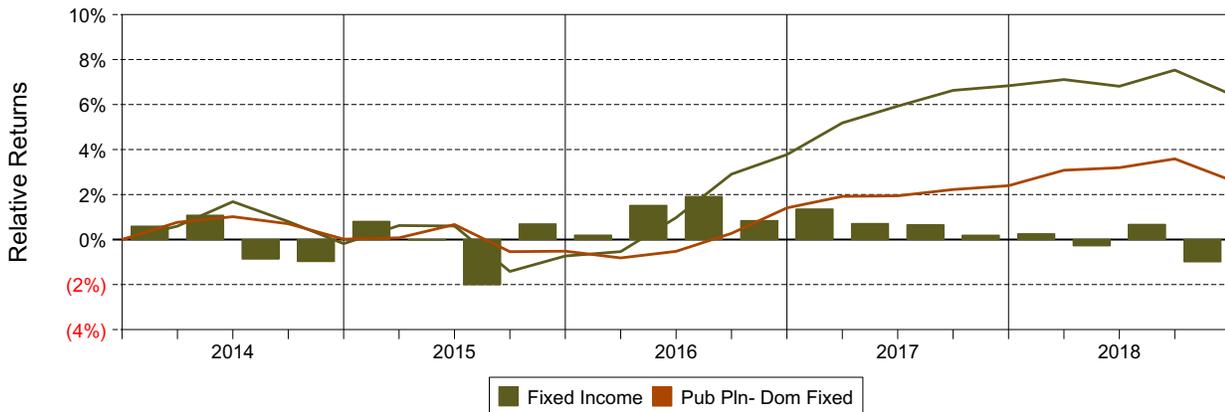
Return Analysis

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.

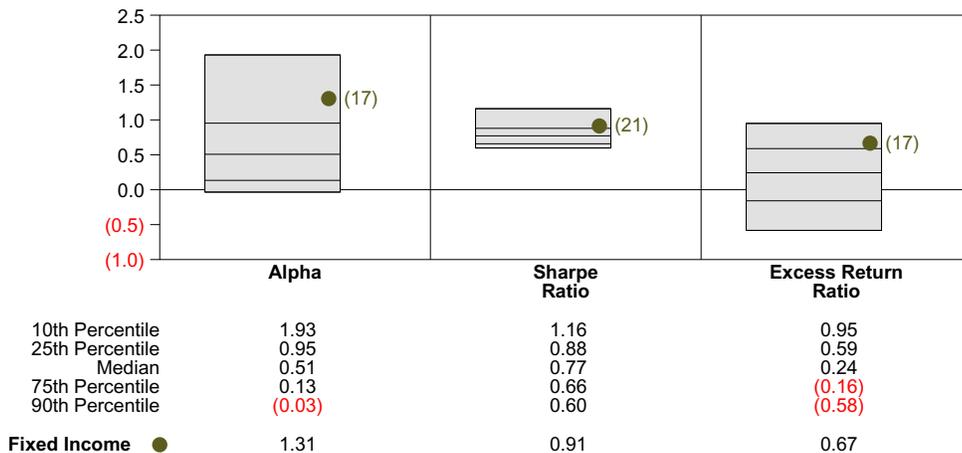
Performance vs Public Fund - Domestic Fixed (Gross)



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 December 31, 2018



BlackRock U.S. Debt Fund Period Ended December 31, 2018

Investment Philosophy

The product was funded during the fourth quarter of 2011. Performance prior is that of the composite.

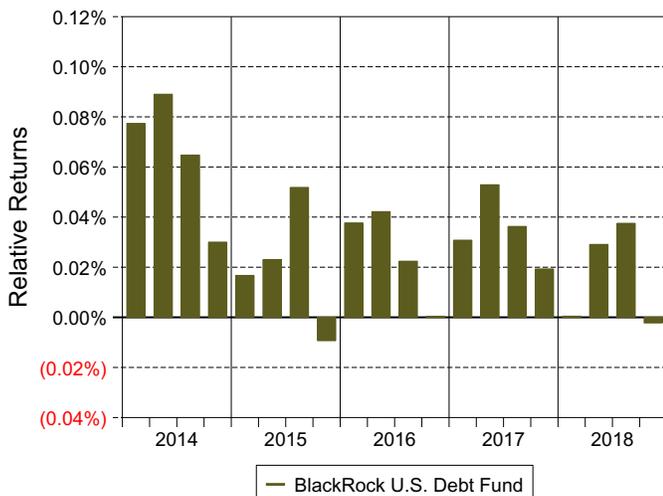
Quarterly Summary and Highlights

- BlackRock U.S. Debt Fund's portfolio posted a 1.63% return for the quarter placing it in the 25 percentile of the Callan Core Bond Fixed Income group for the quarter and in the 58 percentile for the last year.
- BlackRock U.S. Debt Fund's portfolio underperformed the Blmbg Aggregate by 0.00% for the quarter and outperformed the Blmbg Aggregate for the year by 0.06%.

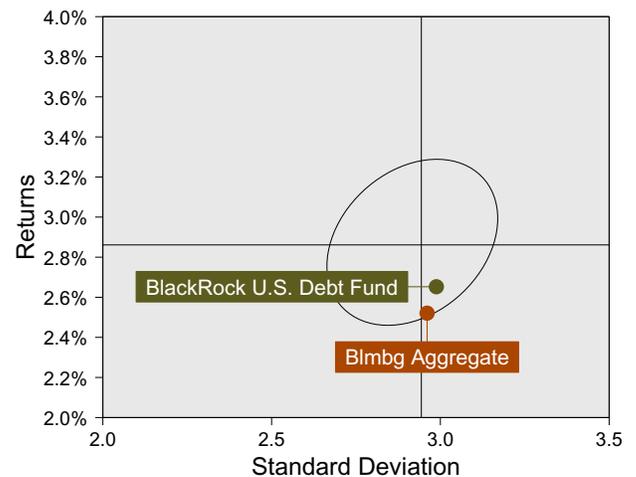
Performance vs Callan Core Bond Fixed Income (Gross)



Relative Return vs Blmbg Aggregate



Callan Core Bond Fixed Income (Gross) Annualized Five Year Risk vs Return

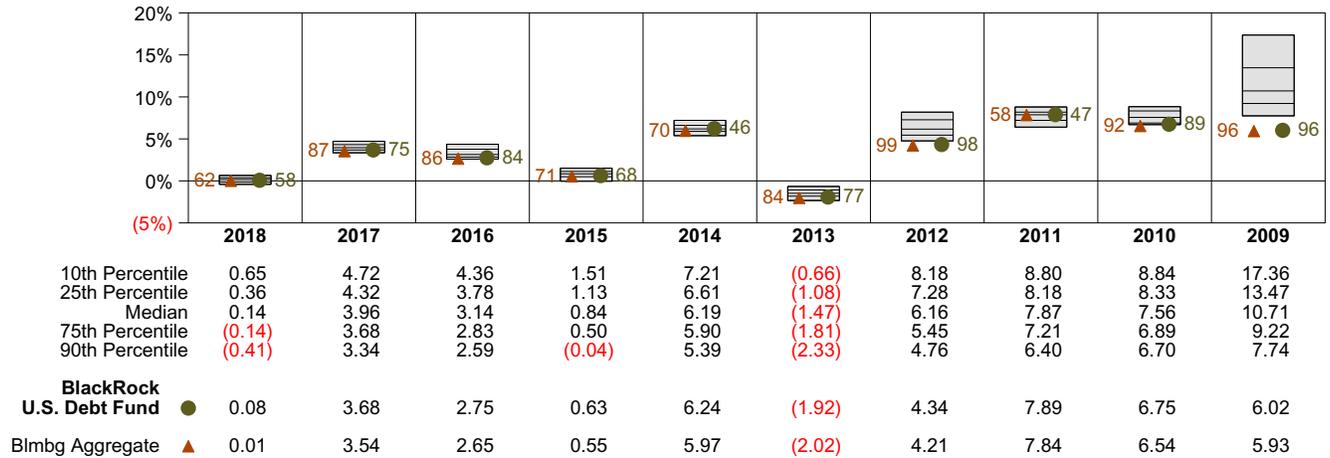


BlackRock U.S. Debt Fund Return Analysis Summary

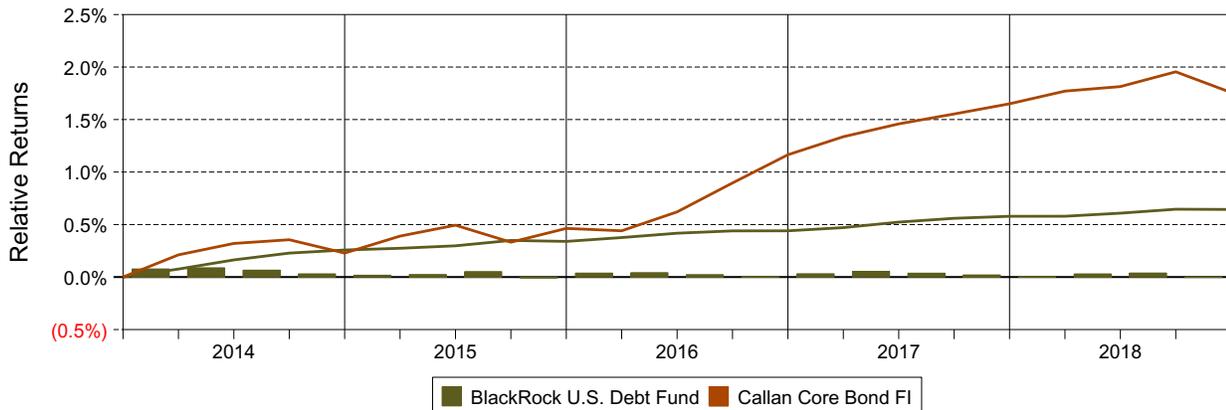
Return Analysis

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.

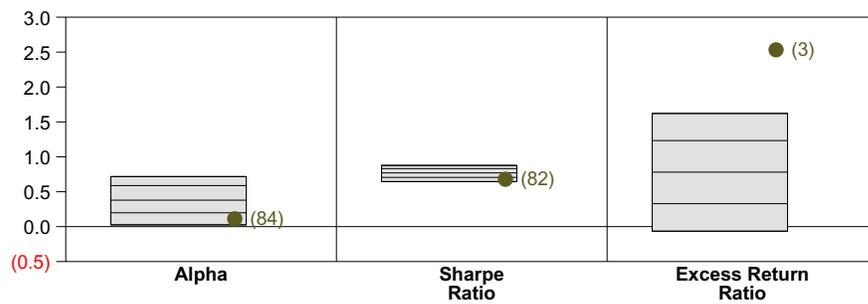
Performance vs Callan Core Bond Fixed Income (Gross)



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 December 31, 2018



PIMCO Fixed Income Period Ended December 31, 2018

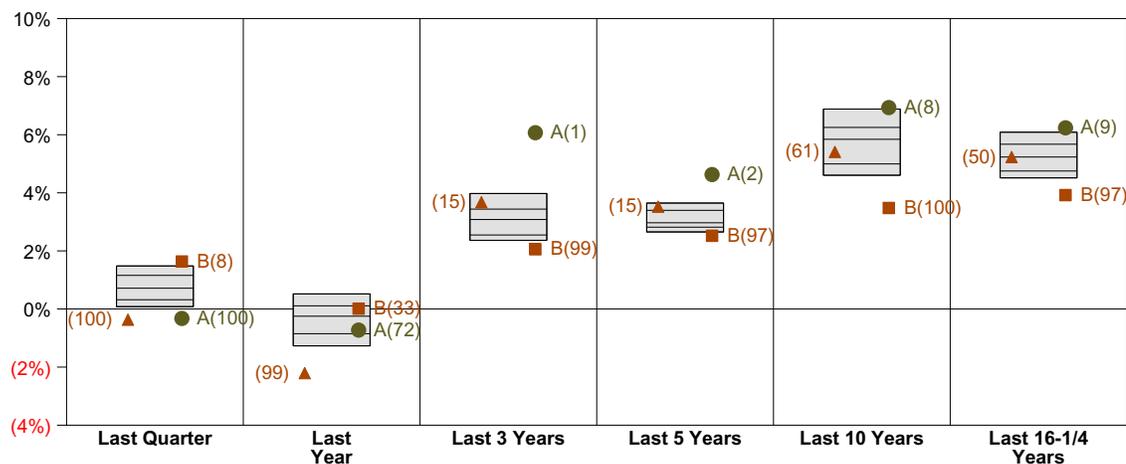
Investment Philosophy

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

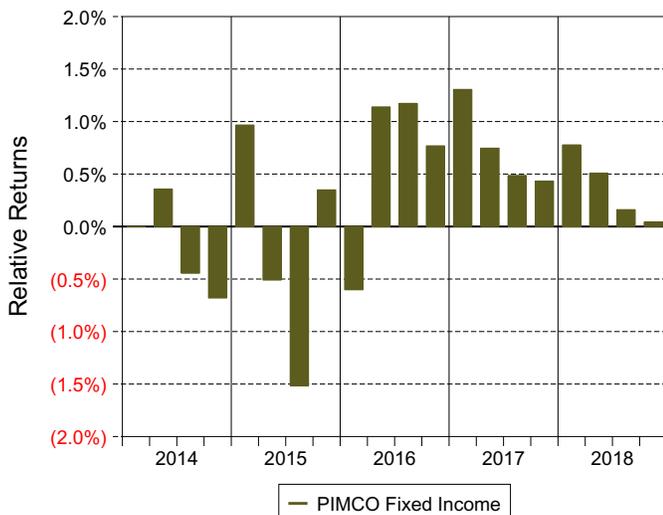
- PIMCO Fixed Income's portfolio posted a (0.32)% return for the quarter placing it in the 100 percentile of the Callan Core Plus Fixed Income group for the quarter and in the 72 percentile for the last year.
- PIMCO Fixed Income's portfolio outperformed the Custom Index by 0.04% for the quarter and outperformed the Custom Index for the year by 1.48%.

Performance vs Callan Core Plus Fixed Income (Gross)

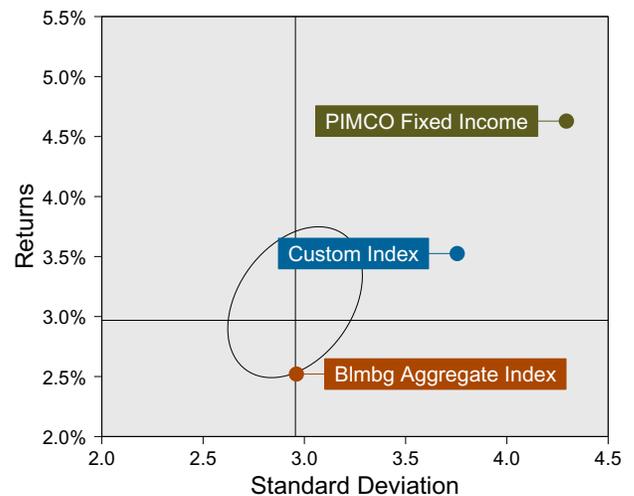


	Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years	Last 16-1/4 Years
10th Percentile	1.48	0.52	3.98	3.65	6.88	6.09
25th Percentile	1.16	0.11	3.44	3.40	6.25	5.67
Median	0.72	(0.25)	3.08	2.97	5.84	5.23
75th Percentile	0.32	(0.85)	2.55	2.82	5.00	4.75
90th Percentile	0.08	(1.27)	2.36	2.65	4.60	4.51
PIMCO Fixed Income	● A (0.32)	(0.73)	6.07	4.63	6.93	6.24
Blmbg Aggregate Index	■ B 1.64	0.01	2.06	2.52	3.48	3.92
Custom Index	▲ (0.37)	(2.21)	3.68	3.53	5.41	5.23

Relative Return vs Custom Index



Callan Core Plus Fixed Income (Gross) Annualized Five Year Risk vs Return

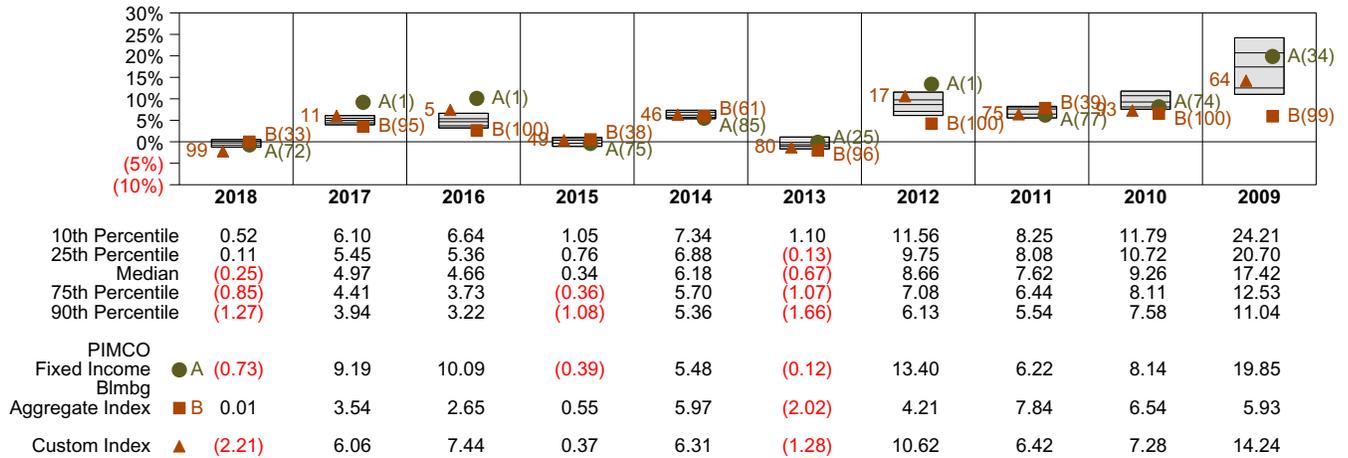


PIMCO Fixed Income Return Analysis Summary

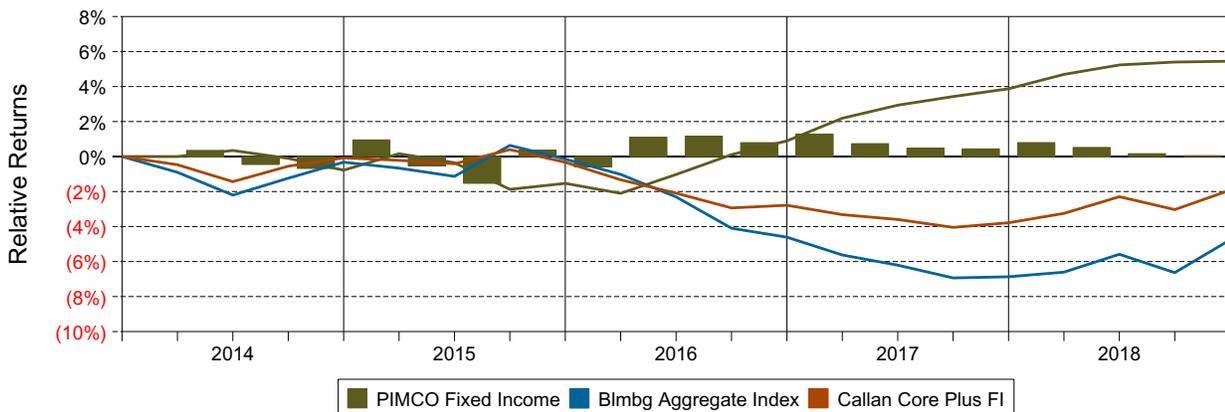
Return Analysis

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.

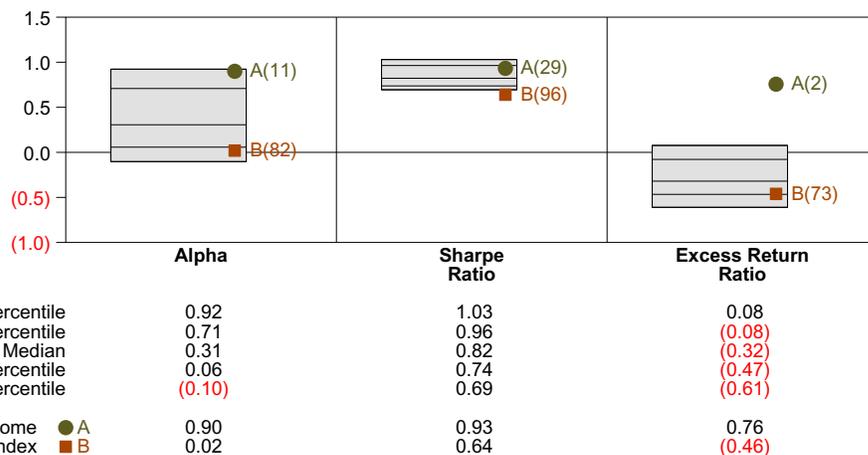
Performance vs Callan Core Plus Fixed Income (Gross)



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 December 31, 2018



Real Estate Period Ended December 31, 2018

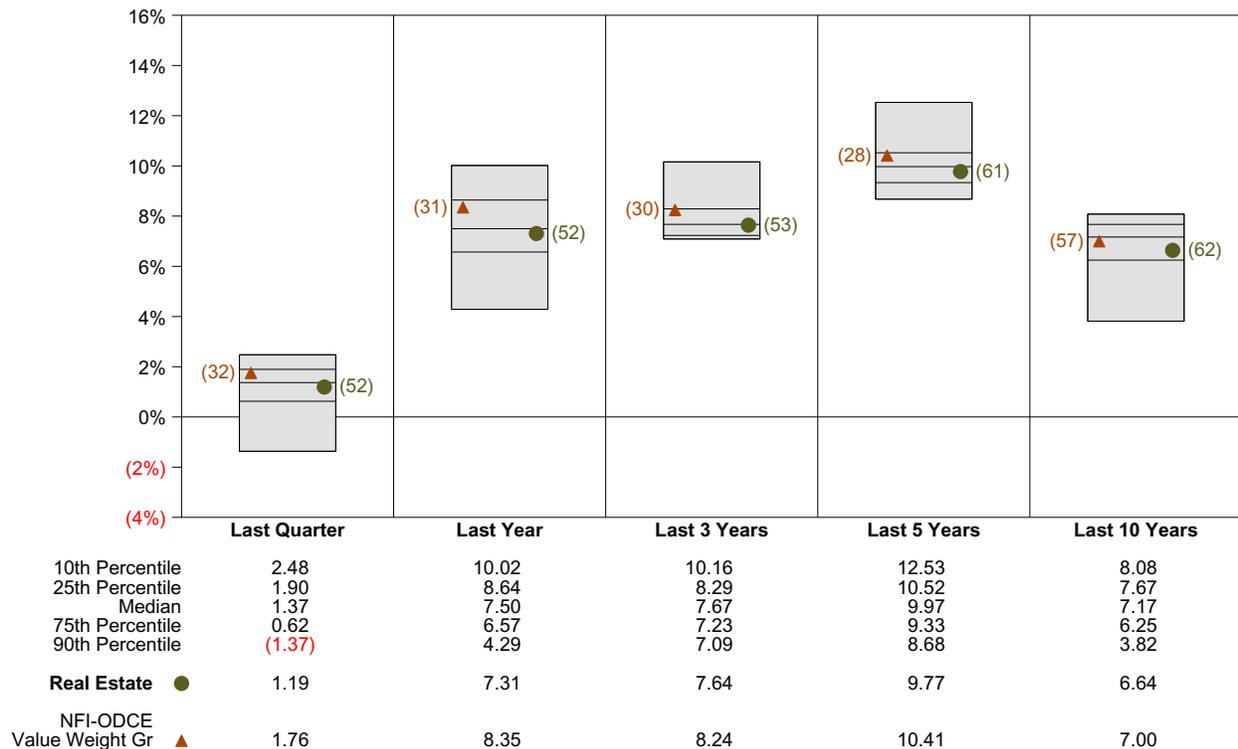
Investment Philosophy

The Total Real Estate Funds Database consists of both open and closed-end commingled funds as well as separate accounts managed by real estate firms. The returns represent the overall performance of institutional capital invested in real estate properties.

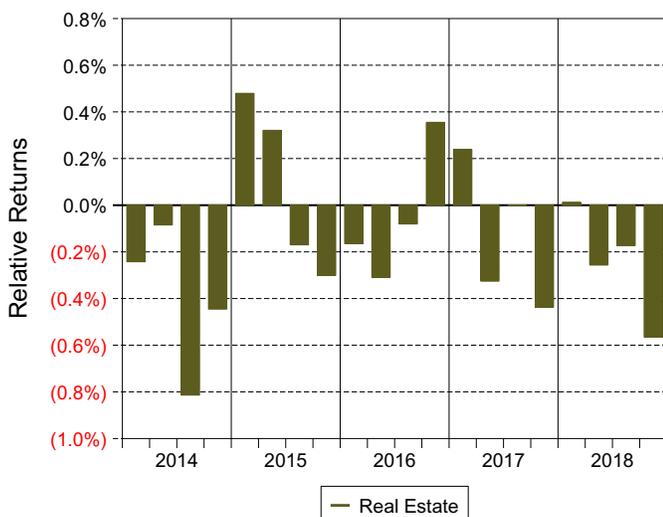
Quarterly Summary and Highlights

- Real Estate's portfolio posted a 1.19% return for the quarter placing it in the 52 percentile of the Public Fund - Real Estate group for the quarter and in the 52 percentile for the last year.
- Real Estate's portfolio underperformed the NFI-ODCE Value Weight Gr by 0.57% for the quarter and underperformed the NFI-ODCE Value Weight Gr for the year by 1.04%.

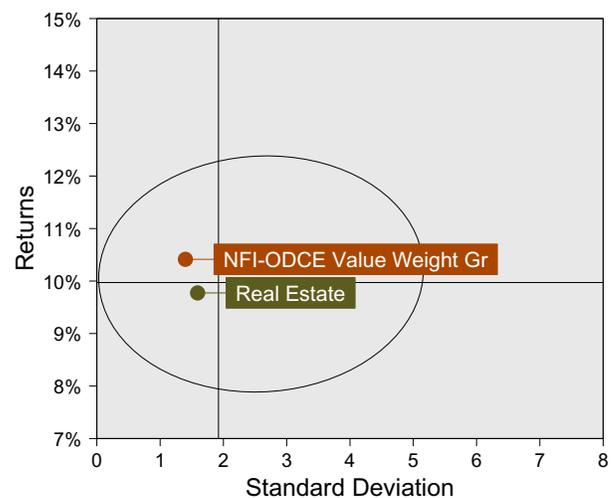
Performance vs Public Fund - Real Estate (Gross)



Relative Return vs NFI-ODCE Value Weight Gr



Public Fund - Real Estate (Gross) Annualized Five Year Risk vs Return

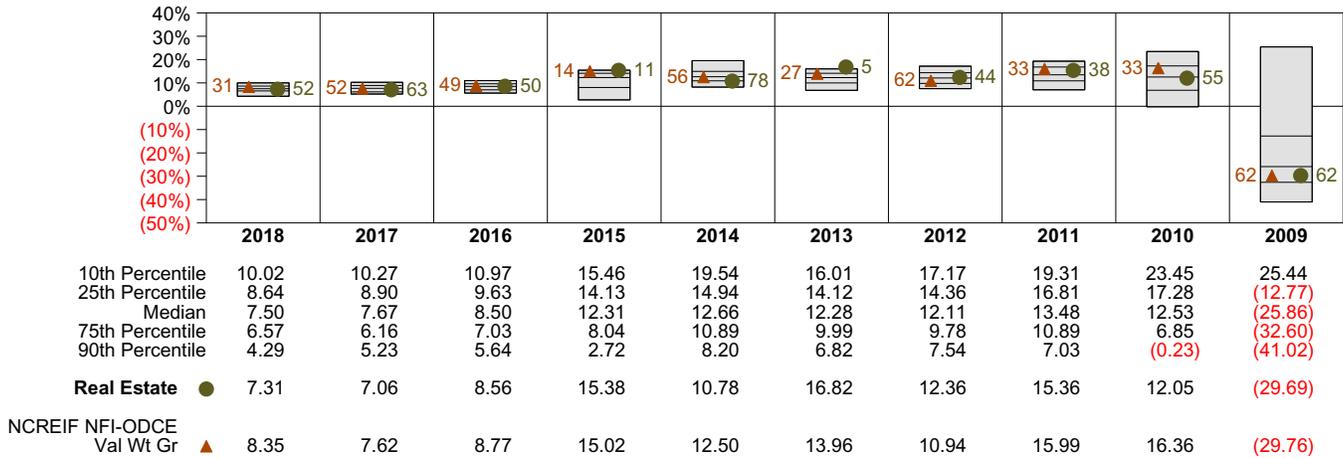


Real Estate Return Analysis Summary

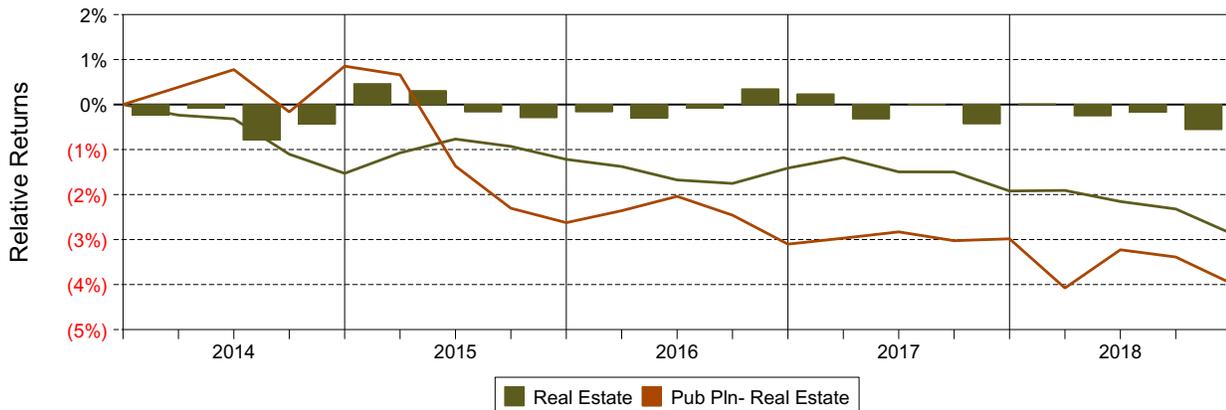
Return Analysis

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.

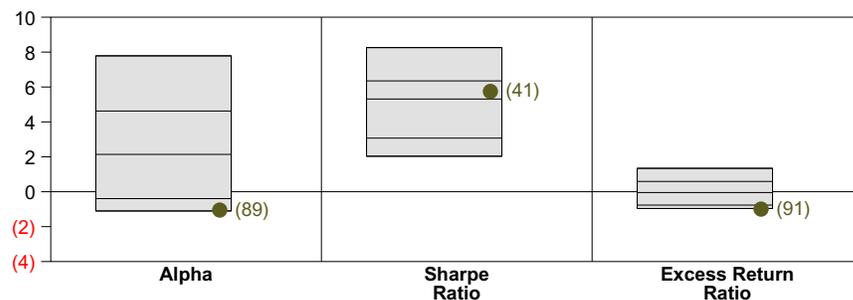
Performance vs Public Fund - Real Estate (Gross)



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 December 31, 2018



	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	7.79	8.26	1.34
25th Percentile	4.62	6.35	0.59
Median	2.14	5.31	(0.05)
75th Percentile	(0.39)	3.07	(0.77)
90th Percentile	(1.10)	2.03	(0.96)
Real Estate ●	(1.05)	5.75	(1.00)

JP Morgan Strategic Property Fund Period Ended December 31, 2018

Investment Philosophy

J.P. Morgan's Strategic Property Fund is an actively managed diversified, core, open-end commingled pension trust fund. It seeks an income-driven rate of return of 100 basis points over the NFI-ODCE Equal Weight Net Index over a full market cycle (three to five year horizon) through asset, geographic and sector selection and active asset management. The Fund invests in high quality stabilized assets with dominant competitive characteristics in markets with attractive demographics throughout the United States. The product was funded in the fourth quarter of 2008.

Quarterly Summary and Highlights

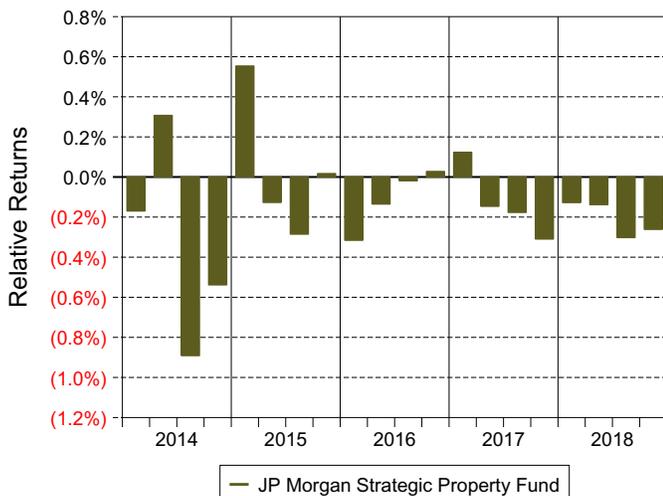
- JP Morgan Strategic Property Fund's portfolio posted a 1.26% return for the quarter placing it in the 87 percentile of the Callan Open End Core Cmmingled Real Est group for the quarter and in the 92 percentile for the last year.
- JP Morgan Strategic Property Fund's portfolio underperformed the NCREIF NFI-ODCE Val Wt Nt by 0.26% for the quarter and underperformed the NCREIF NFI-ODCE Val Wt Nt for the year by 0.87%.

Performance vs Callan Open End Core Cmmingled Real Est (Net)

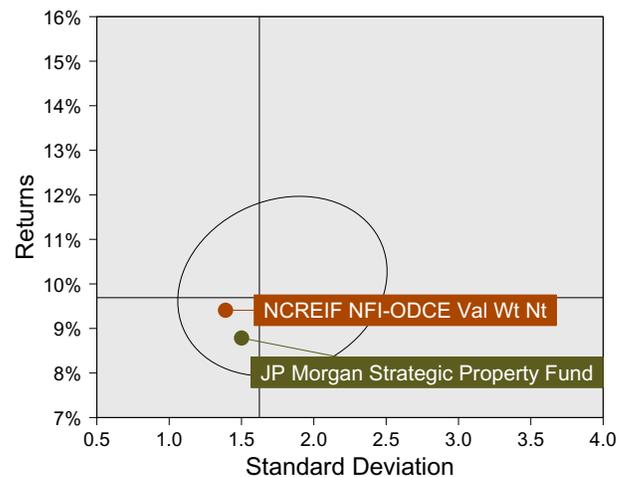


10th Percentile	2.12	9.47	9.49	11.73	8.93	8.26
25th Percentile	1.94	7.93	8.24	10.43	6.74	7.87
Median	1.59	7.56	7.67	9.69	6.25	7.25
75th Percentile	1.38	6.90	6.88	8.91	5.75	6.72
90th Percentile	1.20	6.57	5.90	8.49	5.10	6.30
JP Morgan Strategic Property Fund	1.26	6.49	6.64	8.78	6.22	7.55
NCREIF NFI-ODCE Val Wt Nt	1.52	7.36	7.27	9.41	6.01	7.00

Relative Returns vs NCREIF NFI-ODCE Val Wt Nt



Callan Open End Core Cmmingled Real Est (Net) Annualized Five Year Risk vs Return

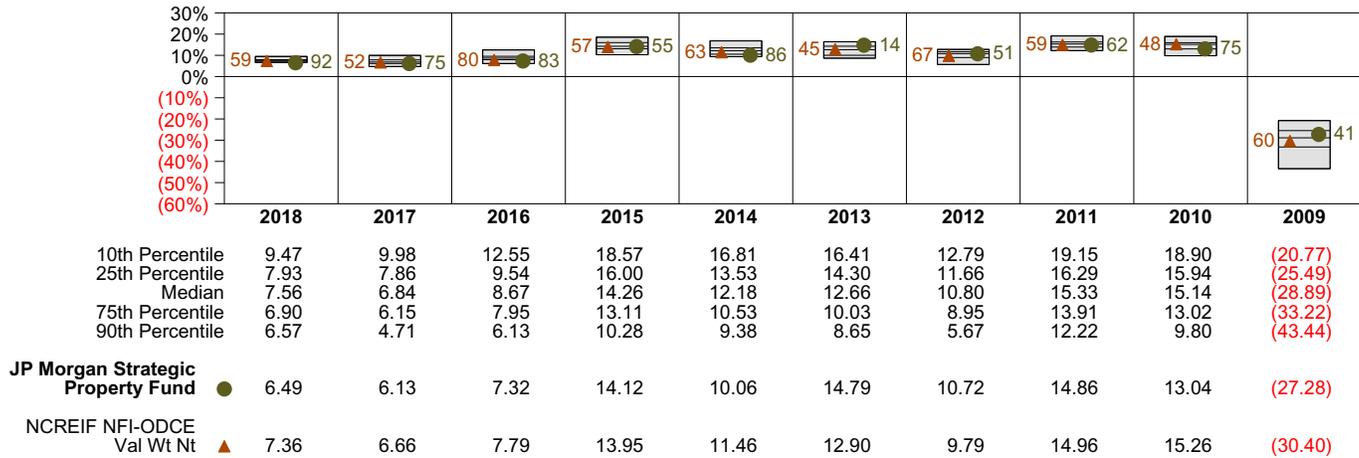


JP Morgan Strategic Property Fund Return Analysis Summary

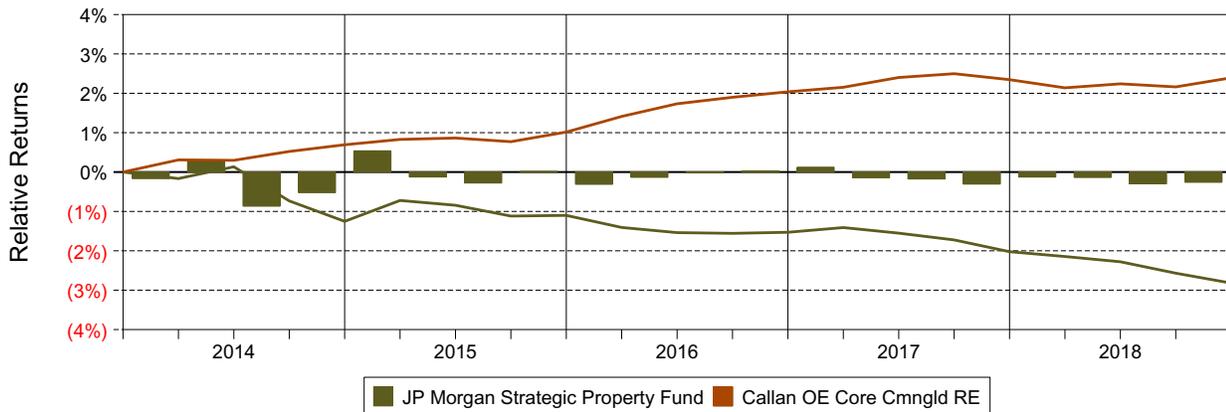
Return Analysis

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.

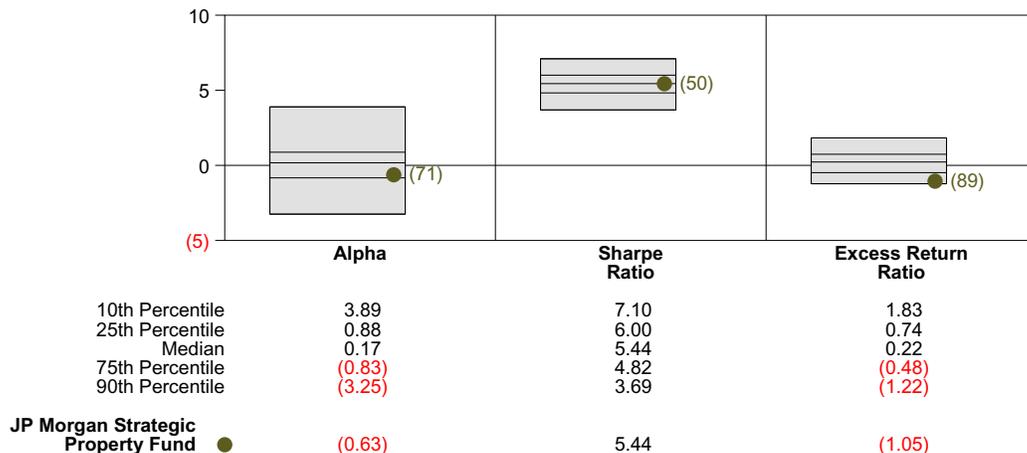
Performance vs Callan Open End Core Cmmngld Real Est (Net)



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 Cmmngld Real Est (Net) Five Years Ended December 31, 2018



JP Morgan Income and Growth Fund Period Ended December 31, 2018

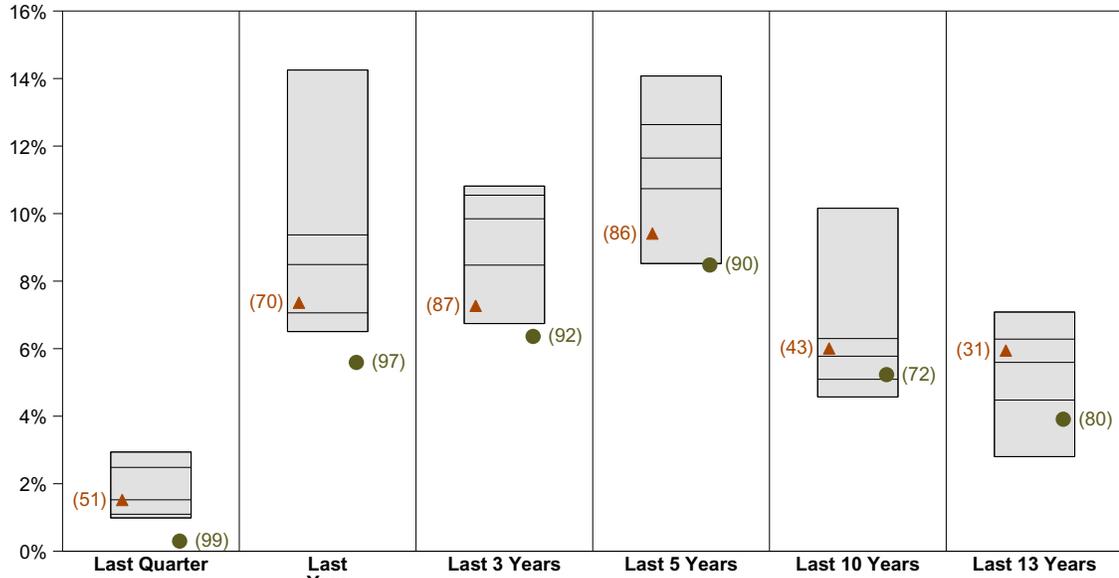
Investment Philosophy

The product was funded in the fourth quarter of 2005.

Quarterly Summary and Highlights

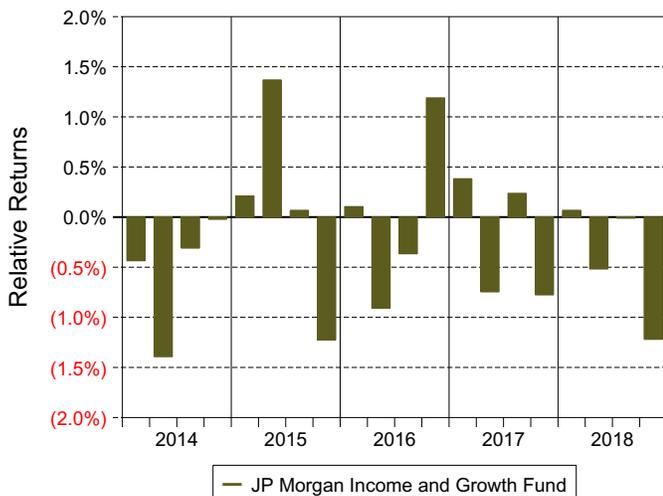
- JP Morgan Income and Growth Fund's portfolio posted a 0.30% return for the quarter placing it in the 99 percentile of the Callan Real Estate Val Add Open End Fds group for the quarter and in the 97 percentile for the last year.
- JP Morgan Income and Growth Fund's portfolio underperformed the NCREIF NFI-ODCE Val Wt Nt by 1.22% for the quarter and underperformed the NCREIF NFI-ODCE Val Wt Nt for the year by 1.77%.

Performance vs Callan Real Estate Val Add Open End Fds (Net)

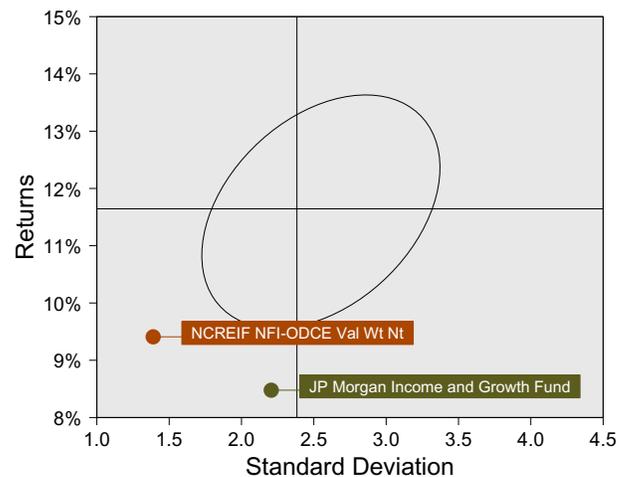


10th Percentile	2.94	14.25	10.82	14.08	10.16	7.09	
25th Percentile	2.48	9.37	10.55	12.64	6.30	6.28	
Median	1.52	8.49	9.85	11.64	5.78	5.59	
75th Percentile	1.10	7.06	8.47	10.74	5.09	4.48	
90th Percentile	0.99	6.51	6.74	8.52	4.57	2.80	
JP Morgan Income and Growth Fund	●	0.30	5.59	6.36	8.48	5.23	3.91
NCREIF NFI-ODCE Val Wt Nt	▲	1.52	7.36	7.27	9.41	6.01	5.94

Relative Returns vs NCREIF NFI-ODCE Val Wt Nt



Callan Real Estate Val Add Open End Fds (Net) Annualized Five Year Risk vs Return

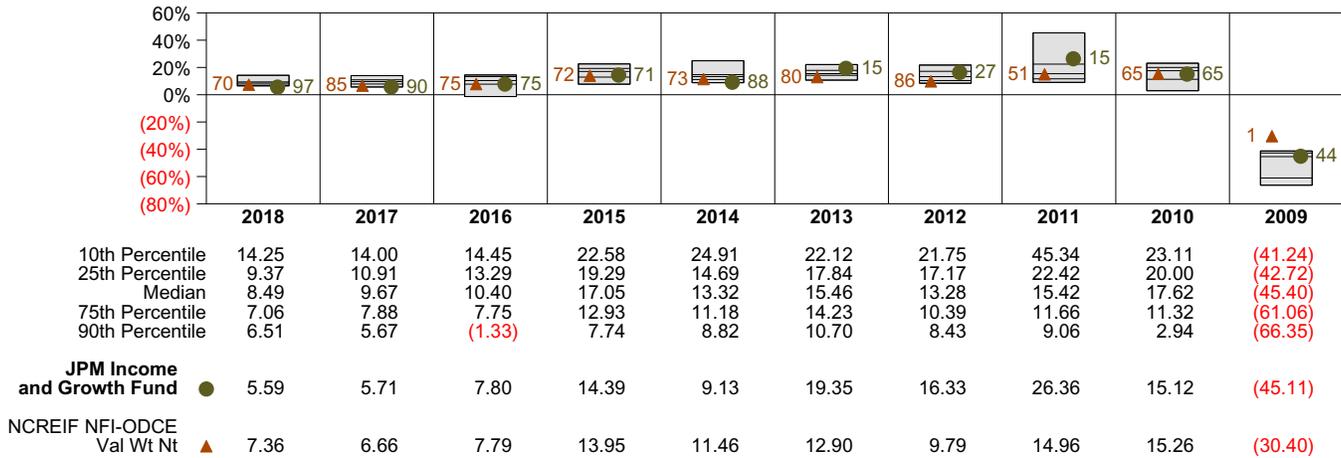


JPM Income and Growth Fund Return Analysis Summary

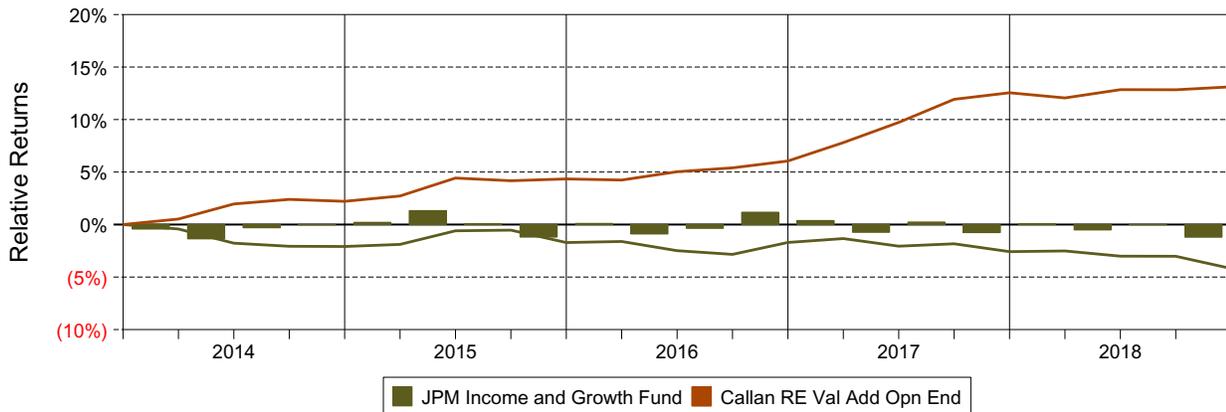
Return Analysis

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.

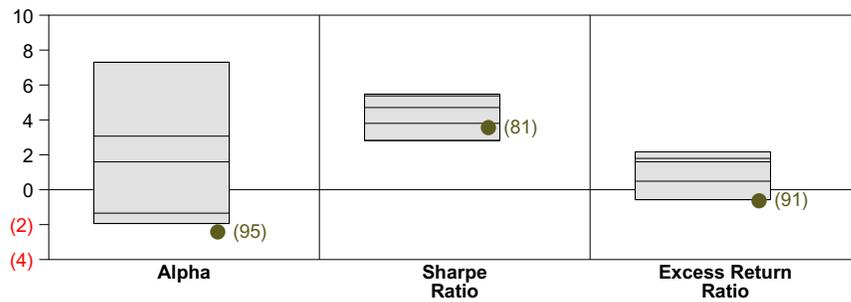
Performance vs Callan Real Estate Val Add Open End Fds (Net)



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 December 31, 2018

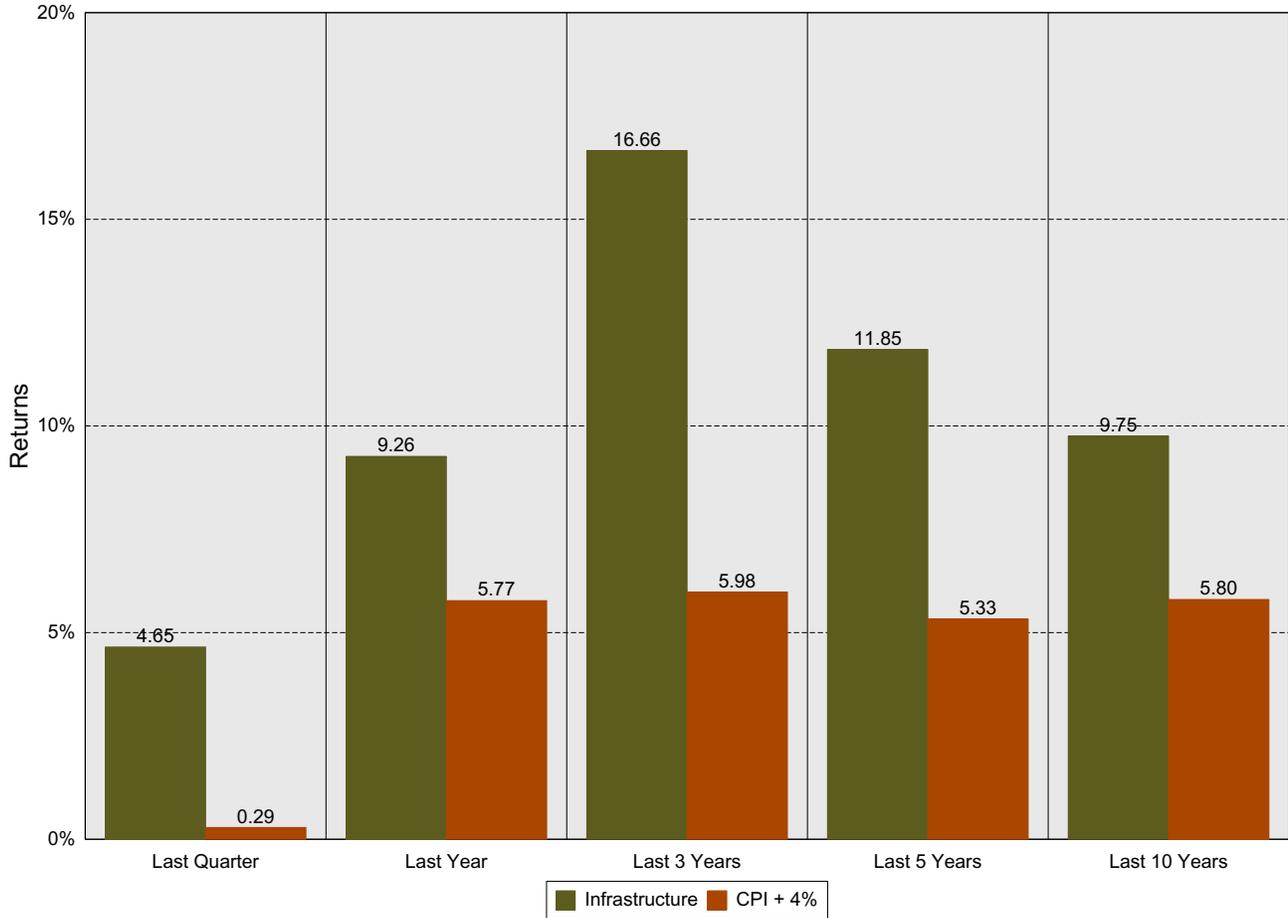


10th Percentile	7.30	5.48	2.17
25th Percentile	3.07	5.38	1.79
Median	1.60	4.71	1.60
75th Percentile	(1.34)	3.80	0.49
90th Percentile	(1.93)	2.82	(0.57)
JPM Income and Growth Fund	(2.42)	3.56	(0.64)

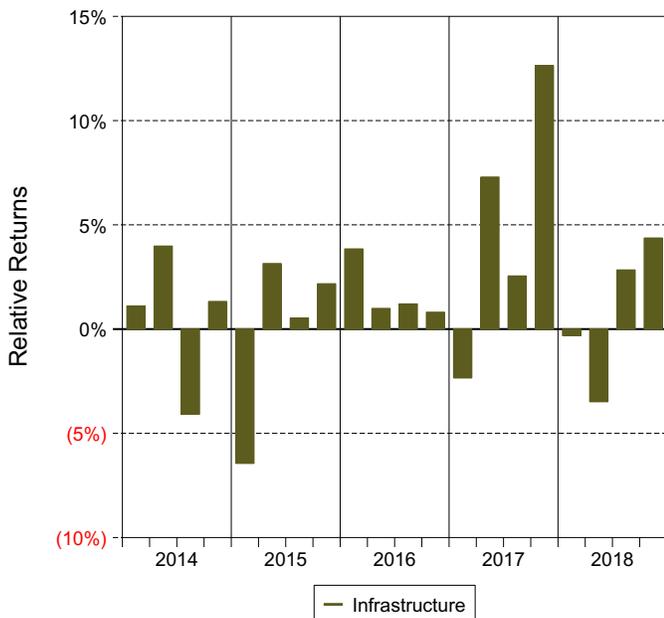
Infrastructure
Period Ended December 31, 2018

Quarterly Summary and Highlights

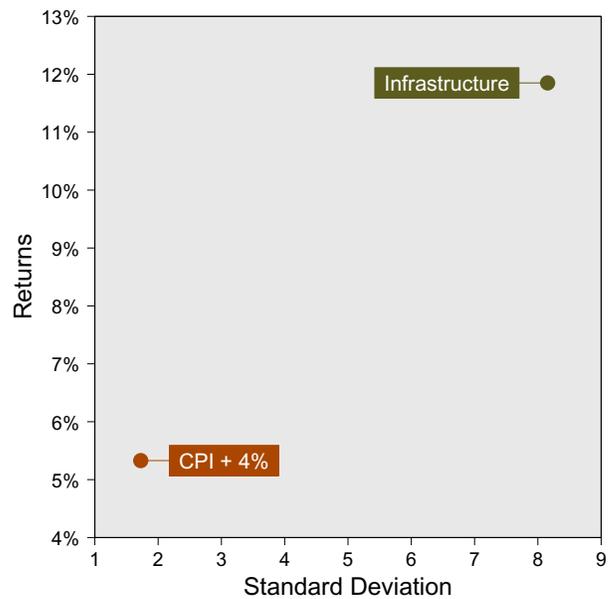
- Infrastructure's portfolio outperformed the CPI + 4% by 4.37% for the quarter and outperformed the CPI + 4% for the year by 3.49%.



Relative Return vs CPI + 4%



Annualized Five Year Risk vs Return



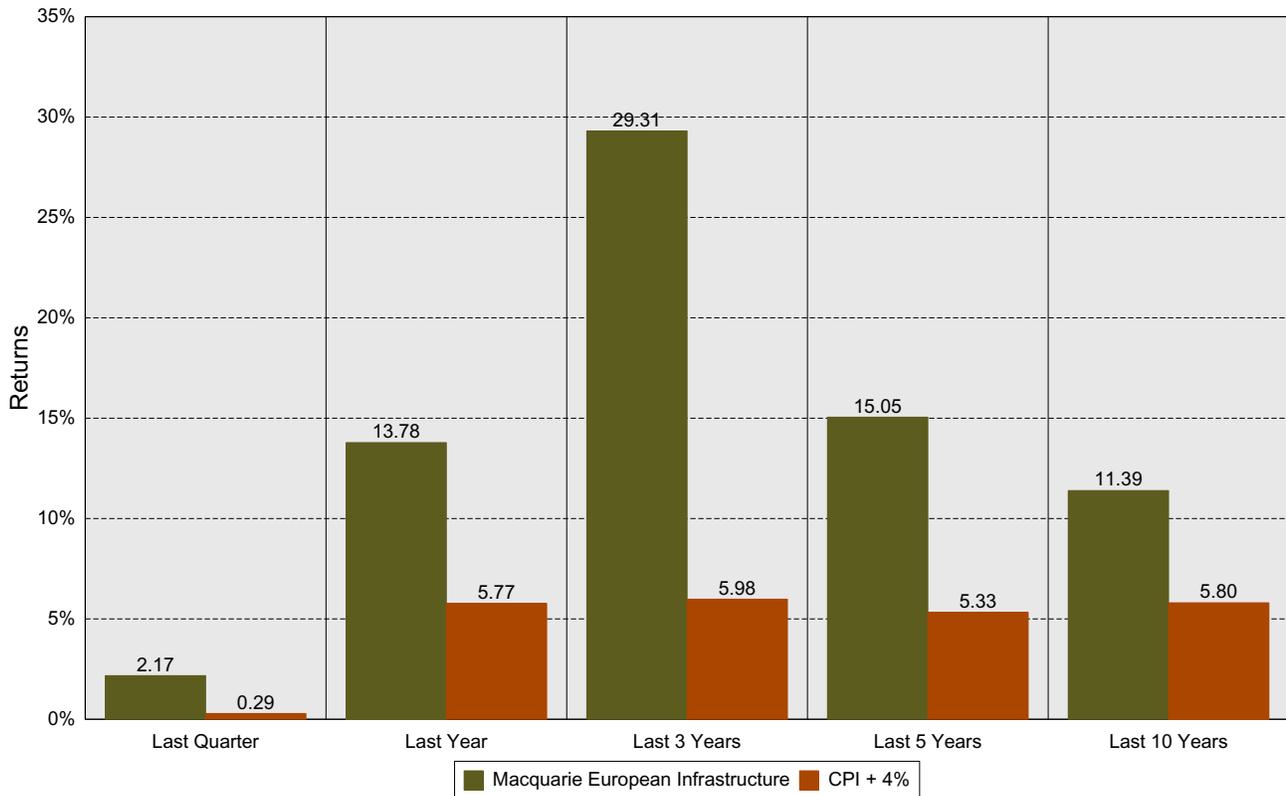
Macquarie European Infrastructure Period Ended December 31, 2018

Investment Philosophy

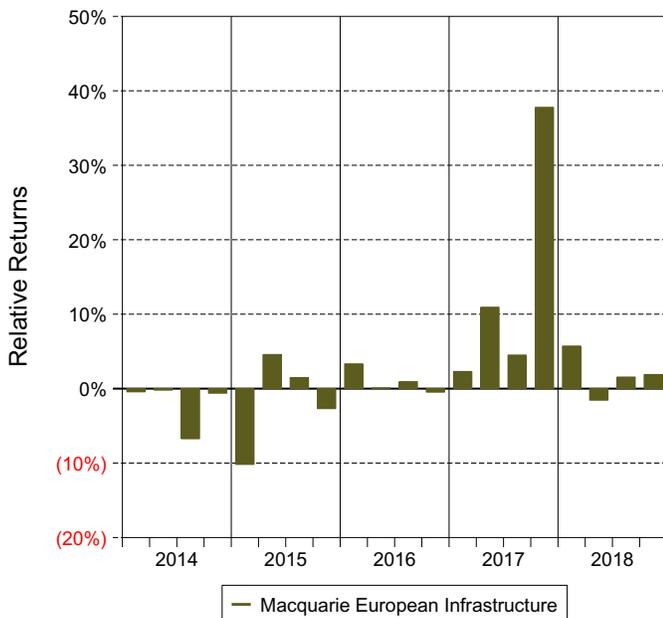
The product was funded in the fourth quarter of 2008.

Quarterly Summary and Highlights

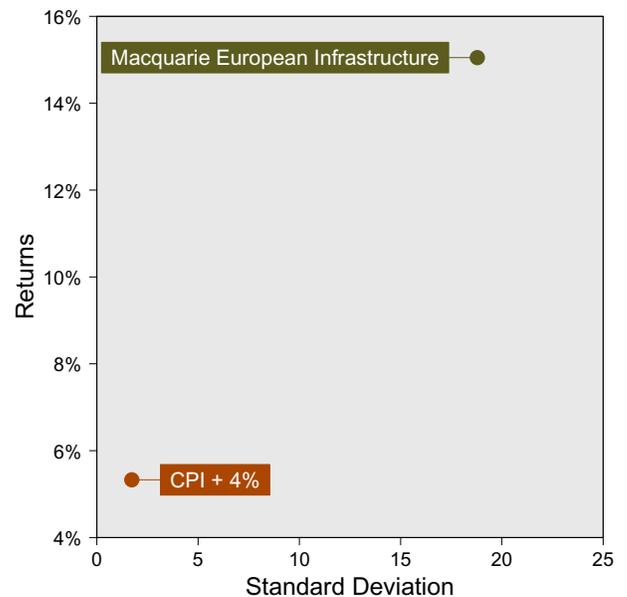
- Macquarie European Infrastructure's portfolio outperformed the CPI + 4% by 1.89% for the quarter and outperformed the CPI + 4% for the year by 8.01%.



Relative Return vs CPI + 4%



Annualized Five Year Risk vs Return



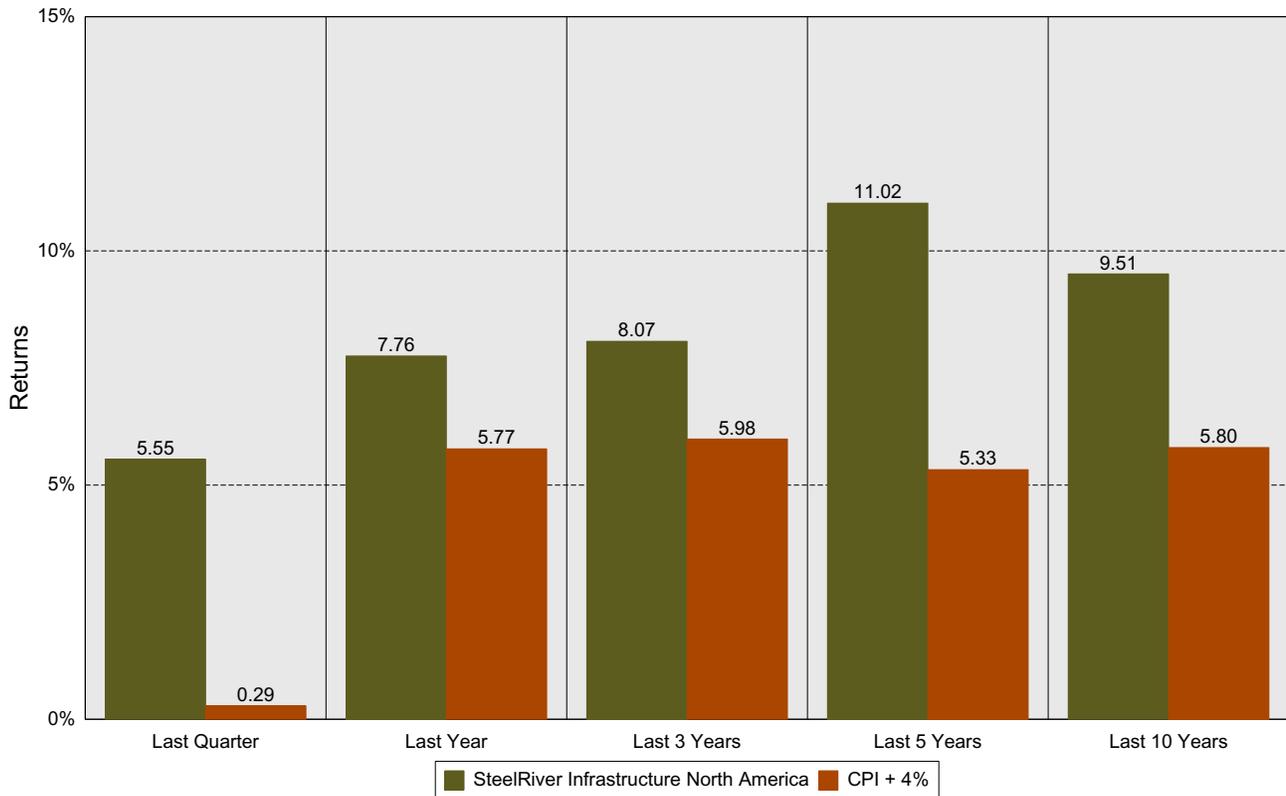
SteelRiver Infrastructure North America Period Ended December 31, 2018

Investment Philosophy

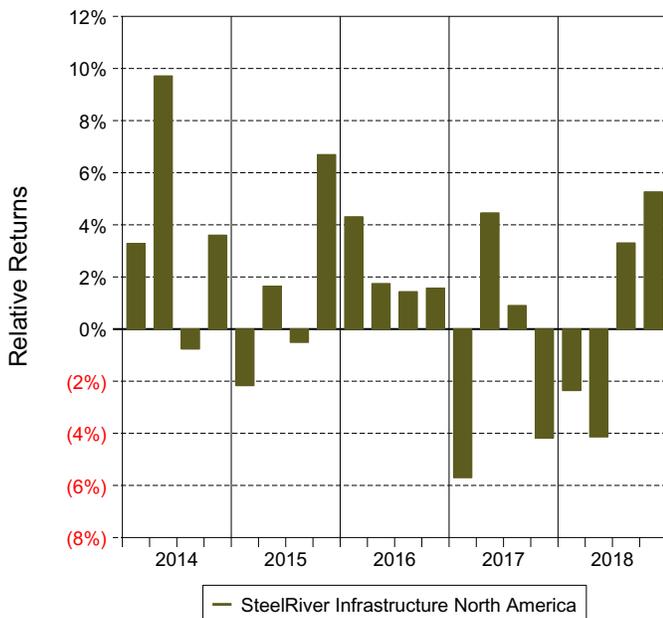
The product was funded in the fourth quarter of 2008.

Quarterly Summary and Highlights

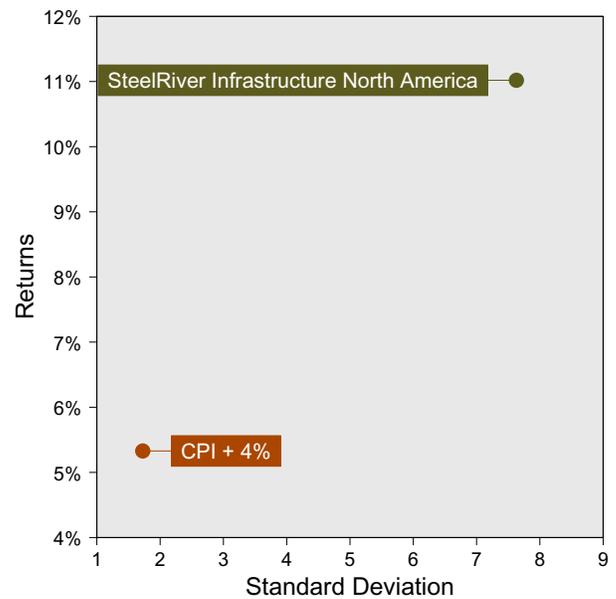
- SteelRiver Infrastructure North America's portfolio outperformed the CPI + 4% by 5.27% for the quarter and outperformed the CPI + 4% for the year by 1.98%.



Relative Return vs CPI + 4%



Annualized Five Year Risk vs Return



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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 Corry Walsh at 312.346.3536 / institute@callan.com.

New Research from Callan’s Experts

Puttin’ on the Risk | For hedge funds, other multi-asset managers, and fund-of-funds, managing investor expectations is just as important as managing returns. That’s why Callan believes standardized risk reporting is an important tool to help managers, especially those with complex strategies, communicate better with their investors and thereby avoid misunderstandings. In this quarter’s *Hedge Fund Monitor*, Callan’s Jim McKee describes and discusses a standardized risk template called Open Protocol, which can help managers explain their strategies to investors.



Reflecting on 30 Years at Callan | Greg Allen, Callan’s chief executive officer and chief research officer, was interviewed by Executive Vice President Millie Viqueira, head of Callan’s Fund Sponsor Consulting Group, to mark Greg’s 30th anniversary with the firm. They discussed his start at Callan, what has changed in the industry and how he has changed over the last 30 years, his passion for research and education, and his thoughts on maintaining Callan’s distinctive culture and on ensuring the firm continues to be an attractive place to work.

2018 Nuclear Decommissioning Funding Study | Callan’s annual Nuclear Decommissioning Funding Study offers key insights into the status of nuclear decommissioning funding in the U.S. to make peer comparisons more accurate and relevant. The 2017 study covers 27 investor-owned and 26 public power utilities (excluding public power owners with small shares) with an ownership interest in the 99 operating nuclear reactors and 10 of the non-operating reactors in the U.S.



Considering Currency Hedging: 10 Charts to Think About | In considering equity currency hedging, institutional investors should consider context and rely upon a documented currency policy to guide decisions.

Workshop Summary | Callan’s 2018 October Regional Workshop, “Looking Beyond the Valley: Disciplined Risk Mitigation for the Long Term,” focused on how investors should consider their options for managing risk—or profiting from it. Among the questions it addressed: Are modern portfolios insufficiently diversified to truly manage and mitigate risk? What tools and strategies should investors be considering, and how do we measure effectiveness and cost? This paper summarizes the workshop.

Quarterly Periodicals

Private Equity Trends | Quarterly newsletter on private equity activity, covering both the fundraising cycle (investments to exits) and performance over time.

Market Pulse Flipbook | A quarterly market reference guide covering trends in the U.S. economy, developments for fund sponsors, and the latest data for U.S. and non-U.S. equities and fixed income, alternatives, and defined contribution plans.

Active vs. Passive Charts | This series of charts compares active managers alongside relevant benchmarks over the long term.

Capital Market Review | Provides 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/

Callan's 2019 Regional Workshop dates are set! Please mark your calendar and look forward to upcoming invitations.

June Regional Workshops:

June 4, 2019 – Atlanta

June 5, 2019 – San Francisco

October Regional Workshops:

October 22, 2019 – Denver

October 24, 2019 – Chicago

Please also keep your eye out for upcoming Webinars in 2019! We will be sending invitations for these and also will have registration links on our website at www.callan.com/events.

For more information about events, please contact Barb Gerraty: 415.274.3093 / gerraty@callan.com

Education: By the Numbers

525 Attendees (on average) of the Institute's annual National Conference

3,700 Total attendees of the "Callan College" since 1994

50+ Unique pieces of research the Institute generates each year

1980 Year the Callan Institute was founded

The Center for Investment Training Educational Sessions

The Center for Investment Training, better known as the "Callan College," provides a foundation of knowledge for industry professionals who are involved in the investment decision-making process. It was founded in 1994 to provide clients and non-clients alike with basic- to intermediate-level instruction. Our next sessions are:

Introduction to Investments

San Francisco, April 16-17, 2019

San Francisco, July 16-17, 2019

Chicago, October 22-23, 2019

This program familiarizes fund sponsor trustees, staff, and asset management advisers with basic investment theory, terminology, and practices. It lasts one-and-a-half days and is designed for individuals who have less than two years of experience with asset-management oversight and/or support responsibilities. Tuition for the Introductory "Callan College" session is \$2,350 per person. Tuition includes instruction, all materials, breakfast and lunch on each day, and dinner on the first evening with the instructors.

Customized Sessions

The "Callan College" is equipped to customize a curriculum to meet the training and educational needs of a specific organization. These tailored sessions range from basic to advanced and can take place anywhere—even at your office.

Learn more at www.callan.com/events/callan-college-intro or contact Kathleen Cunnie: 415.274.3029 / cunnie@callan.com



"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 dialog to raise the bar across the industry."

Greg Allen, Chief Executive Officer and Chief Research Officer

List of Callan's Investment Manager Clients

Confidential – For Callan Client Use Only

Callan takes its fiduciary and disclosure responsibilities to clients very seriously. We recognize that there are numerous potential conflicts of interest encountered in the investment consulting industry and that it is our responsibility to manage those conflicts effectively and in the best interest of our clients. At Callan, we employ a robust process to identify, manage, monitor and disclose potential conflicts on an on-going basis.

The list below is an important component of our conflicts management and disclosure process. It identifies those investment managers that pay Callan fees for educational, consulting, software, database or reporting products and services. We update the list quarterly because we believe that our fund sponsor clients should know the investment managers that do business with Callan, particularly those investment manager clients that the fund sponsor clients may be using or considering using. Please note that if an investment manager receives a product or service on a complimentary basis (e.g. attending and educational event), they are not included in the list below. Callan is committed to ensuring that we do not consider an investment manager's business relationship with Callan, or lack thereof, in performing evaluations for or making suggestions or recommendations to its other clients. Please refer to Callan's ADV Part 2A for a more detailed description of the services and products that Callan makes available to investment manager clients through our Institutional Consulting Group, Independent Adviser Group and Fund Sponsor Consulting Group. Due to the complex corporate and organizational ownership structures of many investment management firms, parent and affiliate firm relationships are not indicated on our list.

Fund sponsor clients may request a copy of the most currently available list at any time. Fund sponsor clients may also request specific information regarding the fees paid to Callan by particular fund manager clients. Per company policy, information requests regarding fees are handled exclusively by Callan's Compliance Department.

Manager Name
Acadian Asset Management LLC
ACR – Alpine Capital Research
AEGON USA Investment Management
Aether Investment Partners
AEW Capital Management
Affiliated Managers Group, Inc.
Alcentra
AllianceBernstein
Allianz Global Investors
Allianz Life Insurance Company of North America
Altrinsic Global Advisors, LLC
American Century Investments
Amundi Pioneer Asset Management
Apollo Global Management
AQR Capital Management
Ares Management LLC
Ariel Investments, LLC
Aristotle Capital Management
Artisan Partners Limited Partnership
Atlanta Capital Management Co., LLC
Aviva Investors Americas
AXA Investment Managers
Baillie Gifford International, LLC
Baird Advisors
Baron Capital Management, Inc.
Barrow, Hanley, Mewhinney & Strauss, LLC
Bentall Kennedy (U.S.) Limited Partnership
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

Manager Name
Bridgeway Capital Management, Inc.
BrightSphere Investment Group (FKA Old Mutual Asset)
Brown Brothers Harriman & Company
Cambiar Investors, LLC
Capital Group
Carillon Tower Advisers
CastleArk Management, LLC
Causeway Capital Management
Chartwell Investment Partners
Christian Brothers Investment Services
ClearBridge Investments, LLC
Cohen & Steers Capital Management, Inc.
Columbia Threadneedle Investments
Columbus Circle Investors
Credit Suisse Asset Management
DePrince, Race & Zollo, Inc.
Diamond Hill Capital Management, Inc.
Dimensional Fund Advisors LP
Doubleline
Duff & Phelps Investment Management Co.
DWS (Formerly Deutsche Asset Management)
EAM Investors, LLC
EARNEST Partners, LLC
Eaton Vance Management
Epoch Investment Partners, Inc.
Fayez Sarofim & Company
Federated Investors
Fidelity Institutional Asset Management
Fiera Capital Corporation
First Eagle Investment Management, LLC
First Hawaiian Bank Wealth Management Division
Fisher Investments
Franklin Templeton
Fred Alger Management, Inc.

Manager Name
Fulcrum Asset Management LLP
Galliard Capital Management
GAM (USA) Inc.
GlobeFlex Capital, L.P.
GMO LLC
Goldman Sachs Asset Management
Green Square Capital LLC
Guggenheim Investments
GW&K Investment Management
Harbor Capital Group Trust
Hartford Funds
Hartford Investment Management Co.
Heitman LLC
Hotchkis & Wiley Capital Management, LLC
HSBC Global Asset Management
IFM Investors
Income Research + Management, Inc.
Insight Investment Management Limited
Intech Investment Management, LLC
Invesco
Investec Asset Management
Ivy Investments
J O Hambro Capital Management Limited
J.P. Morgan
Janus
Jennison Associates LLC
Jensen Investment Management
Jobs Peak Advisors
KeyCorp
Lazard Asset Management
Legal & General Investment Management America
Lincoln National Corporation
LMCG Investments, LLC
Longview Partners
Loomis, Sayles & Company, L.P.
Lord Abbett & Company
Los Angeles Capital Management
LSV Asset Management
MacKay Shields LLC
Macquarie Investment Management (MIM)
Manulife Asset Management
Marathon Asset Management, L.P.
McKinley Capital Management, LLC
MFS Investment Management
MidFirst Bank
Mondrian Investment Partners Limited
Montag & Caldwell, LLC
Morgan Stanley Investment Management
Mountain Lake Investment Management LLC
MUFG Union Bank, N.A.
Natixis Investment Managers
Neuberger Berman
Newton Investment Management
Nikko Asset Management Co., Ltd.
Northern Trust Asset Management
Nuveen Investments, Inc.
OFI Global Asset Management
O'Shaughnessy Asset Management, LLC
P/E Investments

Manager Name
PFM Asset Management LLC
PGIM
PGIM Fixed Income
Pacific Investment Management Company
Pathway Capital Management
Peregrine Capital Management, Inc.
Perkins Investment Management
PineBridge Investments
PNC Capital Advisors, LLC
Principal Global Investors
Private Advisors, LLC
Putnam Investments, LLC
QMA
RBC Global Asset Management
Regions Financial Corporation
Riverbridge Partners LLC
Robeco Institutional Asset Management, US Inc.
Rockefeller Capital Management
Rothschild Asset Management Inc.
Russell Investments
Santander Global Facilities
Schroder Investment Management North America Inc.
Securian Asset Management
Shenkman Capital Management, Inc.
Silvercrest Asset Management Group
Smith Graham & Co. Investment Advisors, L.P.
Smith Group Asset Management
South Texas Money Management, Ltd.
Standard Life Investments Limited
State Street Global Advisors
Stone Harbor Investment Partners, L.P.
Sun Life Investment Management
T. Rowe Price Associates, Inc.
The Boston Company Asset Management, LLC
The London Company
The TCW Group, Inc.
Thompson, Siegel & Walmsley LLC
Thornburg Investment Management, Inc.
Tri-Star Trust Bank
UBS Asset Management
VanEck
Velanne Asset Management Ltd.
Versus Capital Group
Victory Capital Management Inc.
Virtus Investment Partners, Inc.
Vontobel Asset Management, Inc.
Voya
Wasatch Advisors, Inc.
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
Windhaven Investment Management
WisdomTree Asset Management



MEMORANDUM

DATE: February 22, 2019

TO: The Board of Trustees
Tucson Supplemental Retirement System

FROM: Art Cuaron
Pension & Benefits Administrator

SUBJECT: FY 2020 TSRS Recommended Budget

Attached is the FY 2020 TSRS Recommended Budget. The recommended budget remains flat when compared to the FY 2019 adopted budget. This budget was developed using FY 2019 as a baseline with a minor supplemental request of \$14,000 in the Travel line item to accommodate for additional Board and staff travel for training events.

The changes from the FY 2019 adopted budget are summarized as follows:

Revenues:

- Revenues were budgeted \$9.4M higher than FY 2019 as the total assets have grown from the same period last year.
- Employee and employer contributions saw minor increases as a result of the pay increases authorized by Mayor and Council in 2018.

Expenditures:

- Salaries and employee related expenses increased as a result of the aforementioned pay increases.
- Training remains flat to FY 2019 with a recommended budget amount of \$14,000
- The recommended FY 2020 Travel budget includes an additional \$14,000 request to accommodate for additional Board and staff training based on the addition of new Chairman and Pension Manager as well as increased desire from existing members to attend various trainings.
- Staff is recommending many of the charges in Miscellaneous Professional Services be reallocated to Consultants and Surveys, Auditing and Banking Services, Investment Management Fees, Securities Lending, and Carried Interest Expense in FY 2020. This is being done to more accurately reflect the charges for these services in the proper expense line item. Doing so will create efficiency in year-end financial reporting and provide greater clarity to the Board on TSRS expenses.

I am seeking Board approval on the FY 2020 TSRS Recommended Budget.

Attachment: FY 2020 Recommended Budget

**Fiscal Year 2020
TSRS Recommended Budget**

Category	Source	FY19 Adopted	FY20 Requested
40 - USE OF MONEY AND PROPERTY	8421 - UNREALIZED GAIN/LOSS ON INEVST	\$ -	\$ -
	8462 - INTEREST INCOME-TSRS	24,000,000	10,266,670
	8463 - DIVIDENDS-TSRS	\$ -	-
	8465 - REALZ GAIN/LOSS ON LT INV-TSRS	23,242,840	45,558,330
	8466 - UNREALZ GAIN/LOSS LT INV-TSRS	-	-
	8480 - INT INC - SHORT TERM	-	-
	8490 - INT INC - SECURITY LENDING	135,000	135,000
USE OF MONEY AND PROPERTY TOTAL		47,377,840	55,960,000
81 - GIFTS/CONTRIBUTIONS/PREMIUMS	8491 - TSRS EMPLOYEE CONTRIBUTIONS	7,424,760	7,573,260
	8494 - TSRS-CITY CONTRIBUTIONS	37,255,320	38,000,430
GIFTS/CONTRIBUTIONS/PREMIUMS TOTAL		44,680,080	45,573,690

TOTAL TSRS REVENUES

\$ 92,057,920 \$ 101,533,690

Division	Object	FY19 Adopted	FY20 Requested
Retirement Payments	105 - PAYROLL PENSION	\$ 78,370,000	\$ 78,370,000
TOTAL TSRS RETIREMENT PAYMENTS		\$ 78,370,000	\$ 78,370,000
Refunds	186 - TSRS REFUNDS	2,986,000	2,986,000
TOTAL TSRS REFUNDS		2,986,000	2,986,000
TSRS Operations	101 - SALARIES & WAGES FOR PERMANENT EMPLOYEES	276,420	297,940
	102 - EXTRA TIME	-	-
	103 - OVERTIME WAGES	-	-
	105 - PAYROLL PENSION	-	-
	108 - DOWNTOWN ALLOWANCE & DISCOUNTED TRANSIT PASSES	2,310	1,350
	113 - TSRS PENSION CONTRIBUTION	76,010	81,930
	114 - FICA (SOCIAL SECURITY)	20,090	21,450
	115 - WORKERS COMPENSATION INSURANCE	4,500	5,660
	116 - GROUP PLAN INSURANCE	27,000	34,840
	117 - STATE UNEMPLOYMENT	380	340
	125 - ONE-TIME DISTRIBUTION	-	-
	196 - INTERDEPARTMENTAL LABOR	96,000	96,000
	202 - TRAVEL	4,000	18,000
	204 - TRAINING	14,000	14,000
	205 - PARKING SERVICE	500	500
	212 - CONSULTANTS AND SURVEYS	50,000	436,000
	213 - LEGAL	50,000	50,000
	215 - AUDITING AND BANK SERVICES	60,000	380,000
	219 - MISCELLANEOUS PROFESSIONAL SERVICES	9,900,000	884,000
	221 - INSUR-PUBLIC LIABILITY	31,000	2,380
	232 - R&M MACHINERY & EQUIPMENT	1,200	1,200
	234 - COMPUTER HARDWARE MAINTENANCE	-	-
	245 - TELEPHONE	1,200	1,200
	252 - RENTS EQUIPMENT	-	-
	260 - COMPUTER SOFTWARE MAINTENANCE AGREEMENTS	51,000	51,000
	263 - PUBLIC RELATIONS	2,560	2,560
	264 - INVESTMENT MGT FEES & COMMISSIONS	-	3,750,000
	265 - SECURITIES LENDING (STOCK FEES)	-	60,000
	277 - CARRIED INTEREST EXPENSE	-	4,500,000
	284 - MEMBERSHIPS AND SUBSCRIPTIONS	1,500	1,500
	311 - OFFICE SUPPLIES	9,000	9,000
	312 - PRINTING,PHOTOGRAPHY,REPRODUCTION	9,000	9,000
	314 - POSTAGE	12,000	12,000
	317 - COMPUTER SOFTWARE < \$100,000	-	-
	341 - BOOK, PERIODICALS AND RECORDS	250	250
	345 - FURNISHINGS, EQUIPMENT AND TOOLS < \$5,000	1,000	1,000
	346 - COMPUTER EQUIPMENT < \$5,000	1,000	1,000
	359 - NON OFFICE SUPPLIES	-	-
TOTAL TSRS OPERATIONS		10,701,920	10,724,100

TOTAL TSRS EXPENDITURES

\$ 92,057,920 \$ 92,080,100

**RULES AND POLICIES OF THE
TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
BOARD OF TRUSTEES**

***[NOTE: Highlights show changes made after the Board's discussion
at January 2019 meeting.]***

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**RULES AND POLICIES OF THE
TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
BOARD OF TRUSTEES**

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1.0 LEGAL REQUIREMENTS

- 1.1** These Board Rules and Policies are adopted pursuant to Article III of Chapter 22 of the Tucson Code (“TCC”).
- 1.2** The System is operated in accordance with the Internal Revenue Code provisions applicable to tax-qualified governmental retirement plans, the Arizona Constitution, applicable provisions of the Arizona Revised Statutes and the TCC.
- 1.3** The Board shall make an annual report to the Mayor and Council to report on the status of the System and the Board’s activities, and to make recommendations regarding the System to the Mayor and Council. The annual report shall be prepared and presented in accordance with any requests from the Mayor and Council, as well as the City’s guidelines for Boards, Committees and Commissions.

**RULES AND POLICIES OF THE
TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
BOARD OF TRUSTEES**

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2.0 ORGANIZATION

2.1 Pursuant to TCC Sec. 22-44(a), the Board shall consist of seven members, as follows:

- (a)** A Chairman, to be appointed by the Mayor, subject to the approval of the Council;
- (b)** The Director of Human Resources or their designee;
- (c)** The Director of Finance or their designee;
- (d)** Two contributing members, known as employee-representative trustees, nominated and elected by the contributing members of the System in accordance with Board Rule 5.0;
- (e)** One retired member nominated and elected by the retired members of the System in accordance with Board Rule 6.0;
- (f)** One member appointed by the City Manager.

**RULES AND POLICIES OF THE
TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
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3.0 QUALIFICATIONS, COMPENSATION AND TERM LIMITS

- 3.1** The Chairman and the Board member appointed by the City Manager shall be appointed based on the individual's business experience with emphasis on a discipline such as law, retirement administration, accounting or investments.
- 3.2** The members of the Board shall serve without compensation but shall be reimbursed for expenses incurred by them in the performance of their duties.
- 3.3** The Directors of Human Resources and Finance are standing Board members and are not subject to limitations on their terms as Board members. The Chairman shall serve a term of four years. All other Board members shall serve a term of three years. Any employee-representative trustee or retiree representative trustee who has been elected to two consecutive terms shall not be eligible to succeed themselves.

**RULES AND POLICIES OF THE
TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
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4.0 EMPLOYEE REPRESENTATIVE TRUSTEES

4.1 Inasmuch as TCC Sec. 22-44(b)(4), as amended, reads in part as follows:

“Two contributing members, known as employee representative trustees, nominated and elected by the contributing members of the System in the manner as the Board shall prescribe by regulation,”

the Board adopts the following rules:

4.2 Nominations

(a) Not later than the regular November meeting, the Chairman of the Board of Trustees shall appoint a nominating committee consisting of three members:

(a)(1) The incumbent employee representative trustee who is not scheduled for re-election in the forthcoming election shall chair the committee; and

(a)(2) Two non-trustee contributing members of the System who have not served in any capacity on the nominating committee for the past five years.

(b) The Nominating Committee shall, not later than the following December meeting of the Board of Trustees, choose and forward to the Board for its consideration, an appropriate number of nominees for the position of employee representative; no fewer than two names shall be forwarded who shall be contributing members of the System. The nominating committee shall determine that the members nominated are agreeable to the placing of their names in nomination and will accept office if elected and perform to the best of his or her ability the duties required of the position.

**RULES AND POLICIES OF THE
TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
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4.3 Restrictions

- (a) Although the employee representative trustee may be nominated from departments already represented, the two employee representative trustees may not be from the same department.
- (b) Should, as a result of a city reorganization, the employee representative trustees represent the same department, the employee representative trustees shall be allowed to serve to the completion of their respective terms. The employee representative trustee's term which expires first will not be eligible to have his or her name replaced in nomination.

4.4 Elections

- (a) A ballot form, approved by the Board, listing the names of the nominees (along with biographical information submitted by the nominated candidates) and balloting instructions shall be prepared by the System Administrator and distributed to each contributing member of the System not later than January 31. An envelope shall be enclosed with each ballot for return to the System Administrator. Ballots are to be returned no later than 15 calendar days after distribution. Ballots received after that date will not be counted.
- (b) As expeditiously as possible after the close of the election, the nominating committee, acting as the tellers committee, shall open and tabulate all valid ballots received and certify the results of the election to the Board of Trustees. The nominee receiving the highest number of valid votes shall be declared the winner and seated as an employee representative trustee at the next regular meeting of the Board of Trustees.
- (c) In the event of a tie vote for the highest number of votes, such tie shall be resolved by the two nominees by the drawing of lots.

**RULES AND POLICIES OF THE
TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
BOARD OF TRUSTEES**

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- (d)** All ballots returned to the Board shall be retained for thirty (30) days after the new Board member is sworn in. Any ballots returned to the Board due to insufficient address shall be deemed invalid. Upon expiration of the thirty (30) day period, all ballots shall be destroyed by the System Administrator.
- (e)** Should a vacancy occur in the employee representative trustee positions, the Board of Trustees shall appoint a qualified contributing member of the System to complete the unexpired term of the trustee.
- (f)** In the event only one candidate applies for nomination and the Nominating Committee finds that the candidate is qualified, the Board may appoint that person to the Board without an election being held. In the event no candidates apply for nomination, the position is considered vacant and the Board may appoint a member pursuant to Section 4.4(e).

**RULES AND POLICIES OF THE
TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
BOARD OF TRUSTEES**

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5.0 ELECTION OF RETIRED MEMBER

As set forth in T.C.C. Section 22-44(b)(5), the Retiree Representative on the Tucson Supplemental Retirement System (TSRS) Board of Trustees shall be **elected by retired members of the System** and shall be a voting member of the Board. The term of office shall be for three (3) years. A Retiree Representative who has been elected for two consecutive terms shall not be eligible to succeed themselves.

Any City of Tucson retiree who is a member of the Tucson Supplemental Retirement System is eligible to compete in the nominating/election process for the Retiree Representative position.

- 5.1 The process for nominating and electing a Retiree Representative to the Tucson Supplemental Retirement System Board of Trustees shall be administered by the Executive Board of the City of Tucson Retirees Association (CTRA) in accordance with this TSRS Board Rule and Regulation.
- 5.2 The Chairman of the CTRA Executive Board shall appoint a Nominating Committee of not fewer than three (3) retired members of TSRS no later than the CTRA Board's October meeting. Any retiree seeking nomination to the TSRS Board shall not serve on the Nominating Committee.
- 5.3 It shall be the duty of the Nominating Committee to nominate at least one, but not more than three (3), nominees for the position of TSRS Board Retiree Representative. The TSRS Administrator, on behalf of the Nominating Committee, shall mail a nomination application directly to all TSRS retired members. The deadline for TSRS retirees to submit nominations to the Nominating Committee shall be November 10th. The Nominating Committee shall file recommended nominations with the CTRA Chairman by November 14th. Before filing nominations, the Nominating Committee shall determine that the members nominated agree to have their names on the election ballot and will accept office if elected. A certificate of "agreement to serve" signed by each person nominated shall accompany the Nominating Committee's written recommendations.

The Nominating Committee's report will be presented to the CTRA Executive Board for official action no later than November 15th.

**RULES AND POLICIES OF THE
TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
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- 5.4** Election for the position of Retiree Representative on the TSRS Board of Trustees shall be conducted by mail ballot. An Election Committee of not fewer than three (3) TSRS retirees shall be appointed by the Chairman of the CTRA Executive Board no later than the November board meeting. A nominee seeking election to the Retiree Representative position **shall not** serve on the Election Committee.

The Election Committee shall see that a TSRS Board Retiree Representative ballot, clearly identified as such, is printed with candidate names in alphabetical order. "Incumbent" will be added to the candidate currently serving when running for a second term. A brief statement of qualifications and biographical data for each candidate shall be provided with the ballot.

As soon as possible, the Election Committee shall provide the ballot and candidate information to the TSRS Administrator for mailing to TSRS retirees. The TSRS Administrator will prepare and send a direct mailing to all TSRS retirees containing the ballot, candidate statement materials and any other election information being included in the CTRA Newsletter. The Election Committee shall prepare a summary regarding the election, including nominee names, candidate information and ballot instructions and deadlines, to be published in the November CTRA Newsletter.

No voter identification will be required on the ballot form. However, identification shall be required to verify that the person voting is an eligible TSRS retiree and to verify that no eligible voter has voted more than one time. The TSRS Administrator will prepare and include in the direct mailing a return envelope for the ballot which includes the name of the voting member in the upper left corner of the envelope. **Completed ballots must be returned to the Election Committee in an envelope stating the TSRS retiree's name in the upper left corner to identify the voting TSRS retiree.**

Completed ballots must be mailed to the Election Committee at the post office box identified at the bottom of the ballot, in a sealed envelope. The ballot envelope must be postmarked before the voting deadline.

**RULES AND POLICIES OF THE
TUCSON SUPPLEMENTAL RETIREMENT SYSTEM
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It shall be the duty of the Election Committee to verify that the name of the voter appearing on the envelope is a TSRS member and has not voted more than once, and that there are no obvious signs of tampering with a ballot or return envelope. The sealed envelopes shall be kept in a secure location pending tabulation of the ballots. After the expiration of the voting deadline, voting shall be closed and the ballots shall be tallied by the Election Committee. The Election Committee shall report election results to nominees, and the Chairman of the CTRA Executive Board no later than December 13th.

Completed election ballots, and those declared "void", shall be kept on file for thirty (30) days. At the expiration of 30 days, ballots may be destroyed.

- 5.5** The CTRA Executive Board shall notify the Chairman of the TSRS Board of Trustees no later than December 15th of the election results and the name of the retiree elected to serve as the TSRS Board Retiree Representative. The elected Retiree Representative shall be notified in writing by the TSRS Administrator of the election results and informed that his/her term of office begins with the January meeting of the TSRS Board of Trustees.
- 5.6** No member shall be entitled to vote by proxy.
- 5.7** No member shall have more than one vote.
- 5.8** A ballot shall be considered totally void and shall not be counted if the voting member votes for more than one candidate.
- 5.9** A ballot shall be considered totally void and not counted if mailed envelope does not show identification of voter, is submitted by non-TSRS retiree, or is postmarked after voting deadline.
- 5.10** The candidate receiving the most votes shall be declared the Retiree Representative elected to serve a 3-year term on the TSRS Board of Trustees

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- 5.11** The Chairman of the CTRA Executive Committee shall appoint two retirees to serve as election monitors. They will monitor the activities of both the Nominating Committee and Election Committee to ensure compliance with approved process. The election monitors will report findings and recommendations to the CTRA Executive Committee.
- 5.12** Should an incumbent be unable to fulfill his term of office for any reason, the CTRA Executive Board shall appoint a replacement to fill the unexpired term. At the expiration of the regular term, an election will be held to fill the vacancy.

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6.0 OFFICERS

6.1 Chairman

- (a) The Chairman shall preside at all meetings and hearings. In the event of absence or disability of the Chairman, the Vice-Chairman shall preside. In the absence of both, the members shall appoint a Chairman.
- (b) The Chairman may designate members of the Board to make personal inspections when necessary from time to time and, unless otherwise directed by a majority of the Board, shall appoint such committees as may be found necessary.
- (c) The Chairman shall report on all official transactions that have not otherwise come to the attention of the Board.
- (d) The Chairman shall, subject to these rules and further instructions from the Board, direct the official business of the Board, supervise the work of the Secretary, request necessary help, direct the work of staff and exercise general disciplinary power.

6.2 Vice Chairman

- (a) The Vice-Chairman shall be the senior elected employee-representative and shall perform the Chairman's duties in his/her absence.

6.3 Secretary

- (a) TCC Sec. 22-46 specifies that the Director of Finance shall serve as Secretary to the Board. However, the operation and administration of the System falls under the Department of Human Resources following the City's most recent reorganization and the duties of the Secretary to the Board have been delegated to the System Administrator, as further detailed in Board Rule 16.0.

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6.4 System Administrator

- (a)** The System Administrator is charged with the administration of the system and the oversight of the City's retirement office and personnel, as set forth in TCC Section 22-48.
- (b)** The System Administrator, or designee, is charged with the responsibility of keeping all members of the system informed of their obligations, rights and retirement options.
- (c)** The System Administrator, or designee, may advise and inform a member of the various ramifications of retirement options but will not advise the member as to the option to select. While assistance may be rendered to a member in recording his designation, final responsibility for the legal effect thereof shall rest solely with the member.

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7.0 BOARD MEETINGS

7.1 The Board may conduct a meeting and take official action when a quorum of Board members are present. The Board consists of seven (7) voting members and a quorum shall equal four (4) voting members. In the event that a Board member position is vacant, the quorum shall be adjusted appropriately based on the number of sitting Board members, except as set forth in Rule **7.5** below.

7.2 The Board shall approve a schedule of regular meetings on an annual basis.

- (a) Regular meetings of the Board typically shall be held at 8:30 a.m. on the fourth Thursday of each month.
- (b) The Board's annual retreat typically shall be held on a Friday in October, in place of the regular meeting for that month.
- (b) The System Administrator may modify the Board meeting schedule when necessary to accommodate legal holidays and scheduling conflicts, with the consent of the Board Chair.

7.3 Board members must attend meetings in person to participate in discussions and cast votes and no proxies shall be permitted.

7.4 Any individual serving as the Director of Finance or the Director of Human Resources on an "acting" or "interim" basis shall serve as a voting member of the Board until such time as the Director position is filled by the City. An interim or acting Director shall take all steps necessary to assist in the smooth transition of Board member duties to his or her successor.

7.5 The Director of Finance and the Director of Human Resources have the ability to send a designee to attend a Board meeting when the Director is not available to attend. Designees shall be selected and participate in Board meetings only on an as needed basis and are not intended to be named on a long term basis. Designees may participate in Board discussions but shall not be counted for purposes of establishing a quorum of Board members, nor shall they vote on Board actions.

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7.6 Special meetings for any purpose may be scheduled and held upon the request of the Chairman or the request of any three members of the Board.

7.7 Notification of regular and special meetings shall be made pursuant to applicable State statutes.

7.8 The Board may conduct business in executive session in accordance with A.R.S. Section 38-431.03 and all applicable agenda requirements.

7.9 Any ratification action by the Board shall be taken only by members of the Board, not including designees.

7.10 Regular meetings of the Board shall include a call to the audience to permit limited public comment. Members of the audience who wish to address the Board may speak when recognized by the Board Chair. An audience member who is recognized by the Chair may speak to any matter within the purview of the Board, provided that the audience member identifies himself or herself to the Board, limits his or her comments to no more than 3 minutes and does not engage in disorderly or disruptive conduct. The call to the audience shall be limited to no more than 15 minutes. Any response by the Board to matters raised in the call to the audience shall be consistent with the requirements of A.R.S. Section 38-431.01(H).

7.11 With the consent of the Chairman, the System Administrator may cancel a scheduled regular meeting of the Board if the Board does not have pressing business that must be addressed in a particular month.

- (a)** In the event that the Board's regular meeting is cancelled, the pending retirement applications may be ratified by the Chairman of the Board with the consent of the Director of Human Resources or the Director of Finance. The Chairman's ratification of retirement applications and the consent of the Director of Human Resources or the Director of Finance shall be provided to the System Administrator in writing or electronically, and shall not be communicated verbally.
- (b)** Any other regularly scheduled Board business, such as the approval of meeting minutes, review of administrative reports and

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expenditures, etc., shall be held until the next regular meeting of the Board.

- (c)** A report of any retirement application ratifications that are approved pursuant to the alternate procedure set forth in this Rule 7.11 shall be presented to the Board at the next regular meeting of the Board and included in the minutes of such meeting.

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8.0 MINUTES

- 8.1** Minutes of all official meetings of the Board shall be kept and maintained as public records of the Board in accordance with the Arizona Revised Statutes.
- 8.2** To promote operational efficiency of the Retirement Office and to control administrative costs, minutes of Board meetings may be maintained electronically, through the City Clerk's website.
- 8.3** Written minutes of Board meetings shall be maintained in a summary fashion, with specific notation of agenda items, Board actions and cross-references to the audio recording of the full Board meeting. Summary transcriptions of the minutes of Board meetings shall be similar in form to Legal Action Reports filed with the City Clerk.
- 8.4** The Board may, in its discretion and if deemed appropriate for the efficient administration of the System, request that the minutes of a Board meeting, or a portion thereof, be transcribed in detail in lieu of a summary report.

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9.0 PREPARATION OF ANNUAL BUDGET

- 9.1** The System Administrator shall prepare and present to the Board an estimated budget addressing the costs of the System as required by TCC Section 22-44(f). The estimated budget for the System shall include the primary administrative expenses of the System, including, but not limited to, professional expenses, investment fees and expenses, staffing costs and professional development fees and expenses for Board members and the System Administrator. The estimated budget shall be prepared in connection with the City's annual budgeting process. After due consideration, the Board shall adopt an operating budget for the administration and operation of the System for the ensuing fiscal year. The approved operating budget shall be presented to Mayor and Council in connection with the Board's annual report on the System.

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10.0 DISABILITY RETIREMENT APPLICATIONS

- 10.1** The Board shall consider and make final determinations regarding all applications for Disability retirement filed by members with the System Administrator.
- 10.2** Determinations regarding Disability retirement applications shall be made in accordance with TCC Sec. 22-39, including the eligibility and application requirements set forth therein, and the definition of “total and permanent disability” set forth in TCC Sec. 22-30(jj).
- 10.3** The member applying for Disability retirement shall submit to an independent medical examination by the Board’s physician, unless the member has been determined by the Social Security Administration to be totally and permanently disabled, in which case the independent medical examination may be waived in the discretion of the Board.
- 10.4** The Board may consider a determination of total and permanent disability by the Social Security Administration to be conclusive evidence of a member’s Disability under TCC Sec. 22-39, but is not required to do so.
- 10.5** If an application for Disability retirement is denied by the Board, the Board may reconsider its denial if the member provides the System Administrator with new, relevant information regarding the member’s potential Disability within twelve (12) months of the member’s date of termination from employment with the City. The Board may, in its discretion, request another examination of the member by the Board’s physician or a review of the member’s updated Disability application by the Board’s physician in connection with a reconsideration of a prior denial.
- 10.6** Except as set forth in Rule 10.5, the Board’s determination regarding a Disability retirement application shall be final and binding on all parties.
- 10.7** Members who are approved for Disability retirement are subject to the disability verification procedures conducted by the System Administrator in accordance with TCC Sec. 22-39(e).

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11.0 RESERVED POWERS AND DELEGATIONS OF AUTHORITY

11.1 Powers Reserved for the Mayor and City Council

- (a) Design Terms and Conditions of TSRS
- (b) Amend, Modify and Terminate TSRS
- (c) Set Member Contribution Rate
- (d) Set Employer Contribution Rate
- (e) Appoint TSRS Board Chair

11.2 Powers Granted to TSRS Board

- (a) Administration, Management and Operation of TSRS in accordance with TCC Sec. 22-44(a)
- (b) Investment of TSRS assets
- (c) Establish and Maintain Investment Policy
- (d) Determine, Monitor and Adjust Actuarial Assumptions
- (e) Establish and Maintain Funding Policy
- (f) Certify Required Annual Contributions from Members and City, Based on Annual Valuation by TSRS Actuary
- (g) Recommend Member Contribution Rate
- (h) Recommend Employer Contribution Rate
- (i) Select, Monitor, Remove and Replace TSRS Service Providers
- (j) Provide recommendations and guidance regarding TSRS Personnel to the City Manager or the City Director responsible for hiring and supervising the System Administrator and TSRS Staff
- (k) Conduct TSRS Board Meeting and Set Agendas
- (l) Adopt and Maintain TSRS Administrative and Investment Policies
- (m) Ratify Retirement Applications
- (n) Determine Eligibility for Disability Pensions

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- (o) Manage IRS and Other Legal Compliance Issues
- (p) Make recommendations to the Mayor and City Council regarding discretionary and required changes to the City Code
- (q) Conduct Hearings and Make Determinations Regarding Member Benefits

11.3 Powers Granted to City (Exercised by City Manager and Authorized Department Directors)

- (a) Collect Member Contributions and Transmit to TSRS Trust
- (b) Collect Employer Contributions and Transmit to TSRS Trust
- (c) Oversee and manage TSRS System Administrator and Staff

11.4 Powers Delegated to TSRS System Administrator

- (a) Administer, Manage and Operate TSRS as delegatee of Board's authority under TCC Sec. 22-44(a)
- (b) Provide TSRS System Information to Members and Beneficiaries
- (c) Enroll Members in TSRS
- (d) Collect and Maintain Beneficiary Designations and Member Pension Elections
- (e) Maintain Database of Member Information
- (f) Determine Benefit Eligibility and Perform Benefit Calculations
- (g) Approve Member Service Purchases
- (f) Make Benefit Payments When Due to Members and Beneficiaries
- (g) Facilitate Transfers of Assets and Liabilities to State Retirement Systems as Needed
- (h) Compile Information Necessary for, and Assist TSRS Board in Conducting Review of, Disability Pension Applications
- (i) Respond to Inquiries from Members, Beneficiaries, City Officials
- (j) Recommend Administrative Policies and Fee Assessments to TSRS Board

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- (k) Manage IRS Compliance Requirements for Individual Member Benefits and for TSRS System Tax Status
- (l) Manage TSRS Board Meeting Schedule and Prepare Board Meeting Materials
- (m) Create, Retain and Manage TSRS Records
- (n) Manage TSRS Staff Budget and Resources
- (o) Facilitate Service Provider Contracts and Payments
- (p) Interface with TSRS Actuary and Legal Counsel as Needed
- (q) Make Regular Reports on Administrative Activities to TSRS Board

11.5 Powers Delegated to TSRS Investment Manager

- (a) Monitor TSRS System Investments
- (b) Work with TSRS Investment Consultant and Investment Providers to Oversee Investment of TSRS Assets in Accordance with TSRS Investment Policy
- (c) Monitor and Manage Liquidity Requirements for TSRS Benefit Payments
- (d) Facilitate Movement of TSRS Assets
- (e) Assist TSRS Board in the Selection, Review and Replacement of Investment Providers
- (f) Interface with TSRS Investment Consultant and Investment Providers as Needed
- (g) Make Regular Reports on Investment Activities to TSRS Board

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GOVERNANCE POLICY

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GOVERNANCE POLICIES

Purpose: The TSRS Board strives to administer the System appropriately, competently and in the best interests of the TSRS members and beneficiaries. The Board desires to document its governance policies in an effort to provide Board members with a clear understanding of their responsibilities and to create a transparent environment in which the Board can operate can carry out its duties.

Authority: The Board is created and authorized pursuant to TCC Sec. 22-44. The Board has been granted the power and authority necessary to effectuate the administration, management and operation of TSRS, as well as the power and authority to construe, interpret and implement the TCC provisions which constitute the System. TCC §22-44(a). The Board also has the full power and authority to prudently invest the System assets. TCC §22-45.

Definition of Fiduciary: In the context of TSRS, a fiduciary is a person who exercises discretionary authority in the administration of TSRS benefits and liabilities or the management (including custody, payment and investment) of TSRS assets.

Governance Policies:

1. Attendance

All Board members are expected to attend all Board and any applicable committee meetings. While attendance is not always possible, Board members should note any scheduling conflicts as soon as reasonably possible and attempt to manage their schedules to avoid creating additional conflicts. Board members shall attend meetings in person, in accordance with the City's rules and regulations for boards and commissions. When absence from a Board meeting is unavoidable, the Director of Finance and the Director of Human Resources are permitted to send a designee to attend the meeting in his or her place, subject to the restrictions of Board Rule 7.0. Other Board members are not authorized to send designees to attend Board meetings in their place.

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2. Committee Service

Each Board member should serve on committees as requested by the Board Chair.

3. Preparation

Board members should come to Board meetings having read the materials prepared and circulated by the System Administrator and Board consultants, and having asked any questions of TSRS staff necessary to the Board members' understanding of the materials.

4. Inquisitiveness

Board members should be inquisitive and should appropriately question staff, advisors and fellow Board members as circumstances require. The inquisitive nature of Board members helps to build the institutional knowledge base of the Board.

5. Integrity

Board members should conduct themselves with integrity and dignity, maintaining the highest ethical conduct at all times.

6. Confidentiality

Board members shall not reveal confidential matters and will not use confidential information for personal gain or for the benefit of outside interests. Board members shall exercise due care with regard to all confidential information in their possession.

7. Knowledge

Board members should develop and maintain their knowledge and understanding of the issues involved in the management of the System. The specific areas in which board members should develop and maintain a high level of knowledge should include:

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- Public pension plan governance.
- Asset allocation and investment management.
- Actuarial principles and funding policies.
- Financial reporting, controls and audits.
- Benefits administration.
- Vendor selection process.
- Open meeting and public records laws.
- Fiduciary responsibility.
- Ethics, conflicts of interest and disclosures.

8. Education

Board members should identify areas in which they might benefit from additional education and work with staff to find reasonable and appropriate educational opportunities. Members periodically should attend public sector pension conferences and educational programs and educational sessions provided internally by consultants and special guests. Board members should avail themselves of educational materials available from the System Administrator to keep current on public pension plan issues and topics.

9. Collegiality

Board members shall make every effort to engage in collegial deliberations, and to maintain an atmosphere in which Board or committee members can speak freely, explore ideas before becoming committed to positions and seek information from staff and other members. Board members should approach issues impacting TSRS with an open mind.

10. Mentoring

Any new Board member may request a mentor to assist him or her in becoming familiar with his or her responsibilities on the Board. If a request is made, the Board chair will designate one experienced current or former Board member to be a mentor to the new Board member for a period of one year.

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The mentor will be available to the new Board member outside of regularly scheduled board meetings, for consultation or discussion on a reasonable basis.

11. Open and Accountable to Members and the City.

Board members shall be appropriately open in the way key decisions are made and publicly disclosed. The Board shall conduct its business in accordance with the Arizona Open Public Meeting Law, as summarized in Board Rule 14.0. The Board is accountable to both System members and the City for their performance in accordance with the applicable provisions of the TCC and these Governance Policies.

12. Public Statements

Board members shall not make public statements on behalf of the Board or TSRS without the advance authorization of the Board. Any public statements made by Board members on behalf of the Board shall be identified clearly as statements on behalf of the Board, in its fiduciary capacity as the TSRS Trustee. Any public statement by an individual Board member that relates to TSRS business and is not made on behalf of the Board shall be identified clearly as a statement of the individual Board member, not on behalf of the Board. When making a public statement regarding TSRS, Board members shall exercise due care and be mindful of public perceptions of the Board member's authority and any potential conflict of interest issues.

13. Duty of Loyalty

Board members staff shall discharge their duties with respect to the System solely in the interest of the TSRS members, retirees and beneficiaries for the exclusive purpose of:

- Providing benefits to members and beneficiaries.
- Defraying reasonable expenses of administering the plan.

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14. Duty to Act Prudently

Board members must discharge their duties with the same care, skill and diligence under the circumstances then prevailing which a prudent person acting in a like capacity and familiar with the matters at hand would use in the conduct of an activity of like character and purpose. This requires:

- Undertaking an appropriate analysis of a proposed course of action, including determination of the relevant facts, considering alternative courses of action and obtaining expert advice as needed.
- Acting in accordance with the laws, documents and instruments governing the System.

15. Duty to Invest Prudently

The Board must invest the TSRS assets prudently and productively, in a manner consistent with portfolio management theory. Working with qualified investment consultants, the Board shall invest TSRS assets in accordance with the TSRS Statement of Pension Investment Policy and Objectives, and shall keep such Statement up to date and consistent with current investment goals and strategies.

16. Exclusive Purpose of Systems Assets

The assets of the System shall never inure to the benefit of the City and shall be held for the exclusive purposes of providing benefits to members and beneficiaries and defraying reasonable expenses of administering the System.

17. Prohibitions Against Self-Dealing

Board members shall not do any of the following:

- Deal with the assets of the System in their own interest or for their own account.
- In their individual, or any other capacity, act in any transaction involving TSRS on behalf of a party, or represent a party, whose interests are adverse to the interests of the System or the interests of the members and beneficiaries.

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- Receive any consideration for their personal account from any party conducting business with the System in connection with a transaction involving TSRS assets.

18. Avoidance of Conflicts of Interest/Appearance of Conflicts of Interest

Individuals appointed to serve on the Board bring specialized information and knowledge to the Board from their positions with the City and from their represented constituencies. However, when sitting as a Board member, the member must take all reasonable steps to avoid both actual conflicts of interest and the appearance of conflicts of interest as they carry out their Board duties for the exclusive benefit of TSRS members and beneficiaries. Board members shall conduct themselves in accordance with the Conflict of Interest Policy set forth in Board Rule 15.0.

19. Delegations of Authority

The individual members of the Board cannot reasonably perform all acts necessary to operate TSRS; they must rely on TSRS staff and contractors to carry out many activities and functions. Accordingly, the Board may delegate authority to committees of its members, the System Administrator and outside consultants and contractors. Delegations must be prudent and consistent with the Board's fiduciary responsibilities. The Board shall (a) select delegates with care, (b) define delegated authority clearly, (c) monitor the performance of delegates, and (d) take corrective action when appropriate. Board Rule 11.0 identifies the powers reserved by the City Council and active delegations from the Board.

20. City of Tucson Code of Ethics

All Board members and the System Administrator shall comply with the City of Tucson Code of Ethics adopted August 6, 2013 by Ordinance No. 11102.

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**ARIZONA OPEN PUBLIC MEETING LAW SUMMARY
(A.R.S. SEC. 38-431, ET SEQ.)**

It is the policy of the State of Arizona that meetings of public bodies be conducted openly. Notices and agendas are to be provided for such meetings and must contain information necessary to inform the public of the matters to be discussed or decided. All or any part of a public meeting of a public body may be recorded by any person in attendance by means of a tape recorder, camera or other means of sonic reproduction, provided that there is no active interference with the conduct of the meeting. A "Meeting" means the gathering, in person or through technological devices, of a quorum of members of a public body at which they discuss, propose or take legal action, including any deliberations by a quorum with respect to such action. The definition of a meeting was modified by the Arizona Legislature in 2000 to prohibit a quorum of a public body from secretly communicating through technological devices, including facsimile machines, telephones and electronic mail.

1. Public Bodies Defined

The TSRS Board is a "public body" for purposes of the Open Public Meeting Law. "Public body means the legislature, all boards and commissions of the state or political subdivisions, all multi-member governing bodies of departments, agencies, institutions and instrumentalities of the state or political subdivisions, including without limitation all corporations and other instrumentalities whose boards of directors are appointed or elected by the state or political subdivision. Public body includes all quasi-judicial bodies and all standing, special or advisory committees or subcommittees of, or appointed by, such public body."

2. Public Notice Requirements

Notice of all meetings, including executive sessions, must be given to members of the TSRS Board and to the public. Generally, notice of meetings must be posted in a public manner no less than twenty-four (24) hours prior to the time of the meeting. Additionally, every year the TSRS Board must file with the City Clerk a disclosure statement indicating where all public notices of meetings will be posted. If preferred, the City Clerk will post notices for the public body in the locations established by the City Clerk for that purpose.

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The notice should include the following information:

1. The full name of the TSRS Board. (In general, acronyms or other abbreviations should not be used alone. When a committee of the Board is meeting, include the name of the Board as well as the name of the committee.)
2. The date and time of the meeting.
3. The place of the meeting. (Include the name of the building and floor or suite number [if applicable], street address and City).

If the TSRS Board intends to meet for a specified calendar period on a regular day or date during the period, and at a regular place and time, may post public notice of meetings at the beginning of the period and need not post additional notices for each meeting unless there are changes to the schedule. The notice must specify the period for which the notice is applicable. The City Clerk prepares such a notice at the beginning of each calendar year based upon the contents of the annual disclosure statement filed by each public body. (This method of posting does not satisfy the agenda requirements unless the notice also contains a clear statement that the agenda for meetings will be available at least twenty-four [24] hours in advance of the meeting and a statement as to where and how the public may obtain a copy of the agenda.)

In case of an actual emergency, a meeting may be held upon such notice as is appropriate to the circumstances. Contact the City Clerk for further information.

A meeting may be recessed and resumed with less than twenty-four (24) hours' notice if public notice of the initial session of the meeting is given as required, and if, prior to recessing, notice is publicly given as to the time and place of the resumption of the meeting or the method by which notice shall be publicly given.

3. Agendas

In addition to the public notice requirements, the TSRS Board must provide an agenda of the matters to be discussed, considered or decided at each meeting which must be available to the public a minimum of twenty-four (24) hours prior to the time of the meeting. The agenda must contain a listing of the "specific matters to be discussed, considered or decided at the meeting". General terms

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such as "personnel," "new business," "old business", etc. may not be used unless the specific matters or items to be discussed are identified. Agendas should "contain such information as is reasonably necessary to inform the public of the matters to be discussed or decided."

A public body may include items such as "future agenda items" to schedule items for future agendas, or "call to the audience" to designate that part of the meeting at which members of the public may address the public body. Any discussions or decisions regarding a matter brought up under "future agenda items" or "call to the audience" should be rescheduled for a later meeting in order to properly agendize the item.

The Open Meeting law allows the Board chair or presiding Board member to present a brief summary of current events without listing in the agenda the specific matters to be summarized, provided that the summary is listed on the agenda and that the Board does not propose, discuss, deliberate or take legal action at that meeting on any matter in the summary unless the specific matter is properly noticed for legal action.

The agenda may be made available to the public by including it as part of the notice of the meeting or by stating in the notice how the public may obtain a copy of the agenda. Changes in the agenda must be prepared and distributed in the same manner as the original agenda at least twenty-four (24) hours prior to the time of the meeting.

Questions regarding content of the agenda should be discussed with the City Clerk.

4. Record of Meetings

The TSRS Board must maintain minutes of all meetings held either in the form of a taped recording (with supplemental notes, if necessary) or a written record. The record of the meeting must be available for public inspection within three (3) working days after the meeting. The minutes of a public meeting must include the following information:

- (a) The date, time and place of the meeting;
- (b) The members of the public body recorded as either present or absent;

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- (c) A general description of the matters discussed or considered. The Law requires that minutes contain information regarding matters considered or discussed at the meeting even though no formal action or vote was taken with respect to the matter;
- (d) An accurate description of all legal actions proposed, discussed or taken and the names of members who proposed each motion. This does not require that the name of each member who votes on a motion be indicated but only that the member who proposed it be shown in the minutes. Generally, however, the Board, for its own benefit, will include the names of the member who seconded the motion and those who voted in favor of or against the motion. In any case, the minutes must reflect how the Board voted and the numerical breakdown of the vote (for example: 3 in favor, 1 against, 1 abstention);
- (e) "Legal action" means a collective decision, commitment or promise made by a majority of the Board members pursuant to the Tucson City Code, other authority of the Board, and the laws of this state.
- (d) The name of each person making statements or presenting material to the TSRS Board and a specific reference to the legal action to which the statement or presentation relates;
- (e) If the discussion in the public session did not adequately disclose the subject matter and specifics of the action taken, the minutes of the public meeting at which such action was taken should contain sufficient information so that the public may investigate further the background or specific facts of the decisions.

5. Executive Sessions

Executive sessions may only be held for specific purposes. Notice of the executive session must be given to the members of the TSRS Board, and to the general public in the same manner as all other meetings and must include the specific provision of the law authorizing the executive session.

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Once proper notice has been given, the executive session may only be held following a public majority vote of a quorum of the Board members and a public announcement by the Board identifying the specific section of the law authorizing the executive session. The purposes for which an executive session may be called are narrowly defined in the law. Questions regarding holding an executive session should be discussed with the City Clerk.

6. Circumvention of the Open Meeting Law

Discussions and deliberations between less than a majority of the members of the TSRS Board, if used to circumvent the purposes of the Open Meeting Law violate that law. The Board may not circumvent public discussion by splintering the quorum and having separate or serial discussions with a majority of the Board members, whether in person or through technological devices. Board members should refrain from any activities that may undermine public confidence in the public decision making process established in the Open Meeting Law, including any actions that may appear to remove discussion and decision from the public view.

Relevant Arizona Attorney General Opinions:

Ariz. Att'y Gen. Ops. 75-8: All discussions among a majority of Board members subject to Open Meeting Law requirements.

Ariz. Att'y Gen. Ops. 78-1: Public participation in open meetings.

Ariz. Att'y Gen. Ops. 179-45: Changes to the agenda and timely publication.

Ariz. Att'y Gen. Ops. 179-49 and 196-012: Right of affected individuals involved in personnel matters before the Board.

Ariz. Att'y Gen. Ops. 190-19: Placing legal advice executive session notification on agenda.

Ariz. Att'y Gen. Ops. 190-058, 187-038; 187-131: Handling confidential records.

Ariz. Att'y Gen. Ops. 191-033, 183-135: Board member telephonic participation in meetings.

Ariz. Att'y Gen. Ops. 199-006: Limitations on responses to issues raised in call to the public.

Ariz. Att'y Gen. Ops. 105-004: Email to and from Board members.

Ariz. Att'y Gen. Ops. 107-013: Comments to the media regarding issues before the Board.

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CONFLICT OF INTEREST POLICY

1. Individual Board members are fiduciaries and trustees. As such, Board members will at all times act in the best interest of TSRS and its members and beneficiaries, consistent with the Board member's fiduciary duty, and take positive steps to prohibit breaches of duty through negligence or intentional action.
2. Board members will never act where the Board or the individual member has determined that a conflict of interest exists. A conflict of interest is understood to be a situation where a relationship exists that could reasonably be expected to diminish independence of judgment in performance of official responsibilities as a Board member.
3. Board members may not participate in decisions which might result in significant personal economic advantage.
4. An ex-officio member shall not use his or her position with the City to influence Board or TSRS decisions in which the City has a material financial interest, or where they have a duty or responsibility that may give the appearance of a conflict of interest.
5. Board members will take positive steps to prohibit unauthorized communications with and from individuals seeking to influence the Board or who may receive personal benefit or gain as a result of Board actions.
6. To avoid the appearance of undue influence, Board members will refrain from communications with staff, outside of a Board or committee meeting, wherein the Board member advocates for or directs a specified action, decision or course of conduct regarding any existing or prospective investment transaction, benefit payment, service contract or other System transaction. The foregoing is not intended to place limitations on a Board member's ability to work with staff on routine Board matters or to request public information.
7. Board members will not seek nor accept any compensation or political contributions that would violate Arizona or City law.

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- 8.** Board members shall not solicit or accept any gift, service, favor anything of value, or any compensation for any service rendered in connection with that individual's Board duties and responsibilities. Board members shall not accept or solicit, directly or indirectly, anything of economic value such as a gift, gratuity, favor, entertainment or loan that may appear to be designed to influence the Board member. This provision does not prohibit acceptance of minor promotional items such as calendars and pens; food and refreshments delivered as a gift to the work place for consumption on the premises by all employees at the work place; and business meals paid for by vendors or consultants in the normal course of business.
- 9.** Each Board member shall have the authority to call an actual or perceived conflict to the attention of the Board for discussion and consideration. Similarly, the Board chair shall have the authority to ask whether any Board member has a conflict to disclose prior to discussion or action on any Board item.
- 10.** Any Board member who is affected by an actual conflict of interest must (i) inform the Board of the conflict and (ii) refrain from voting upon or otherwise participating in the Board decision or action.

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**FUNDING POLICY
(As Adopted by the Board of Trustees November 17, 2016)**

I. Intent and Summary

The Tucson Supplemental Retirement System is a defined benefit pension plan maintained for the benefit of City of Tucson employees. TSRS is governed by provisions of the Tucson City Code, the public pension protections included in the Arizona Constitution, and the Internal Revenue Code. Within that framework, the TSRS Board has adopted a Funding Policy to ensure that TSRS will remain sustainable and to assist in the accumulation of adequate resources to fund the costs of TSRS benefits.

The costs of defined benefit pension benefits generally fall into three categories:

1. The cost of pension benefits earned by employee members each year, referred to as the “normal cost” of benefits;
2. The unfunded liabilities that have accumulated in the retirement program over time, as the retirement program grows and benefit liabilities exceed the assets held in the program; and
3. The administrative costs of operating the retirement program.

These cost elements are funded on an annual basis through a combination of employer contributions, employee contributions and investment returns.

Intent

The intent of the TSRS Funding Policy is to set forth the policies and practices that will be used to determine City and employee member contributions to TSRS each year. Contributions calculated in accordance with the Funding Policy will be designed to achieve full funding of the TSRS benefit liabilities over a prudent time horizon, while balancing the goals of:

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- Maintaining retirement benefit security;
- Incorporating experience based actuarial assumptions into all contribution calculations;
- Keeping contribution rates relatively stable on an annual basis; and
- Allocating contribution costs in an equitable manner to mitigate intergenerational transfers of retirement program liabilities.

Summary

It is the goal of the Board to increase the funded status (the ratio of the assets to the accrued liabilities) of TSRS. Under the TSRS Funding Policy, the Actuarially Determined Contributions (as detailed in the annual actuarial valuation report) calculated for the City and the employee members include the payment of:

- a. The normal cost of benefits;
- b. The annual amortized payment on TSRS' unfunded liabilities, calculated over a 20 year open, level percent of pay amortization policy;
- c. The reasonable and appropriate annual administration costs of TSRS; and
- d. The additional contribution element attained through the rounding of employee member and City Contribution Rates pursuant to the Board's rounding policy, which is designed to assist with the achievement of the full funding of TSRS over a reasonable timeframe.

II. Funding Policy Goals

The TSRS Funding Policy is designed to provide assurance that TSRS will remain viable and sustainable, and that the cost of the benefits provided by TSRS will be funded in an equitable manner. The TSRS funding policy is based on the following primary principles:

- A. The Board intends to encourage the City to extinguish the TSRS unfunded liability within a target timeframe of fiscal year 2025 to 2030. While the Board recognizes that investment markets and returns have a significant impact on the funded status of TSRS and cannot be predicted, the Board intends to use the target timeframe as a tool to measure success in the reduction of the unfunded liability. If and when the TSRS actuarial valuation shows that the unfunded liability will not be extinguished within the target

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timeframe, the Board will review closely the actuarial assumptions and investment policies to determine if adjustments should be made.

- B. The Board will work toward the extinguishment of the unfunded liability by recommending that the City contribution to TSRS exceed the amount that the City is required to appropriate and pay to TSRS pursuant to the Tucson City Code ("TCC"), and the annual City contribution to TSRS be a minimum of 27.5% of payroll.
- C. The TSRS Board wishes to demonstrate accountability and transparency by communicating all of the information necessary for assessing the City's progress toward meeting its pension funding objectives.

III. Authority

The Board has been granted the power and authority necessary to effectuate the administration, management and operation of TSRS. TCC §22-44(a). The Board is required to certify to the City Manager the Actuarially Determined Contribution ("ADC"), the Required Member Contribution Rate(s) and the Required City Contribution.¹ TCC §22-35(b). The City is required, pursuant to TCC Section 22-30(t), to appropriate and pay over to TSRS 100% of the Required City Contribution.

IV. Policy:

The Board shall determine the Recommended Member Contribution Rates and the Recommended City Contribution Rates in accordance with all applicable provisions of the TCC and the terms of this Funding Policy as set forth below. The Funding Policy takes into account the following three core elements in the calculation of the recommended annual contributions to TSRS: the Actuarially Determined Contribution, administrative expenses and the Board's rounding policy.

- A. **Actuarially Determined Contribution.** The ADC is the annual amount necessary to pay the sum of the employer normal cost, the employee segment normal cost amounts and the amortization requirements for the TSRS unfunded accrued

¹ The Actuarially Determined Contribution is referred to in the TCC as the "annual required contribution." The Required City Contribution Rate is referred to in the TCC as the "employer contribution."

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liability, determined on a fiscal year basis by the System's actuary in accordance with the following actuarial assumptions:

1. **Actuarial Cost Method.** The actuarial cost method is the individual entry age normal cost method, level percent of pay. This method conforms to the actuarial standards of practice and allocates normal costs over a period beginning no earlier than the date of employment and does not exceed the last assumed retirement age. This cost method fully funds the long-term costs of the promised benefits of the employees' period of active service.
2. **Asset Valuation Method.** To minimize the volatility effect of contribution rates affected by investment gains or losses during the year, the Board has adopted a smoothing process that involves spreading the difference between actual and expected market returns over a five year period to determine the actuarial value of assets.
3. **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). When the 20 year open amortization policy is combined with the Contribution Rounding Policy set forth in Section IV.C. below, the Board's amortization policy is a hybrid approach, designed to fully extinguish the unfunded liability in a similar but more flexible manner than a closed amortization policy. The Board's amortization policy has been in place since July 1, 2013.

B. 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 Recommended City Contribution Rate 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

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administration of the System. Investment fees and expenses shall not be included in the calculation of the Recommended City Contribution Rate

C. Contribution Rounding Policy. The Board's rounding policy is intended to (1) minimize volatility in the Member Contribution rates and the related impact on the net take home pay of employees, (2) eliminate minor adjustments in contribution rates, and (3) recognize the inherent timing gap between actuarial valuation data and the effective date of new contribution rates.

1. Recommended Member Contribution Rates: Recommended Member Contribution Rates for 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") shall be determined by the System actuary pursuant to TCC Section 22-34. The Legacy Members contribute 5% of pay, and there are no further adjustments to Legacy Member contribution rates; i.e., the Required Member Contribution Rate and the Recommended Contribution Rate for the Legacy Members are the same. The Tier I Members and Tier II Members are referred to collectively as the "Variable Contribution Tier Members," and they make Member Contributions equal to a percentage of the normal cost for their particular

Tier. The percentage applicable to the Variable Contribution Tier Members currently is set at 50%, but can be changed by the City in accordance with Section 22-34(b) of the TCC. 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).

The Recommended Member Contribution Rates for Variable Contribution Tier Members are subject to the Board's rounding policy. The normal cost for Tier I Member and for Tier II Members are calculated by the System actuary and then multiplied by the applicable Member Contribution Percentage (currently 50%). The result of that calculation is the Recommended Member Contribution Rate required for the Variable Contribution Tier Members under the TCC.

The Board will then review the Required Member Contribution Rates for the Variable Contribution Tier Members and apply the rounding policy. Pursuant to the rounding policy, the Required Member Contribution

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Rates for the Variable Contribution Tier Members will be rounded up to the nearest 0.25%. The Recommended Member Contribution Rates for Variable Contribution Tier Members shall never be less than the Required Member Contribution Rate for that member group (for that same fiscal year). The Recommended Member Contribution Rates will be recommended by the Board to the City for the upcoming fiscal year.

Examples:

Year 1: Required Member Contribution
for Tier I Member: 6.67% of pay

Recommended (Rounded) Member Contribution
for Tier I Member Contribution: 6.75% of pay

Year 2: Required Member Contribution
for Tier I Member Contribution Rate: 6.48% of pay

Recommended (Rounded) Member Contribution
for Tier I Member Contribution: 6.50% of pay

- 2. Recommended City Contribution Rates:** Pursuant to TCC Section 22-30(t), the City is required to fund the Required City Contribution for a particular fiscal year, which equals the difference between the ADC and the Required Member Contribution rate(s). For purposes of determining the Recommended City Contribution Rate that will be recommended by the Board to the City, the System actuary will be asked to prepare the following calculations:

Because there are three different Required Member Contribution Rates, the System actuary shall calculate a Required City Contribution Rate for each member group (which is the Required City Contribution Rate for each group) and a blended Required City Contribution Rate for the entire member population. In no event shall the blended Required City Contribution Rate for the entire member population be less than the Required City Contribution Rate for any member group.

The Board will then review the blended Required City Contribution Rate and set the Recommended City Contribution Rate for the upcoming fiscal year. The Recommended City Contribution Rate will equal the

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blended Required City Contribution Rate, rounded up to the nearest 0.50. The Recommended City Contribution Rate shall be rounded up to the nearest 0.50 instead of the nearest 0.25 because the Required City Contribution Rates are based on a blend across the three groups of members. The Recommended City Contribution Rate shall never be less than the Required City Contribution rate for any member group for that same fiscal year.

Example:

Required City Contribution Rates
for three member groups:

Legacy Members:	27.22% of pay
Tier I Members:	25.55% of pay
Tier II Members:	27.08% of pay

Actuarially Calculated Blended City Contribution Rate 26.95%

Recommended (Rounded) City Contribution Rate: 27.50% of pay

(Recommended Rate is not set at 27.0% because that would be less than the Required Rate for two of the member groups)

- 3. Funded Status of TSRS:** It is the goal of the Board to increase the funded status of TSRS. The Board anticipates that Required Member Contribution Rates and the Required City Contribution Rates may decrease from time to time, based on various actuarial factors. The Board will not decrease its Recommended Member Contribution rates or its Recommended City Contribution Rate until such point as TSRS is fully funded. At that time, the unfunded accrued liability will have been extinguished, and the ADC will represent the payment of the normal cost of benefits only. Moreover, the Board shall decrease the Recommended Member Contribution Rates for the Variable Contribution Tier Members only to the extent that the Recommended Member Contribution Rates for Tier I Members and Tier II Members decrease simultaneously, in the same percentage of pay.

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TSRS ACTUARIAL ASSUMPTIONS

- A.** To determine the value of actuarially equivalent member benefits under TCC Sec. 22-30(d) (Definition of “Actuarial Equivalent”), the following actuarial assumptions shall be applied:

Interest Rate: 7.25%

**Updated effective July 1, 2020:
7.00%**

Mortality Table: RP-2000 Combined Mortality Table for males and females projected with Scale BB to 2020

**Updated effective July 1, 2020:
RP-2014 Mortality Tables for healthy employees,
healthy retirees and disabled retirees, with MP-
2018 Projection Scales**

- B.** The foregoing actuarial assumptions are adopted in accordance TCC Chapter 22, Sec. 22-30(d) and are incorporated into this Board Rule as required pursuant to Section 401(a)(25) of the Internal Revenue Code of 1986, as amended.

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FUNDING POLICY GLOSSARY OF TERMS AND CONCEPTS

1. **Actuarial Cost Method:** the method used by the actuary to allocate total benefit costs between employees' past and future service. The actuarial cost method determines the normal cost for a year.
2. **Accrued Liability:** the present value of retirement benefits earned by employees for past service.
3. **Actuarial Value of Assets:** the value of pension assets for purposes of actuarial valuations and funding calculations, which takes into account certain actuarial assumptions such as smoothing investment returns over a stated period.
4. **Actuarially Determined Contribution:** the annual contribution to the plan necessary to pay the normal cost and the annual amortization payment on any unfunded accrued liability, which may be less than the annual contribution recommended by the Board after full application of the Funding Policy.
5. **Amortization:** the process of paying off the unfunded accrued liability over time. Please refer to Section IV.A.3. of the Funding Policy for an explanation of the hybrid amortization policy used by TSRS.
 - (a) **Closed Amortization:** using a specific number of years to determine annual payments intended to extinguish debt and the number of years remaining in the amortization schedule decline to zero.
 - (b) **Open Amortization:** using a period of years that does not change over time to determine annual contributions to pay down the unfunded accrued liability. With each annual calculation, the period of years used to determine the payment is reset to the original period; the number of years in the amortization schedule does not decline to zero.

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Example: Assume that \$1,000,000 in liability is being amortized over 5 years. Following is a simplified illustration of the difference between Open and Closed Amortization Schedules:

	Closed Amortization			Open Amortization		
	Starting Liability	Amortization Payment	Ending Liability	Starting Liability	Amortization Payment	Ending Liability
Year 1	\$1,000,000	\$200,000	\$800,000	\$1,000,000	\$200,000	\$800,000
Year 2	\$800,000	\$200,000	\$600,000	\$800,000	\$160,000	\$640,000
Year 3	\$600,000	\$200,000	\$400,000	\$640,000	\$128,000	\$512,000
Year 4	\$400,000	\$200,000	\$200,000	\$512,000	\$102,400	\$409,600
Year 5	\$200,000	\$200,000	\$0	\$409,600	\$81,920	\$327,680

6. **Contribution Rate:** the amount to be contributed to TSRS annually, expressed as percentage of payroll.
- (a) **Required City Contribution Rate:** the City contribution rate calculated by the actuary in accordance with the applicable provisions of the Tucson City Code.
 - (b) **Recommended City Contribution Rate:** the City Contribution rate recommended by the Board after the rounding policy has been applied, which may be more than the required rate.
 - (c) **Required Member Contribution Rate:** the Member Contribution rate for a particular group of members (Legacy, Tier I or Tier II Members) calculated by the actuary in accordance with the applicable provisions of the Tucson City Code.

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- (d) **Recommended Member Contribution Rate:** the Member Contribution rate recommended by the Board for Tier I Members or Tier II Members after the rounding policy has been applied, which may be more than the required rate.
7. **Entry Age Normal Cost Method:** the actuarial cost method which produces the normal cost of an employee's retirement benefits as a level percent of pay, beginning at the employee's age when he or she enters the plan and continuing until the employee reaches retirement age.
8. **Full Funding:** occurs when the unfunded accrued liability is \$0 and the funded ratio is 100%.
9. **Funded Ratio or Funded Status:** the ratio of assets available to pay retirement benefits to accrued liability under the plan (liabilities associated with retirement benefits earned by employees).
10. **Legacy Members:** Members hired prior to July 1, 2006 and whose Required and Recommended Member Contribution Rate equals 5% of pay.
11. **Level Percent of Pay:** calculating plan contributions as a consistent percentage of annual payroll costs each year and assuming that future contributions will increase by the same rate as payroll increases.
12. **Market Value of Assets:** the value of pension assets, determined with reference to the value at which the assets would trade or could be sold on an open market.
13. **Member Contribution Percentage:** The percent of the Variable Contribution Tier Members normal cost for which the member is to contribute-effective 6/30/2014 that rate is 50%.
14. **Normal Cost:** the annual present value or costs for benefits earned by employees during the year.

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- 15. Smoothing:** an actuarial method of spreading out investment gains and losses over a stated period of time, used to average investment returns over the smoothing period and therefore minimize volatility in the calculation of contributions to the plan.

Example: Assume that an investment achieved the following annual returns, and that the investment returns are smoothed over a 5 year period:

Year	Investment Return (parentheses indicate loss)	Annual Amount Recognized in Actuarial Value of Assets (1/5 per year)
2012	(\$30,000)	(\$6,000)
2013	\$20,000	\$4,000
2014	\$50,000	\$10,000
2015	(\$20,000)	(\$4,000)
2016	(\$30,000)	(\$6,000)
Total	(\$10,000)	(\$2,000)

In the calculation of the actuarial value of the assets for 2016, the market value of the assets will be reduced by a \$2,000 investment loss. Without smoothing the investment returns, the market value of the assets would be reduced by a \$30,000 investment loss. When the market value of the assets fluctuates widely as a result of investment returns, the contribution obligation to the pension plan also fluctuates widely. Smoothing the investment returns has the effect of stabilizing contribution rates.

- 16. Tier I Members:** members hired from July 1, 2006 to June 30, 2011.
- 17. Tier II Members:** members hired on or after July 1, 2011.
- 18. Unfunded Accrued Liability:** the difference between the assets and the accrued liability.
- 19. Variable Contribution Tier Members:** TSRS members who are classified as either Tier I Members or Tier II Members and are required to make Member Contributions which may change over time in accordance with TCC Section 22-34.

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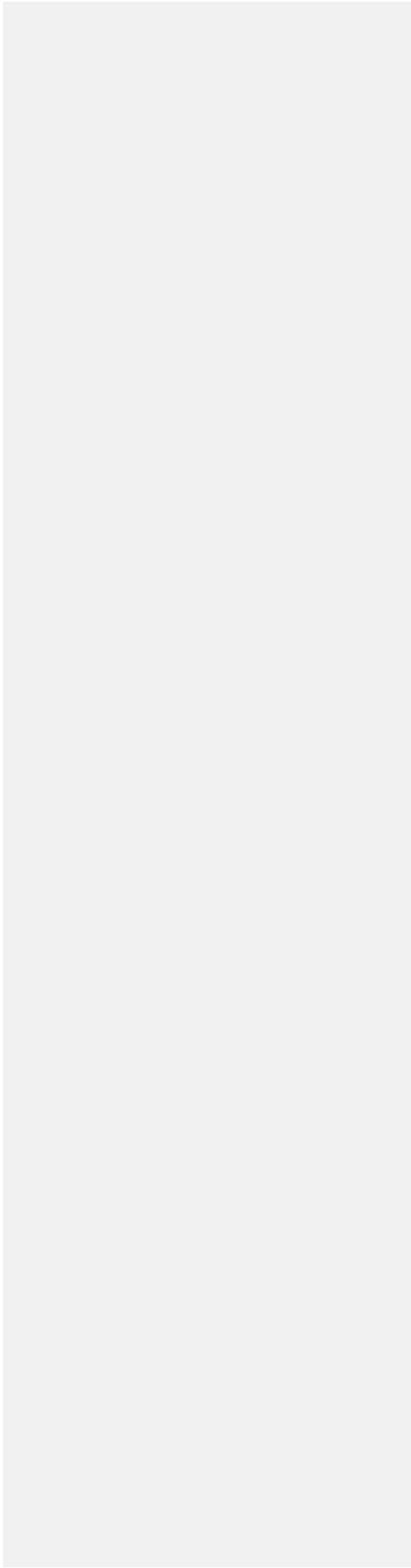
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POST RETIREMENT BENEFIT INCREASE POLICY

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[Pending Board Review]

Statement of Pension Investment
Policy and Objectives
Tucson Supplemental Retirement System

Updated , 2019 ~~March 2017~~



**TUCSON SUPPLEMENTAL
RETIREMENT SYSTEM
INVESTMENT POLICY STATEMENT**

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I. BACKGROUND, PURPOSE & OBJECTIVES

The purpose of this Investment Policy Statement (the “IPS”) is to assist the Board of ~~Trustees Retirement~~ (“BOARD”) in effectively establishing, monitoring, evaluating, and revising the investment program established for the Tucson Supplemental Retirement System (“TSRS”), a governmental, ERISA-exempt defined benefit plan sponsored by the city of Tucson.

TSRS was established to provide retirement benefits to city employees. The Board is comprised of one Mayor appointee, the Mayor, Finance Director, Human Resources Director, one City Manager Appointee, two elected employee representatives and one retiree representative, two CTRA Representatives, one Elected Retiree Representative, and five staff members. The Board works closely with the TSRS System Administrator and TSRS staff, who all are City employees.

TSRS was organized in accordance with the Internal Revenue Code, the Arizona Revised Statutes and the Tucson City Code ~~provisions of the laws of the State of Arizona.~~ This document provides a framework for the management of the assets of TSRS. The Board establishes this investment policy in accordance with applicable local, state, and federal laws. ~~The Board members exercise authority and control over TSRS, by setting policy, which the Staff executes either internally or through the use of external prudent experts.~~

This IPS may be modified from time to time by action of the Board. The policy identifies a set of investment objectives, guidelines, and performance standards for the investment of the assets of TSRS. This policy represents the formal document governing the investment of TSRS assets and will be used as the basis for future investment performance measurement and evaluation.

Investments will be made for the sole interest of the participants and beneficiaries of TSRS and in accordance with the following objectives:

To ensure funds are available to meet current and future obligations of TSRS when due.

To ensure the assets of TSRS are invested with the care, skill, and diligence that a prudent person acting in a like capacity would undertake.

To ensure the assets of TSRS are invested in a manner that minimizes and controls the costs incurred in administering and managing the assets.

To earn a minimum rate of return net of investment management fees equal to or exceeding

the expected rate of return (the actuarial rate). TSRS will be managed in perpetuity indicating a long time horizon in which to evaluate investments.

To earn the maximum rate of return that can be realistically achieved, given existing market conditions, at an acceptable and controlled level of risk, in order to minimize future contributions.

ROLES & RESPONSIBILITIES

INVESTMENT RELATED DUTIES OF THE BOARD

The Board is generally responsible for developing, implementing, supervising and evaluating the investment policy of TSRS, hiring ~~Service Providers, which include~~ investment managers, custodians, consultants and transition managers (referred to as “Service Providers”) and monitoring and evaluating their effectiveness of the Service Providers in carrying out their respective duties.

The Board's specific investment related responsibilities, which shall be carried out with professional advice and assistance from the Board's General Investment Consultant and administrative support from the TSRS Staff, include:

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Delineating general investment policy for TSRS including:

Asset allocation policy, which establishes and communicates the Board's return expectations and risk tolerance;

Investment manager structure policy, which establishes and communicates the Board's decisions regarding the number and types of investment managers that are appropriate for TSRS under the then current circumstances; and

Investment manager guidelines, which establish and communicate the risk parameters set by the Board for each individual manager consistent with the overall risk level set for TSRS.

Hiring a bank as Custodian and an Investment Consultant to assist the Board and the TSRS staff in implementing investment policy and managing TSRS assets.

Appointing investment managers to fulfill specific roles ~~in TSRS~~ defined by the TSRS investment manager structure.

Establishing effective communication and review procedures between the investment managers, the Investment Consultant, the Custodian and the Board.

Monitoring and evaluating each investment manager's success in achieving the objectives set for such manager by the Board and adhering to established guidelines.

Approving the termination and, if appropriate, replacement of an investment manager when the investment manager fails to achieve the objectives set for the manager by the Board or when the needs of TSRS change

Monitoring and controlling investment expenses, including investment manager fees, trustee and Custodian fees, and trading costs.

~~DUTIES OF THE TSRS STAFF~~

~~The TSRS staff members are responsible for certain ministerial nondiscretionary functions in connection with TSRS, for bringing relevant issues to the attention of the Board and for working with the Service Providers to implement the decisions made by the Board. The responsibilities of TSRS staff include:~~

~~Monitoring the actions of service providers including custodian and investment consultant~~

~~In conjunction with Investment Consultant, conducting on going monitoring of the actions of investment managers and reporting to the Board regarding their findings.~~

~~In conjunction with the Investment Consultant, developing proposals to enhance TSRS for consideration by the Board.~~

~~Preparing the Board's meeting agenda in conjunction with the Investment Consultant and Board members.~~

~~Working with the custodian bank to rebalance in keeping with the decisions of the Board.~~

~~Working with TSRS's actuary and auditor.~~

~~Verifying TSRS's compliance with guidelines.~~

~~Monitoring and evaluating applicable governmental regulations and consulting with tax and legal counsel regarding TSRS matters.~~

DUTIES OF INVESTMENT MANAGERS

The duties and responsibilities of each investment manager include:

Managing those assets of TSRS that are under the supervision of the investment manager in accordance with the guidelines and objectives contained in this Investment Policy Statement, and consistent with each investment manager's stated investment philosophy and style as presented by the investment manager representatives to the Board.

Exercising investment discretion in regard to buying, managing and selling TSRS assets under the supervision of the investment manager, subject to any limitations contained in this Investment Policy Statement.

Promptly voting all proxies and taking all related actions in a manner consistent with the long-term interest and objectives of TSRS as described in this Investment Policy Statement. Each investment manager shall keep detailed records his or her voting of proxies and related actions and will comply with all regulatory obligations related thereto.

Communicating with the Board in writing regarding all significant changes pertaining to TSRS assets under the supervision of the investment manager or relating to the investment manager itself such as changes in ownership, organizational structure, financial condition, and professional staff of the investment manager. The Board must receive such communications in a timely manner after the change occurs.

Using at least the same care, skill, prudence, and due diligence under the circumstances then prevailing that experienced investment professionals acting in a like capacity and fully familiar with such matters would use in like activities for like retirement plans with like aims in accordance and compliance with all applicable laws, rules, and regulations

Managing the funds within the parameters of applicable laws and governmental rules and regulations.

To acknowledge and agree in writing as to the investment manager's fiduciary responsibility to fully comply with the objectives and guidelines set forth in this Investment Policy Statement or otherwise set out by the Board for such investment manager.

When possible, it is expected that active portfolio managers meet with the Board in person at least once per year. However, timing of meetings for all managers will be at the Board's discretion.

DUTIES OF THE GENERAL INVESTMENT CONSULTANT

The primary role of the Investment Consultant is to assist the Board in fulfilling its [investment related](#) responsibilities by providing information and analysis required by the Board to carry out its duties. This includes assisting the Board in developing and implementing a prudent process for monitoring and evaluating TSRS. The responsibilities of the Investment Consultant include:

Assisting the Board in the development, implementation and evaluation of investment policy for TSRS that reflects the Board's tolerance for risk and the objectives for TSRS.

[Assisting](#)~~To assist~~ the Board in the development, implementation and evaluation of an investment manager structure that provides appropriate diversification with respect to the number and types of investment managers retained by the Board.

Making recommendations to the Board regarding the identification of appropriate market benchmarks and peer groups against which each investment option should be evaluated.

Conducting a prudent investment manager search process, as needed, to identify appropriate candidates for review and selection by the Board.

Producing quarterly performance evaluation reports to assist the Board in evaluating investment policies and TSRS. Such reports will evaluate the performance and risk characteristics of each investment option then offered under TSRS and each investment manager relative to targets established in this Investment Policy Statement. The Investment Consultant will also evaluate the investment style of each manager to determine if the manager is fulfilling the role for which they were hired.

Monitoring the investment management firms and products employed by TSRS on an on-going basis and inform the Board of any developments that might impact performance or TSRS.

Educating the Board on investment issues that could impact TSRS.

DUTIES OF THE CUSTODIAN

The responsibilities of the trustee/custodian include:

Safekeeping of Assets – custody, valuation and accounting & reporting of assets owned

by the TSRS;

Trade Processing – track and reconcile assets that are acquired and disposed; and,

Asset Servicing – maintain all economic benefits of ownership such as income collection, corporate actions, and proxy notification issues.

DUTIES OF THE TRANSITION MANAGER

Transition management is the cost effective and efficient portfolio restructuring of institutional assets from single or multiple investment managers/asset classes to a new investment allocation over a short-term investment horizon. During the transition process, the transition manager is looked upon as a discretionary caretaker of the portfolio(s) to be liquidated and as the conduit for the funding of the target portfolio(s). The Board established certain guidelines with a transition manager and should include the following responsibilities.

Transition management (portfolio transition) services from the legacy portfolio(s) to the target portfolio(s).

The transition manager will act as a fully-discretionary fiduciary and will perform the transition with utmost care and prudence. The fund sponsor realizes that markets fluctuate and risks are inherent during the transition period. However, market forces do not absolve the transition manager from negligence and applying the highest level of care and prudence inherent in a fiduciary.

Minimize tracking error and maintain asset class (benchmark) exposure. During the transition period, the preservation of capital must be taken into consideration through the expert use of all sources of liquidity, namely: in-kind transfers (“cherry picking” of the legacy portfolio for the target portfolio), internal and external crossing networks, primary exchanges, non-displayed liquidity, and principal trades. The strategic and tactical deployment of cash, futures, ETFs, and other hedging strategies are included in the tools required to accomplish a smooth transition.

Before the transition, the transition manager should provide the fund sponsor a written portfolio transition (liquidation) strategy, including the timeframe required, to achieve the desired objective of liquidating the legacy portfolio(s) and building (and/or funding) the target portfolio(s).

During the transition period, daily reporting of all trade activity from commencement of the liquidation to the completion and full funding of the target portfolios should be available to TSRS.

After the completion of the transition, the transition manager should provide TSRS with a report on the outcome and results of the transition. The report should include relevant statistics (i.e., tracking error, costs, VWAPs, t-standard, etc.) and full trading/transaction reports.

Coordination of the firm's trading activity with investment managers (both legacy and target portfolios) and the custodial bank.

The transition manager must carry the appropriate coverage for errors and omissions and professional liability insurance.

The Service Providers in providing services to the Board and TSRS, will use at least the same care, skill, prudence, and due diligence under the circumstances then prevailing that experienced investment and administrative professionals acting in a like capacity and fully familiar with such matters would use in like activities for like retirement plans with like aims in accordance and compliance with all applicable laws, rules, and regulations. [The Service Providers understand and acknowledge through their provision of services that the Board relies on the information, advice and counsel provided by the Service Providers.](#) The list of services provided above for each Service Provider may be revised from time to time by the Board.

II. POLICIES AND PROCEDURS

A. ASSET ALLOCATION GUIDELINES

The asset allocation policy established by the Board for TSRS is intended to reflect, and be consistent with, the Board's return objectives and risk tolerance. The asset allocation policy, developed by the Board and the Investment Consultant after examining the historical relationships of risk and return among the asset classes in which TSRS is invested and the relationship between the expected behavior of TSRS's assets and liabilities, is designed to provide the greatest probability of meeting or exceeding TSRS's objectives at the lowest possible risk.

In establishing the Board's risk tolerance for TSRS, the ability to withstand short and intermediate-term volatility in various market conditions was considered. The Board also reviewed the long-term characteristics of various asset classes, focusing on balancing risk with expected return. Accordingly, the Board selected the following asset allocation policy.

	Percent of Total Pension Fund		
	Minimum	Target	Maximum
Equities:			
Large Capitalization	21%	26%	31%
Small/Mid Capitalization	4%	8%	12%
International	20%	25%	30%
Equities	54%	59%	64%
Fixed Income	22%	27%	32%
Real Estate	7%	9%	11%
Infrastructure	3%	5%	7%

The asset allocation target will be reviewed annually for reasonableness in relation to significant economic and market changes or to changes in the Boards' long-term goals and objectives. A formal asset allocation study will be conducted periodically to verify or provide a basis for revising the targets.

B. INVESTMENT MANAGER STRUCTURE

The Board has developed an investment management structure that emphasizes simplicity and cost control. The Board has employed the number of managers believed to provide appropriate diversification within each asset class. The table below lists the roles to which individual investment managers are assigned, the target allocation of assets for each manager and the rebalancing ranges.

Investment Manager Structure Allocations

Portfolio Style	Investment Manager	Percent of Total Pension Fund		
		Minimum	Target	Maximum
U.S. Equity:				
Large Cap Equity (Index)	AllianceBernstein	6%	8%	10%
Large Cap Equity (Enhanced Index)	PIMCO	2%	4%	6%
Large Cap Growth Equity (Active)	T. Rowe Price	5%	7%	9%
Large Cap Value Equity (Index)	BlackRock	5%	7%	9%
Mid Cap Equity (Active)	Champlain Investment Partners	2%	4%	6%
Small Cap Equity (Active)	Pyramis Global Advisors	2%	4%	6%
International Equity:				
Core Style (Active)	Aberdeen Asset Management	8%	10%	12%
Value Style (Active)	Causeway Capital Management	8%	10%	12%
Small Cap (Active)	American Century Investment Management	3%	5%	7%
U.S. Fixed Income:				
U.S. Investment Grade Fixed Income (Index)	BlackRock	11.5%	13.5%	15.5%
Non-Government Fixed Income (Active)	PIMCO	10.5%	13.5%	16.5%
Real Estate:				
Open-end Core Properties Fund	J.P. Morgan Asset Management	4%	6%	8%
Open-end Value Added Real Estate	J.P. Morgan Asset Management	1%	3%	5%
Infrastructure:				
North American Infrastructure	SteelRiver Infrastructure Partners	1.5%	2.5%	3.5%
European Infrastructure	Macquarie Investment Management	1.5%	2.5%	3.5%

C. REBALANCING POLICY

One essential component of a strategic asset allocation policy is the development and use of rebalancing ranges for the target allocation. The Board believes that systematic rebalancing should reduce portfolio volatility and increase portfolio return over the long term. The ranges specified in the table above are a function of the expected volatility of each asset class and the proportion of the total fund allocated to the asset class.

If TSRS experiences positive cash flow (*i.e.*, contributions exceed disbursements), new contributions will be directed to the under-allocated assets. If TSRS experiences negative cash flow, funds to make distributions will be withdrawn from over-allocated assets. If the cash flow is not sufficient to keep an allocation within the defined ranges stated above, then purchase or sale transactions are required to rebalance TSRS assets. The Board, at its discretion, may rebalance TSRS assets to the target level or to some point within the target range based on the relative cost of such rebalancing and such other factors as the Board determines.

Rebalancing actions are the responsibility of the [TSRS](#) Staff and shall be reported to the Board on a periodic basis. When asset allocations exceed the ranges indicated above the TSRS Staff will rebalance to the target level or to a point within the target range if the Board deems such action appropriate.

~~Staff is authorized and directed (in the normal course of events) to act in accordance with this policy. Where particular circumstances arise and Staff determines rebalancing is not prudent, because doing so may generate unnecessary costs or otherwise not be in the best interests of TSRS, a full report of the actions taken or not taken shall be made to the Board at the earliest opportunity.~~

TSRS' actual asset allocation shall be reviewed at the end of each month at a minimum and shall be based on current asset valuations. Estimated values may be used when current asset valuations are not available.

When asset allocations exceed the ranges indicated above the TSRS staff will rebalance to the target level or to a point within the target range if the Board deems such action appropriate.

Comment [CL1]: Is this authority – to elect not to rebalance – granted to Staff? There's a significant difference between the Staff implementing a rebalancing policy and the Staff making the decision whether and when rebalancing is prudent/required.

III. TOTAL FUND PERFORMANCE OBJECTIVES

The total fund has been designed to meet TSRS objectives as defined in the introduction of this document. The overall portfolio has been designed to provide the most appropriate structure and asset allocation from a risk and return perspective to meet this long term objective.

A. TIME HORIZON

The Board has adopted a time horizon of at least three to five-years for evaluating the TSRS Investment Program as a whole, each asset class and each investment manager relative to established benchmarks.

B. PERFORMANCE OBJECTIVES

Based on the analysis used by the Board to develop the asset allocation principles and investment manager structure policy set forth in this Investment Policy Statement, the Board has identified performance benchmarks and peer groups for each investment option and the separate mandates within each asset class.

Asset Class	Market Index ¹	Callan Style Group
Total Domestic Equity	Russell 3000 Index	Domestic Equity
Passive Large-Cap Equities	S&P 500 Index	Large Cap Style
Large Cap Value Equities	Russell 1000 Value Index	Large Cap Value Style
Large Cap Growth Equities	Russell 1000 Growth Index	Large Cap Growth Style
Mid Cap Core Equity	Russell Midcap Index	Mid Cap Style
Small Cap Core Equity	Russell 2000 Index	Small Cap Style
Total Non-U.S. Equity	MSCI ACWI ex U.S. IMI	International Equity
Core Non-U.S. Equity	MSCI ACWI ex U.S.	Non-U.S. Equity Style
Non-U.S. Equity Small Cap	MSCI ACWI ex U.S. Small Cap	Non-U.S. Equity Small Cap
Fixed Income	BC Aggregate Bond Index	Domestic Fixed
Real Estate	NFI-ODCE	Open-End Real Estate
Infrastructure	CPI+4%	NA

¹ The Investment Consultant has advised the Board that broader indexes such as the Russell 1000 and Russell 2000 are the most appropriate measures of success over the long run and that style indexes such as the Russell 1000 Value or Russell 2000 Growth are appropriate for measuring performance in the nearer term when investment managers have distinct growth or value styles.

The primary benchmark for evaluating the performance of TSRS is a Target Index consisting of a market index for the asset class weighted in accordance with the allocation target. The Target Index is:

S&P 500 Index	26%
Russell 2500 Index	8%
MSCI ACWI ex U.S. IMI	25%
BC Aggregate Bond Index	27%
NFI-ODCE	9%
CPI + 4%	5%

Over a rolling five year time period the Board expects TSRS to generate returns, after payment of all fees and expenses, which exceed the returns of the Target Index.

IV. INVESTMENT MANAGER GUIDELINES

TSRS's investment managers, unless otherwise noted in an addendum to this document or in a separate written agreement, are expected to adhere to the investment guidelines found in this document. Commingled investments, including but not limited to investments in mutual funds, trusts, limited liability partnerships, limited liability corporations, group trusts or other commonly used investment vehicles are expected to comply with the guidelines established in the governing documents or fund prospectus.

An investment manager should contact TSRS when it believes that deviation from the guidelines would be in the best interest of the pension fund. TSRS will consider the manager's request based upon the facts and circumstances at the time of the request. Approval must be obtained in writing before an investment manager deviates from the guidelines.

The Board and Staff will consider the comments and recommendations of consultants in conjunction with other available information in making informed, prudent decisions.

A. GENERAL GUIDELINES

The following broad guidelines reflect the parameters under which the Board desires to achieve its objectives:

1. The Investment Manager shall be given full discretion to manage the

assets under its supervision subject to these Investment Guidelines and the laws of the State of Arizona.

2. Investments will be of a prudent nature and consistent with the best investment practices.

B. PROHIBITED/RESTRICTED TRANSACTIONS

The following transactions are prohibited or restricted unless specifically authorized by TSRS in a separate written agreement:

1. Borrowing of money.
2. Purchase of securities on margin or short sales unless used for the purpose of risk control.
3. Pledging, mortgaging, or hypothecating of any securities except for loans of securities that are fully collateralized.
4. Purchase of the securities of the investment managers, its parent, or its affiliates.
5. Purchase or sale of futures or options for speculation or leverage.
6. Purchase or sale of commodities, commodity contracts, or illiquid interests in real estate or mortgages.
7. Purchase of illiquid securities.
8. Use of various futures and options strategies for hedging or for taking limited risks with a portion of the portfolio's assets.

C. SECURITIES TRADING

In making investment decisions the investment manager(s) should concentrate on total fund returns. The emphasis for securities trading shall be on "best execution"; that is, the highest proceeds to the fund at the lowest cost, net of all transaction expenses.

Managers should report brokerage allocation to TSRS as part of the routine reporting process. Managers also should inform TSRS annually regarding any "soft dollar" arrangements between the manager and the brokers and describe the

Comment [CL2]: Do we want to add here the prohibition on investments with companies involved with construction of border wall? Does the City follow the State rules on no investments related to state sponsored terrorism or the boycott of Israel?

services that are purchased with the soft dollars, if any, generated by pension fund assets. The managers also should regularly inform TSRS of the turnover within their portfolio and be prepared to document the rationale for any significant increases in portfolio turnover.

D. SECURITIES LENDING

TSRS may enter into securities lending agreements with the pension fund's custodian bank. The securities lending agreements should include credit approval, collateral management investment policies, and indemnification provisions that minimize the risk of principal loss.

E. PROXY VOTING

The investment manager(s) are responsible for their portfolios and for making their own assessment of the issues to be voted upon. Managers are expected to vote all proxies received so as to enhance the economic interest of the pension plan. In addition, the managers should maintain records as to the voting of proxies so that TSRS can monitor both the general voting procedures and the specific actions taken. Each manager should submit quarterly reports to the TSRS that addresses proxy voting activity during the prior quarter. In addition, the Board may direct how proxies should be voted on certain issues.

F. DIVERSIFICATION

The investment manager(s) are responsible for achieving a level of diversification in their portfolio that is consistent with their investment approach and their role in TSRS's overall investment structure. Managers may be retained for portfolios that concentrate in specific market segments. General diversification guidelines may be waived (upon request) for these "special purpose" portfolios.

V. GENERAL INVESTMENT OBJECTIVES AND GUIDELINES

A. EQUITY PORTFOLIOS

Each equity investment manager retained by TSRS will follow a specific investment style and will be evaluated against a specific market index that represents their investment style. In addition, in the case of active managers, investment results may also be compared to returns of a peer group of managers with similar styles.

This segment may include common and preferred stock, convertible securities, warrants, and cash equivalent securities. General equity guidelines for active managers include the following:

1. Holdings in any one economic sector (e.g., energy) should not exceed more than 4 times the weight of the sector in the benchmark index or 50% of the portfolio's market value, whichever is lower. If a sector has a greater than 50% weight in the index, the maximum exposure to that sector in the portfolio may be as high as its weight in the index. This restriction notwithstanding, the manager may invest up to 10% of the portfolio in a single sector.
2. It is expected that the portfolio will be invested primarily in stocks of companies headquartered in the United States. However, the manager also has discretion to invest up to 15% of the portfolio in securities of foreign issuers listed on a major U.S. exchange or traded on a major U.S. securities market (including ADRs and ADSs). In addition, the manager may invest in other depository receipts and shares as well as non-dollar denominated securities of foreign issuers traded on non-U.S. exchanges. Restriction of depository receipts does not apply to dual listed stocks.
3. Private placements and other restricted securities (including Rule 144A eligible securities) are eligible for purchase up to 10% of the market value for the total portfolio.
4. Equity managers are expected to run fully invested portfolios. In most situations, residual or transitional cash should be no more than 5% of the portfolio market value. If, in a manager's judgment, a higher level of cash is warranted for defensive purposes, the 5% limit may be exceeded, provided prior notification has been given to an authorized representative of the Board. Regardless of the level of cash in the portfolio, the manager's performance will be measured on the entire portfolio, not on only the equity

portion. Non-equity assets will be high-quality cash equivalent securities maturing within one year.

5. Larger capitalization portfolios should have a weighted average market capitalization in excess of the weighted average market capitalization of the Russell Midcap Index. Middle capitalization portfolio should have a weighted average market value similar to that of the Russell Midcap Index. Smaller capitalization portfolios should have a weighted average market capitalization less than the weighted average market capitalization of the Russell Midcap Index

B. NON-U.S. EQUITY MANAGER GUIDELINES

This segment may be invested in common and preferred stocks, convertibles, and warrants of companies headquartered outside of the United States.

1. Issues held in the portfolio should be traded on a recognized national stock exchange with adequate liquidity, trading volume, regulations, and breadth of securities. Investments in any single country market should not exceed more than 4 times the weight of the country in the benchmark index or 50% of portfolio assets, whichever is lower. If a country has a greater than 50% weight in the index, the maximum exposure to that country in the portfolio may be as high as its weight in the index.
2. No more than 35% of each manager's portfolio should be invested in "emerging markets" (i.e., markets that are not included in the Morgan Stanley Capital International Europe, Australia, and Far East index).
3. ADRs and other depository receipts are permitted in the portfolio.
4. Private placements and other restricted securities (including Rule 144A eligible securities) are eligible for purchase up to 10% of the market value of the total portfolio.

C. U.S. INVESTMENT GRADE FIXED INCOME MANAGER GUIDELINES

Permissible investments include marketable government, corporate, and mortgage-backed bonds and cash equivalent securities.

1. For passive investment strategies, it is expected that the portfolio will be managed to replicate the performance of the underlying index. Therefore, overall characteristics of the portfolio should be similar to that of the index (including, but not limited to quality, sector, and duration characteristics).

D. DIVERSIFIED FIXED INCOME MANAGER GUIDELINES

The manager will be allowed to invest in those securities listed in Appendix B of this document. The manager should adhere to the following sector limitations as they relate to the total portfolio:

Sector	Ranges
Mortgage	10% - 40%
Credit (Inv. Grade)	10% - 40%
High Yield	10% - 40%
Emerging Markets	10% - 40%
U.S. Treasury	0% - 30%
Non-US Dollar Denominated Fixed Income	0% - 30%
Foreign Currency Exposure	0% - 15%
Non-144A/Non-Reg S Private Placements	0% - 10%
Convertible Securities	0% - 5%

1. Duration of the total portfolio should be within 30% of the custom benchmark which is defined as 25% Barclays Mortgage, 25% Barclays Credit, 25% Barclays High Yield, 25% JPM EMBI Global.
2. The maximum position in a single issuer (excluding obligations of U.S. Government and its Agencies) should not exceed 5% of the portfolio's assets at current market value.
3. The portfolio should maintain an average quality of at least "BB+".
4. Money Market instruments must be rated in one of the two highest categories by a nationally recognized rating agency.
5. The minimum rating for individual issues should be CCC (based on market value) as rated by Moody's, S&P, or Fitch. Should an issue be downgraded below the minimum, the manager will determine the appropriate action to be taken.

E. ALTERNATIVE ASSET MANAGERS

The Board may employ funds, funds of funds, exchange traded funds, mutual funds or separate account management to pursue investments in "alternative assets" for the purpose of diversifying the market exposure of the Fund, to reduce correlations to equity and fixed income investments, and/or to enhance returns. These might

include, without limitation, managers or partnerships investing in leveraged buyouts, distressed debt, venture capital, natural resources, hedge funds, private real estate, infrastructure, or other asset classes/strategies. These investments will not generally fall within the guidelines established for the more traditional asset classes that make up the majority of the Fund's investments.

The Board shall consider certain criteria, including, but not limited to, the following in evaluating alternative asset managers:

1. Tenure and track record of management as a team;
 2. Expertise in targeted areas of investment;
 3. Diversification relative to other investments;
 4. Use of Leverage;
 5. Liquidity of investments;
 6. General Partner investment, fees and potential conflicts of interest; and
 7. Unrelated Business Income Tax.
-

VI. INVESTMENT MANAGER SELECTION AND EVALUATION

A. INVESTMENT MANAGER SELECTION

The Board will utilize a process for investment manager selection that embodies the principles of procedural due diligence. Accordingly, when selecting investment managers, the Board will employ a competitive search process, including the following steps or such other steps as the Board determines in the situation:

1. Formulation of specific investment manager search criteria that reflect the requirements for the investment manager role under consideration.
2. Identification of qualified candidates from the manager search database maintained by the Investment Consultant and such other sources as determined by the Board.
3. Analysis of qualified candidates in terms of:
 - a. Quantitative characteristics, such as CFA GIPS-compliant composite return data, risk-adjusted rates of return and relevant portfolio characteristics.
 - b. Qualitative characteristics, such as key personnel, investment

philosophy, investment strategy, research orientation, decision-making process, and risk controls.

- c. Organizational factors, such as type and size of firm, ownership structure, client-servicing capabilities, ability to obtain and retain clients, and fees.
4. Selection and interview of finalist candidates based on a due diligence report prepared for the Board by the Investment Consultant summarizing the analysis described above.

B. MANAGER COMMUNICATION GUIDELINES

TSRS will be in regular communication with their Investment Managers and will require informal and formal communication channels. There are four basic elements of the communications program: 1) on-site due-diligence meetings, 2) quarterly

reporting requirements, 3) monthly reporting requirements, and 4) event-driven reporting requirements.

C. MANAGER EVALUATION AND REVIEW

With the assistance of the TSRS staff and the Investment Consultant, the Board will evaluate each investment manager from a quantitative and qualitative standpoint on a quarterly basis. In evaluating all investment managers, the Board will consider qualitative factors likely to impact the future performance of the TSRS's assets managed by an investment manager in addition to current and historical rates of return.

The Board believes that it is appropriate to include "objective standards" designed to guide future decisions regarding investment managers.

1. Qualitative Review – The Board will evaluate qualitative factors relating to an investment manager, including:
 - a. Ownership changes (e.g., key people "cash out")
 - b. Key people leave firm
 - c. Conflict of Interest
 - d. Changes in investment strategy the investment manager was employed by the Board to implement
 - e. Investment manager is involved in material litigation or fraud
 - f. Material client-servicing problems

2. Quantitative Review
Long-term performance standards used by the Board should measure an investment manager's performance from inception and on a rolling five-year returns basis in relation to a broad market index or indices that the investment manager previously agreed to be measured against. If an investment manager fails to generate a return premium in excess of the agreed-upon index or indices, then, upon completion of appropriate due diligence or such other steps as the Board determines, the Board may decide to further evaluate their relationship with the investment manager.

Shorter-term performance will be measured in relation to an appropriate style index and "Peer Group". Each investment manager is to be measured

against the median return of a previously agreed-upon peer group of investment managers with similar investment styles.

Managers are expected to maintain their stated investment style and philosophy. Quantitative measures of investment style and philosophy include style mapping, style attribution analysis, and tracking error relative to the benchmark. TSRS with the assistance of the Investment Consultant will monitor these factors on a quarterly basis.

Notwithstanding any other provision of this Investment Policy Statement or TSRS, the Board retains the right to terminate the contract with, and the services provided to the Board by, an investment manager at any time. The Board believes that the decision to retain or terminate an investment manager or other Service Provider should be based on reasoned judgment and confidence in the investment manager's or other Service Provider's ability to perform in the future.

D. WATCHLIST PROCEDURE AND CRITERIA

A number of factors may contribute to a manager's over- or under-performance at any given time - market dynamics, investment skill, and/or pure chance. Given this uncertainty, it is unwise to terminate purely for lagging performance at any specific point. A Watch List will be utilized to identify managers whose performance and/or organization changes are cause for concern.

At the discretion of the Board a manager may be included on the Watch List based on the qualitative and quantitative criteria described in the manager evaluation and review section. Once a manager is placed on a Watch List, performance will be closely monitored and scrutinized. Additional actions could include Staff meetings with the manager or a formal re-interview of the manager by the Board. An update on each manager as well as recommendation from Staff and Investment Consultant to terminate or retain the manager must be made to the Board at subsequent meetings after inclusion on the Watch List. If the manager is not terminated, the manager shall remain on the Watch List subject to a subsequent recommendation by Staff and Investment Consultant as to the manager's ongoing relationship. Organizational issues that have been resolved in a satisfactory manner and improved performance relative to an index and or peers will be used as an indicator to remove a given manager from the watch list.

VII. INVESTMENT POLICY REVIEW

The Board will review this Investment Policy Statement at least every [two \[?\]](#) years to ensure that it remains relevant and appropriate. The Investment Policy Statement may be amended at any time by majority vote.

APPENDIX A

Benchmarks

Investment Allocation		Benchmark Indexes
<i>U.S. Equity</i>		
Large Cap	Large Cap Core	S&P 500 Index, Russell 1000 Index
	Large Cap Styles	Russell 1000 Growth and Value Indexes
Mid Cap	Mid Cap Core	Russell Mid Cap Index
	Mid Cap Styles	Russell Mid Cap Growth and Value Indexes
Small Cap	Small Cap Core	Russell 2000 Index
	Small Cap Styles	Russell 2000 Growth and Value Indexes
<i>International Equity</i>		
Developed		MSCI EAFE Index
All Country ex-U.S.		MSCI All Country World Index ex-U.S. Index
Small Cap		MSCI All Country World Index ex-U.S. Small Cap Index
Emerging Markets		MSCI EM Index
<i>Fixed Income</i>		
U.S. Investment Grade		Barclays Aggregate Bond Index
Diversified		Custom benchmark: 25% Barclays Mortgage Index 25% Barclays Credit Index 25% Barclays High Yield Index 25% JP Morgan EMBI Global Index
<i>Real Estate²</i>		
Private Real Estate		NCREIF ODCE Index
<i>Infrastructure¹</i>		
Private Infrastructure		CPI + 4%

² The Board recognizes that benchmarks for private investments are imperfect, particularly for illiquid investments. The Board will evaluate performance of each strategy, taking into consideration the market environment at the time of investment. The Board may also consider the performance of traditional equity and fixed income benchmarks as part of the evaluation process.

APPENDIX B

Diversified Fixed Income Manager Guidelines

The Manager will have discretion to invest in a broad array of public and private asset classes, instruments and investment vehicles including but not limited to:

- Money Market Instruments
- U.S. Treasury and Agency Notes and Bonds
- Municipal Bonds
- Corporate Securities
- Private Placements (Including 144As)
- Event-linked Bonds
- Bank Loans
- Yankee and Euro Bonds
- Mortgage-Backed Securities (including CMOs and REMICs)
- Mortgage Derivatives
- Asset-Backed Securities
- Preferred Stock
- Convertible Securities
- Non-U.S. Dollar-denominated Securities
- Emerging Market Securities
- Non-Leveraged Structure Notes
- Futures and Forwards (Including Exchange Traded Swaps Futures)
- Currencies
- Options, Caps and Floors
- Swaps
- Credit Default Swaps (Long and Short)
- PIMCO Pooled Funds



MEMORANDUM

DATE: February 22, 2019

TO: The Board of Trustees
Tucson Supplemental Retirement System

FROM: Art Cuaron
Pension & Benefits Administrator

SUBJECT: Board Member Term Limits and Addition of Elected Retiree Board Member

This item is continued from the November meeting and a follow up to the October Retreat. Trustee Wysocki has provided the attached letter for Board consideration regarding Board Member term limits and the addition of an elected retiree Board Member. I am seeking separate Board action on each agenda item.

Attachment: Proposal Letter from Jim Wysocki

To: Tucson Supplemental Retirement System Board
From: James C. Wysocki, Trustee
Subject: Proposals for Consideration
Date: November 14, 2018

As requested at the October TSRS Board Retreat, I am enclosing my comments in support of two proposals: first, changing the Board's governance structure and second, removing the term limits for elected representatives, thereby eliminating term limits for all board members.

1. Adding another elected representative

Approval of this proposal would add an elected representative with full voting rights to the TSRS board. This new trustee would represent the TSRS retired members, and raise the retirees' representatives from one to two. This change would consequently raise the number of board members from seven to eight.

There are several assumptions which govern the submission of this proposal.

- a. There are three principal interest groups within TSRS: active employees, retirees, and City of Tucson (COT) administration.
- b. Most of the time the self interests of these three groups are in agreement with one another, but not always.
- c. Unconscious biases may occur within the thought processes of each group, even among people of good will. These world views will color each representative's thoughts about certain topics, and they become accentuated under periods of stress (political, financial, organizational, etc.).
- d. These different viewpoints must be balanced among the board members through a thorough process of discussion and negotiation. Doing so generally combines board members' best thought processes. This reconciliation of conflicting positions should be able to best serve the long-term interests of the TSRS interest groups as a whole.

So the first reason to increase the size of the board by one is to ensure that board decisions receive the most thorough analysis possible. This would make it more difficult for one group of board members to pass their proposals too easily, which would then force the board into a more intensive coalition-forming effort among the three constituencies.

The second reason is that adding another trustee to the board would follow along with the ratio of retired members to active COT employees. COT administration's current method of cost control is to reduce the number of FTE employees, and given the City's current revenue sources and income streams this policy is unlikely to change in the foreseeable future. Thus the policy over the long term will accentuate the proportional decrease in the number of active employees vs. that of the retirees. I believe that this reality needs to be reflected in the composition of the board.

The next reason in favor of this proposal is that adding a retiree board member would represent a fairer distribution of elected representatives, with respect to the overall membership base. Otherwise the retirees would be underrepresented.

Additionally, the change would thereby better balance the overall self-interests of the three interest groups. Currently employed and retired COT employees would have an equal influence within the board. Furthermore, the combined influence of the two employee groups would match that of COT's administration.

Since a proposal would fail with a tied vote, if the COT employee's representatives and the management representatives differed on an issue, the change forces the interest groups (i.e., management, and both the active and retired sectors of the labor force) to talk more and negotiate to a mutually-acceptable resolution.

This revised governance structure would be more difficult to manage politically, but it should result in a more thorough analysis, review, and approvals process. This should enhance the board's ability to better ensure the long-term success of the retirement fund.

2. No term limits

There are two observations that drive this proposal.

First, it can be observed from looking at other boards of directors, that in general the experience and judgment that is derived from having conscientious, seasoned, experienced board members typically can lead to a more effective oversight process.

Second, it can also be observed that the overall interest level of active COT employees in serving on oversight boards of any kind has diminished over time. To my knowledge, during at least the last two recruiting cycles no eligible employee wanted to stand for election to the TSRS board. Nor did any employee nominate another for election to the board. The board therefore had to resort to executive action to fill a vacancy. This is not a desirable situation in which to be.

In the face of the demonstrated lowering of interest levels and participation in TSRS board activities over time, especially among COT's active employees, it has become increasingly difficult to find people who are willing to serve on the board. The elected representatives fully participate in its activities, and their insight and judgment are strong assets. But this only goes so far, since their participation is limited to two successive terms in office. If this proposal were adopted, the TSRS board would not lose the experience and good judgement of its currently term-limited trustees, just at the time when they were getting really good at what they do.

The removal of term limits could also equalize the experience level of the permanent and elected representatives over time, as time-in-service generally increases one's proficiency in discharging the duties of a position. The change would compensate for the low interest in TSRS board participation by the active COT employees.

My request:

In light of the above discussion, I am requesting that both proposals be added to a future board agenda, that their merits and demerits be debated at that meeting, and that the two proposals be voted on for their approval or disapproval. My thanks to the board for their consideration of this request.



MEMORANDUM

DATE: February 22, 2019

TO: The Board of Trustees
Tucson Supplemental Retirement System

FROM: Art Cuaron 
Pension & Benefits Administrator

SUBJECT: Update on Internal Audit of Fraud Prevention Mechanisms

PURPOSE:

Internal Audit received a request from the Tucson Supplemental Retirement System Board of Trustees (Board) to review fraud prevention mechanisms in the Pension Division of the Human Resources Department and note any combination of factors which might indicate deficient internal controls.

CONCLUSIONS PRESENTED BY INTERNAL AUDIT:

- 1) The processing of transfers out of the BNY Mellon investment and liquidity accounts lacks review, segregation of duties and adequate controls to mitigate risk to an acceptable level.
- 2) Bank statement reconciliation duties, including verification of transfers and transactions, are not in place for BNY Mellon investment and liquidity accounts.
- 3) The benefit payment process lacks segregation of duties and includes high risk practices.
- 4) Changes to member data lack segregation of duties and review processes.

OBSERVATIONS AND RECOMMENDATIONS:

- I. **Objective A:** Review fraud prevention mechanisms and segregation of duties related to wire transfer and authorization process.

Conclusion #1: The processing of transfers out of the BNY Mellon investment and liquidity accounts lacks review, segregation of duties and adequate controls to mitigate risk to an acceptable level.

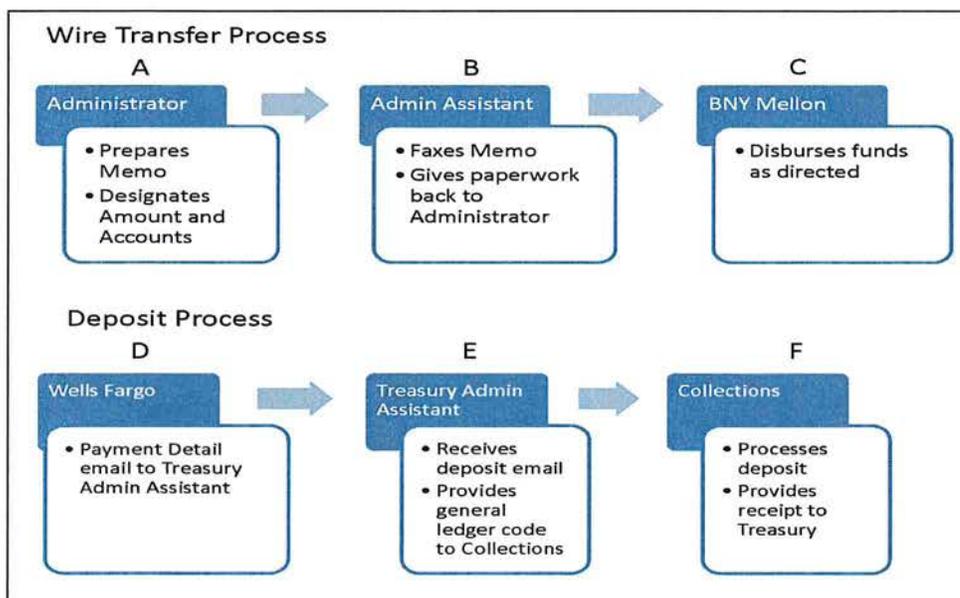
Observation: The following current practices heighten the risk of deposits being processed into non-City accounts.

- Single signature authorization of transfers out of BNY Mellon accounts without restrictions on where funds are deposited.
- Transfer requests are not reviewed or approved by anyone other than the requestor.

- Deposit bank information and account numbers are not verified by anyone other than the requestor.
- The only notification to Treasury is from Wells Fargo upon receipt of deposit.

The Pension Administrator prepares a transfer request which is sent to BNY Mellon by the Pension Administrative Assistant. The request and notice of submission are returned to the Pension Administrator. BNY Mellon completes the transfer as directed. The transfer should go from BNY Mellon to Wells Fargo. Wells Fargo sends receipt notice email to the Treasury Administrative Assistant when funds are received. The Treasury Administrative Assistant identifies the deposit using the description provided on the Wells Fargo receipt notice, and then provides the general ledger information to the Collections Division for entry into the accounting system. This process is displayed in **Figure 1**.

Figure 1 – Current Transfer and Deposit Process



Recommendations:

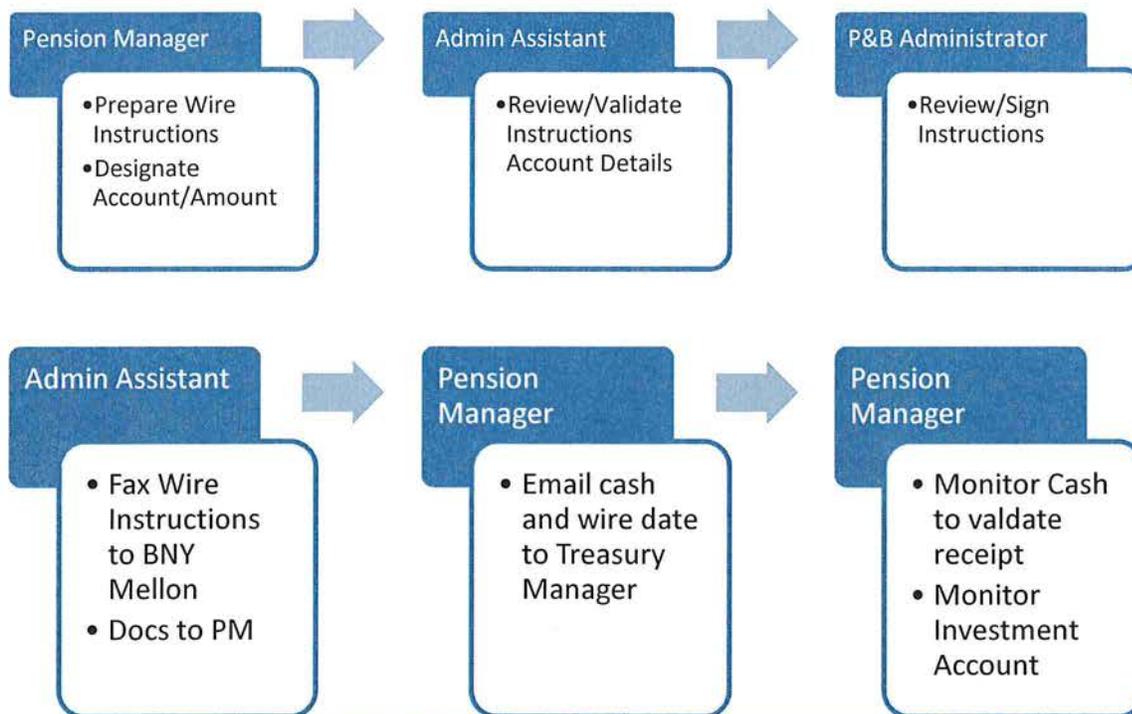
- Enact restrictions with BNY Mellon allowing authorized transfers to only deposit into a pre-designated account. This can be accomplished on BNY Mellon's signature card under 'Asset Transfer and Investments – Other Restrictions' section, with the specific restriction being applied to transfers to an outside entity. Adds control to **Figure 1 step C**.
- After transfer request is sent, Pension Administrative Assistant provides notice of pending deposit to Treasury. Once deposit is processed, Treasury provides receipt copy to Pension. This allows Treasury to track deposit status and Pension to track general ledger classification. Adds controls to **Figure 1 steps B & E**.

Management Response and Action Plan:

TSRS will adopt recommendations A and B as presented above. The implementation of the new process will be complete on or before August 31, 2018.

Update:

TSRS staff has new employees and follows this practice now:



Note: Pension Manager is NOT an authorized signer to disburse funds.

Conclusion #2: Bank statement reconciliation, including verification of transfers and transactions, are not in place for BNY Mellon investment and liquidity accounts.

Observation: Detailed bank reconciliations are not being performed. A Financial Operations Senior Financial Accountant records summarized bank transactions into the City's general ledger on a quarterly basis in order to produce quarterly financial statements. The existing process does not include reconciliation processes beyond adjusting general ledger totals to match bank statement ending summary amounts; this method is not sufficient to find errors and omissions. Also, the current process does not include review of material transactions for accuracy/validity.

Recommendations:

- Monthly reconciliation and review of BNY Mellon statements to the supporting transfer memos should be performed by staff not involved in the transfer and receipt process. BNY Mellon's online system includes detailed transaction reports. These reports include sections related to receipts from other banks and disbursements to other banks which should be utilized in the reconciliation and review process.

- b) Existing quarterly process should be expanded to include a detailed comparison of general ledger transactions to bank account activity in order to identify omitted transactions, transactions in process, errors and reconciling items.

Management Response and Action Plan:

On or before August 31, 2018, TSRS will meet with Accounting staff in Business Services to discuss the reconciliation process and the possibility of adopting the recommendations identified above. An update will be provided to the Board and the Internal Audit division based on the discussion with Accounting Services.

Update:

As previously reported, Accounting Services has agreed to perform a quarterly bank reconciliation. This was to begin effective 1/1/2019, however, Accounting staff continues toward the completion of the City's annual Comprehensive Annual Financial Report and has not started on the reconciliation. They will initiate the quarterly reconciliations upon completion of the CAFR.

- II. **Objective B:** Review fraud prevention mechanisms and segregation of duties related to the benefit payment process.

Conclusion #3: The benefit payment process lacks segregation of duties and includes high risk practices.

Observations: The same individual that updates member payment records mails the checks generated from those records. Also, check information is modified in a secondary system and used to produce duplicate check numbers with altered payees. Altered checks are disbursed and do not match the payee listed in the system of record.

Benefit payments were analyzed in two main categories; recurring and refund/rollover. Both types of payments are generated through a system batch process.

Recurring benefit payments are generated once a month. Checks are generated by Human Resources – Payroll Division based on system records maintained by Pension Management Analyst. Payroll Division accesses Automated Bank Account Transfer (ABAT) system report to obtain batch total and submits a wire transfer request to Treasury. As changes to employee information or calculated amounts are received, the Pension Management Analyst updates system records and keeps physical file folders of monthly changes. Once checks are printed, Pension Management Analyst takes custody of the checks, verifies items in the monthly change file to printed checks and then mails checks. This process is displayed in **Figure 2**.

Refund/Rollover payments are generated in supplemental payroll runs that occur every other week. Checks are generated by Human Resources – Payroll Division based on system records maintained by Pension Management Analyst. As refund and rollover requests are received by Pension, a Payment Authorization Packet is created.

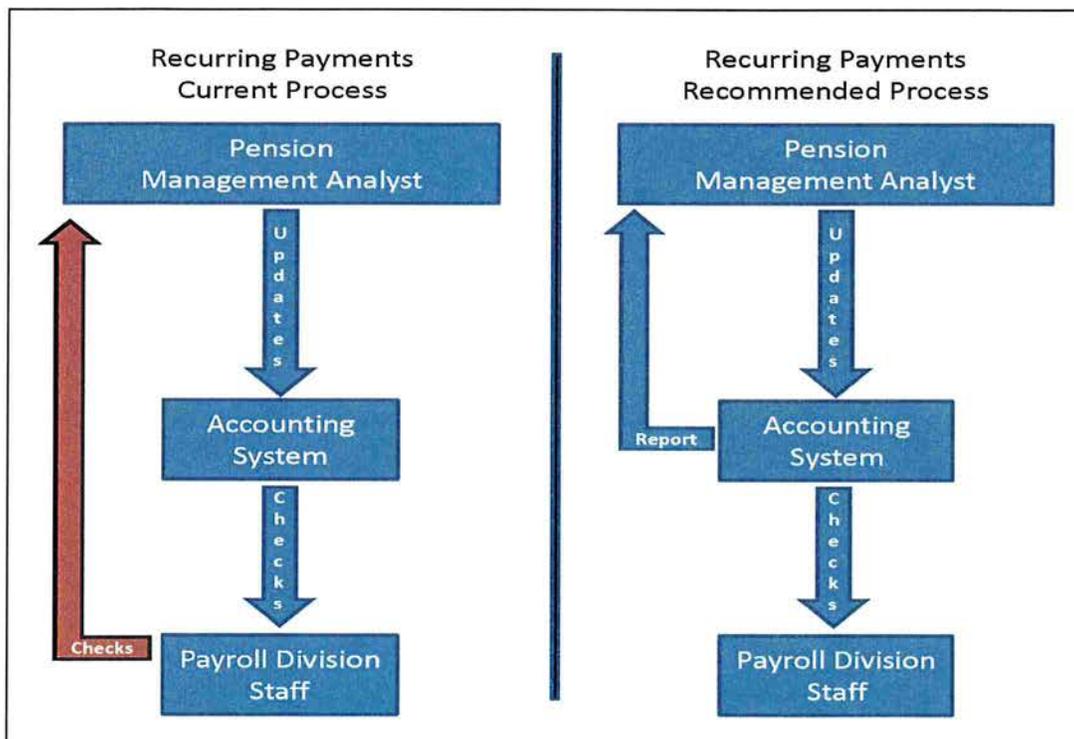
Rollover checks requested to be made payable to a financial institution are initially generated through Payroll as payable to an individual. These checks are then forwarded to Accounting Services Division - Office Assistant, who accesses a secondary system called 'Paybase' to generate a second check with identical check number and amount, but with the payee changed from the individual to the financial institution. Accounting Services then forwards financial institution check to Pension and individual check to Payroll. Payroll attaches individual check to copy of payment request and puts in file.

Pension Management Analyst takes custody of printed refund/rollover checks, verifies information against Payment Authorization Packets, mails checks and files packets.

Recommendations:

- a) Custody of recurring checks should be removed from the staff responsible for updating payment records. Checks can be held by Payroll Division, to be mailed upon verification performed by Pension Division staff. Pension staff can perform verification against system reports generated with payment batch before providing Payroll with authorization to mail checks. This is displayed in **Figure 2**.

Figure 2



- b) Modifications and changes to checks should be processed and documented in the main accounting system. Interviews with staff indicated a system change currently being designed to accomplish this through use of payment documents processed directly in the main accounting system that go through a system approval process and a subsequent document to adjust payroll information to reflect the payment. This change is expected to be in place August 2018.

Custody of refund/rollover payments should follow the recommendation for recurring payments displayed in **Figure 2**.

Management Response and Action Plan:

With respect to recommendation A, above, TSRS will meet with Payroll and implement as prescribed above by 8/31/18.

In regard to recommendation B, and as noted above, the City's ERP is undergoing a massive version upgrade. The upgrade will bring enhancements that will enable TSRS to implement recommendation B above. This will eliminate the current process and provide for enhanced internal controls. The ERP upgrade is expected to go-live beginning August 1st. As of the date of this report, TSRS has had meetings with systems staff to discuss the enhancements and future functionality but testing has not yet begun. Staff will provide an update to the Board and Internal Audit as the time line for testing and go-live become clear.

Update:

TSRS staff has met with ERP staff and the upgrades to the system went live in October of 2018. ERP has launched this improvement in the production environment for the week of 2-15-19. The new process is:

- 1. the Management Analyst requests a vendor be set up,*
- 2. the Management Analyst enters the payment information to the retirement account institution,*
- 3. the information is reviewed by the Pension Manager,*
- 4. the transaction is processed and mailed by AP,*
- 5. the Management Analyst updates the separated employee HRM file to document the transaction*
- 6. The Pension manager reviews the updates*

We believe this should fully address the concerns noted.

- III. **Objective C:** Review fraud prevention mechanisms and segregation of duties related to member data management.

Conclusion #4: Changes to member data lacks segregation of duties and review processes.

Observations: A sample of 93 Payment Authorization Packets, selected from October 2016 through March 2018, were found to have 43 verification omissions. Some of these omissions coincided with staff vacancies and new staff appointments.

Changes and updates to member bank account information are entered into the accounting system by the Pension Management Analyst. These updates to the system table generate a document that becomes final submitted upon entry. Upon final submission, member records are changed. These records are picked up during system batch payment processes detailed in section II, above.

Member data and payment calculation documents are compiled by the Pension Management Analyst into Payment Authorization Packets which include a review and internal control checklist as the cover page. The checklist includes an area for the Pension Administrator to verify check amounts to calculations and system inputs.

Recommendations:

- a) Changes to member information, especially bank account / direct deposit information, should be verified by someone other than the person updating information. Verification should occur before payments are processed. This verification can be automated to provide a documented audit trail of changes to member data and approval of those changes. The existing accounting system allows for the generated documents to go through an electronic approval process before final submission, this tool should be utilized.
- b) The review and verification checklist that is in place for Payment Authorization Packets should be followed. Should any one of the staff verification levels be vacant, a suitable backup should be designated.

Management Response and Action Plan:

TSRS staff will explore the possibility of adopting recommendation A as described above. A meeting has been requested with systems and Payroll (7/17) to determine what needs to be done to implement document workflow in HRM/Advantage and how any change to the existing process would impact the timing of the Payroll Pension run. We will also examine how this change would impact the TSRS ability to service our active and retired membership. We anticipate final resolution of the feasibility to implement recommendation A to be complete by August 31, 2018.

Update:

TSRS staff has met with Payroll staff and has not been able to implement the recommendation. We have not been able to develop a system document which can use workflow rules to ensure electronic review and approval prior to posting. As a compensating control, the process for refunds or initiation of retirement includes documentation of the direct deposit instructions and system setup.

With regard to recommendation B, staff will revise the current verification checklist and corresponding procedures to include random periodic verifications of the Payment Authorization Packets including the calculations used to determine payment amounts.

Update:

TSRS staff has adjusted its process to ensure that at least two people are reviewing each checklist prior to the commencement of payments. Due to the continued turnover in staffing the form itself has not been updated to reflect the change in responsibilities but the staff has been trained to ensure segregation of preparation and review functions.



MEMORANDUM

DATE: February 22, 2019

TO: The Board of Trustees
Tucson Supplemental Retirement System

FROM: Art Cuaron
Pension & Benefits Administrator

SUBJECT: Consideration for TSRS to Hire External Legal Counsel

This item is informational and a follow up from the October retreat. No Board action is required at this time.

Section 28-19 of the Tucson City Code provides the City Attorney's Office with the authorization to procure and award the services of external legal counsel. I have attached the relevant section of the Code for the Board's review. The City's Chief Deputy City Attorney, Dave Deibel, will be present to discuss this item with the Board.

Attachment: Sec. 28-19. Contracting for Legal Counsel

Sec. 28-19. Contracting for legal counsel.

Sec. 28-19(1). Authority. For the purpose of procuring the services of legal counsel, as defined by the laws of the state, contracts for the services of legal counsel shall be awarded with the authorization of the city attorney except as otherwise provided by law.

Sec. 28-19(2). Conditions for use. Unless determined by the city attorney that direct selection is in the best interest of the city, the services of legal counsel shall be procured in accordance with this chapter.

(Ord. No. 10404, § 1, 5-15-07)

The Epic Clash Between Bonds and Stocks Is Coming Back

By Justina Lee

There Are Hazards at Every Turn for This Shaky U.S. Stock Rally

Photographer: Michael Nagle/Bloomberg

Photographer: Michael Nagle/Bloomberg

Want the lowdown on European markets? In your inbox before the open, every day. [Sign up here.](#)

It's the latest chapter of the ever-raging battle between stocks and bonds.

Treasury yields signal a brewing economic slowdown while equity bulls are cheering the business cycle. The schism is testing the mettle of investors mulling whether to ride or fade the \$3 trillion new-year U.S. stock rally.

The S&P 500 is on track for the best two-month run since 2010, fueled by the most economically sensitive sectors, even as 10-year U.S. Treasury yields hover close to the lows plumbed during the recent global market meltdown.

Growth angst is feeding haven demand for longer-dated debt, while the U.S. futures market prices in interest-rate cuts. In Europe, benchmark bund yields are trading close to the lowest in more than two years, at the same time that equities have climbed near a four-month high.

It's all adding to fears that the fast re-rating of stocks after the overwrought correction in 2018 has gone too far.

Bullish stock moves sit awkwardly with bets the Fed will be forced to cut rates

"Investors are getting a little bit ahead of themselves," said Simon Wiersma, Amsterdam-based investment manager at ING Bank NV's wealth management unit. "There's a lot of optimism, but that could turn quite soon if economic figures are not better than they are right now."

Dovish monetary signals in the U.S. and Europe have spurred a rush to risk even as Nobel laureates to corporate chief financial officers fret the prospect of a [contraction](#). Cyclical sectors have rebounded against defensives, while more volatile and leveraged shares have regained favor -- in concert with a spirited rally in risky corporate bonds.

European and Asian shares climbed on Wednesday, following an advance in U.S. stocks on encouraging earnings. Fed minutes due later in the day will shed more light on the central bank's assessment of the U.S. economy after it signaled a pause to tightening.

Enter Goldilocks

The stock "market has been pushed higher by hope rather than actual improvement

in the economic outlook,” Ned Davis Research analysts Tim Hayes and Anoop Nath wrote in a note. “Among the signs of deficient fundamental support is the lack of rising bond yields.”

Low bond yields threaten the usual suspects like financials and, to a lesser degree, industrials and energy given their typically stronger relationship with interest-rate markets, according to the strategists. Yet, these sectors have rallied at least in line with the S&P 500 this year.

The most sanguine [explanation](#) is that shares are still coasting on cheaper valuations and a Goldilocks economy that’s cool enough to justify a dovish Federal Reserve but warm enough to support earnings. Add signs of progress in U.S.-China trade talks, and you have a case to be bullish.

European cyclicals are recovering even as economic data worsen

But it all sits awkwardly with the Wall Street maxim that the smart money in Treasuries is a lead indicator for the cycle -- and the disconnect looks extreme.

The S&P has jumped more than 10 percent since the U.S. central bank chief Jerome Powell said early January that the Fed will be [“patient”](#) with the tightening trajectory. That compares with an average 11 percent six-month return fed by monetary pauses historically, according to Credit Suisse Group AG.

U.S. cyclicals also appear to be pricing in a stronger economic growth outlook than supported by the data -- one reason the bank’s strategists led by Andrew Garthwaite downgraded the asset class to neutral this week.

Over at KBC Asset Management NV, which oversees about 100 billion euros (\$113 billion), Dirk Thiels has also shifted to neutral on equities in the wake of the gravity-defying bull advance.

“Some of the rally is a bit of a correction for the exaggerated moves we saw in December,” the head of investment management said from Brussels. “But basically it’s a bit worrying when the economic signs are worsening and the stock markets are rallying.”

— *With assistance by Luke Kawa, and Tanvir Sandhu*

(Adds Wednesday market moves in third paragraph under first chart.)

LDI Strategies and Preparing DB Plans for Recessions | PLANSPONSOR

By John Manganaro

During a webcast hosted by PGIM Fixed Income, speakers from across the organization dove deep into the current risk sources and return opportunities the firm sees in the equity and fixed-income markets, using the analysis to argue in favor of defined benefit (DB) plans adopting liability-driven investing (LDI) strategies.

The speakers included Tom McCartan, vice president of liability-driven strategies; Robert Tipp, chief investment strategist and head of global bonds; and Richard Piccirillo, senior portfolio manager of multi-sector strategies. While the group [did not predict a recession](#) is imminent in the U.S., they shared some sophisticated analysis of interest rate trends that may give pension plan sponsors reason to stop and think about the amount of risk exposure their portfolio has.

According to the speakers, “adopting LDI” in basic terms means changing the investing objective from maximizing returns to instead focus on [meeting a specific funding goal over a specific time period](#). Setting such guidelines can allow a pension plan sponsor to better tailor the risk exposure to avoid large losses. This safety may potentially come at the expense of missing some of the upside, but that is not really significant if the pension plan is remaining more stable and is able to smoothly and surely pay out the benefits owed to beneficiaries.

The speakers said LDI is growing even more important as pension plans broadly move into a phase where they are not growing but instead need to be focused on meeting their benefit obligations. They said that plan sponsors must acknowledge that, when there is eventually another downturn, it is going to be harder for market authorities and governments around the world to revive the economy. This is because of all the easing that has happened since the Great Recession.

The speakers said debt levels remain incredibly high around the world, and so there is very little room for governments to stimulate the global economy through some of the traditional means if/when the next recession occurs. They noted how the U.S. has started, for its part, to tighten its monetary policy in response to strong growth and record-low unemployment. They said this was one of the main drivers of the equity market volatility of 2018 and early 2019.

The PGIM Fixed Income team had a few practical recommendations for pension plan sponsors to consider when it comes to adopting LDI and “getting off the funded status rollercoaster.” These include raising the pension plan’s interest rate liability hedge ratio to help mitigate interest rate risk; reducing spread duration and/or risk asset exposure to help lower funded status drawdown risk; moving from a market benchmark to a liability cash flow benchmark to help manage credit migration risk; and treating risk allocations and interest rate hedge ratios as distinct decisions to help achieve a high interest rate hedge ratio with desired risk asset exposure. Such strategies can be complex to design and operate, the speakers admitted, and will likely require the engagement of a specialist consultant or investment provider.

Importantly, the speakers emphasized that the move to an LDI strategy is a serious decision requiring a diligent planning and execution process. They said plotting the rollercoaster exit strategy first requires that sponsors identify the primary risks to funded status. For most corporate defined benefit pension plans, they are declining long-term U.S. interest rates; tightening long-dated corporate spreads; credit migration in investment grade corporate bonds; and falling risk asset prices, principally in the U.S. and international equity markets.

The speakers concluded that pension plans have benefited from the rise in interest rates and strong equity markets following a long period of easy monetary policy and, more recently, the 2016

presidential election, fiscal stimulus and corporate tax reform. The said the fundamental question for pension plans to ask today is, "Should you stay on the funded status rollercoaster or move toward a recession-ready LDI strategy?"

These 10 emerging markets will dominate the global economy in the next decade

Callum Burroughs



AP Photo/Manish Swarup

- **Most of the top 10 fastest growing emerging market economies are in Asia, in line with expectations that the region is the future of the global economy.**
- **India claimed top spot in the rankings compiled by Oxford Economics.**
- **The rankings take into account factors beyond just GDP figures and also look at funding availability and workforce growth.**

Rankings of the biggest growth stars in emerging markets sees India take top spot in the next decade, according to Oxford Economics.

Figures compiled by the research firm indicate that Asian economies will be the most successful emerging markets by 2028 with only one South American country and no African countries in the top 10.

Oxford Economics cites the need for emerging markets to undergo rapid capital accumulation through domestic financing to succeed alongside strong GDP and robust total factor productivity (TFP) growth.

A sizeable export sector is seen as a key factor in avoiding the middle-income trap — wherein countries get stuck at one size for long periods of time — with the main way of aiding this coming from investment in innovation.

According to Oxford Economics, capital deepening stems from investment, the bulk of which has to be financed by domestic saving.

Here are the 10 fastest growing emerging market economies:

Oxford Economics have South Africa as the 10th fastest emerging market economy on the list with average annual GDP growth of 2.3%. It's the only African country on the list, and suffers from a lack of capital deepening, a statistic designed to understand the value of the labour pool.

Europe's only entry in the top 10 is Poland. The country has been in a remarkable growth cycle since its admittance to the European Union, with the Eastern European country expected to maintain 2.5% GDP growth with high capital deepening courtesy of strong access to the European banking sector and its use of the euro.

South America's only entry on the list is Chile with the country deemed to be a more attractive emerging market growth story than nearby Argentina and Brazil. The country is a mining giant and looks set to be at the forefront of the lithium battery market going forward. Oxford economics predicts a 2.6% GDP average growth rate.

The so-called "land of smiles" is one of the world's fastest growing emerging markets with 2.9% GDP growth expected. Tourism makes up around 11% of GDP output with numbers increasing every year. In the previous decade Thailand's labour productivity growth was below the trend for comparable emerging markets' GDP growth, but this is expected to change going forward.

Located at the crossroads between Europe and Asia, Turkey is an emerging market tour de force with its rollercoaster currency and unstable markets a hallmark of the country. However, Oxford Economics thinks the country will grow at around 3% a year. Turkey's comes in lower for capital deepening as a result of its reliance on foreign funding, which saw a crisis in 2018 during the lira's turmoil.

Previously restricted to being a major exporter of agricultural goods and commodities, the Malaysian economy is another South East Asian power on the rise. Impressive 3.8% GDP growth isn't matched by the country's TFP growth, which is the lowest in the top 10.

Perhaps a surprise at number four is China. The country's rapid transition away from being an emerging market means its GDP growth is expected to slow in the next decade, while its debt levels [remain](#) high. China's huge banking market means it has the joint highest capital deepening figures in the top 10 and 5.1% GDP growth.

Comprised of thousands of islands in the Pacific, Indonesia's growth story is one of the world's most compelling with the country set to be a powerhouse of the global economy in the coming years. Blessed with plentiful natural resources and increasingly less reliant on foreign funding, Indonesia looks set to be a key player in the future with growth of 5.1%.

Currently led by the brash strongman Rodrigo Duterte, the Philippines are, much like Indonesia, a large island group with huge economic potential. The Philippines is set to have the highest increase in its labour force of any of the top 10 which, alongside its GDP growth of 5.3%, means it will be one of the world's fastest growing economies sooner rather than later.

India tops the charts with its massive GDP growth of 6.5%, and it's likely to be the world's largest economy one day not just within emerging markets. The country has a huge population and when fully utilized it will be an unshakeable force across global markets.

More: [Features](#) [BI Select](#) [GDP growth](#) [EM](#)