

Callan



Chicago Teachers' Pension Fund

Executive Summary

December 31, 2017

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**Public School Teachers' Pension and Retirement Fund of Chicago
Performance Evaluation Executive Summary
Fourth Quarter 2017**

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Total Fund Commentary

The Fund was valued at \$10.9 billion at the end of the fourth quarter, representing an increase of \$158.6 million from September 30, 2017. Investment gains of \$437.9 million exceeded net cash outflow activity of \$279.3 million during the quarter. Overall, the portfolio's asset allocation was close to its strategic targets at quarter-end, reflecting a slight underweight to private equity and real estate.

Stock markets hit a number of record highs in 2017, adding trillions of dollars to global market capitalization. U.S. consumer confidence remained near a 17-year high and unemployment at a 17-year low. At the same time, geopolitical concerns, domestic political issues and other noteworthy news items littered the headlines but had little effect on investors' complacency. Risk appetite was strong, fueling returns for traditional and non-traditional assets. In the public realm, emerging market equities outperformed developed markets; within fixed income, high yield corporate bonds posted the best returns. Cash, returning less than 1%, was the worst place to be in 2017. Commodities fared well, bolstered by oil prices and copper, which gained about 30% for the year on strong global growth and demand from China. The year closed with the rushed passage of the largest tax reform bill in 30 years, lending further support to stocks given the significant cut in corporate tax rates. Estimates as to the likely effect of the package on U.S. annual GDP growth vary from "negligible" to upwards of 3%, and the package is expected to add \$1.5 trillion to the budget deficit over 10 years.

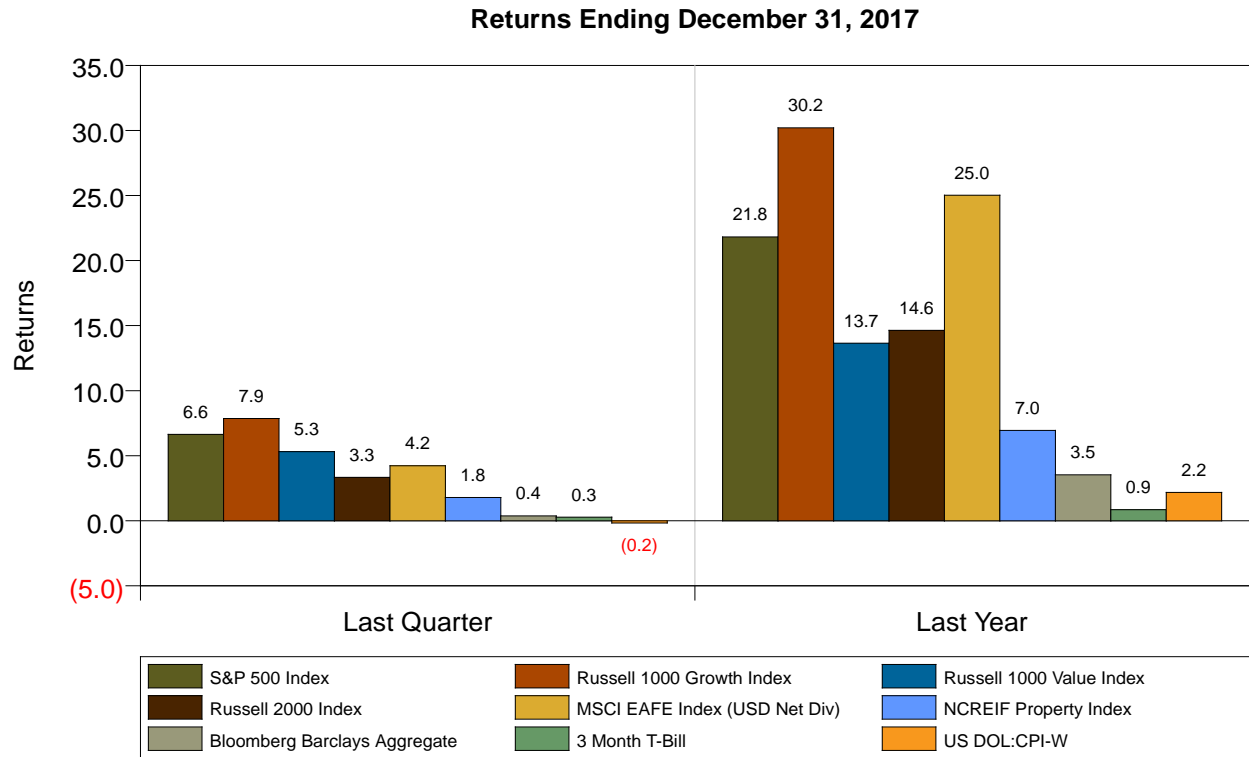
In this environment, the Fund had a net return of 4.06% over the quarter (4.13% gross of fees), underperforming the Policy Target by 10 basis points. However, the Fund ranked in the top 20% of its peers over the quarter, and in the top 12% over calendar-year 2017. We continued to observe a considerable divergence between the performance of domestic and international stocks, as well as style divergence between value and growth over calendar-year 2017. International stocks outperformed domestic stocks by a modest margin and growth stocks outperformed their value counterparts over the year. Though manager-specific performance was varied relative to their respective benchmarks, as a collection, they added value in what can be described as a high momentum market environment. The overall public equity portfolio underperformed by a small margin over the fourth quarter, but posted favorable results over the year, net of fees. Additionally, the fixed income portfolio demonstrates exceptional performance relative to benchmarks over all periods measured.

The Fund posted competitive performance versus the Policy Benchmark over all longer periods measured, ranking in the top third of its peer group over the trailing 5-, 7- and 10-year periods.

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Select Market Returns



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QUARTERLY REVIEW

- **Fourth Quarter, 2017 Investment Performance Update:**
 - **Performance:** For the fourth quarter, the Fund posted unfavorable performance relative to the market benchmark, but outperformed 80% of its peers (20th percentile ranking).

- **Watch Status Report:** The following managers are on the Watch List:
 - Ivy: Included on the Watch List due to inconsistent rolling three- and seven-year performance relative to benchmarks, and deteriorating risk-adjusted performance. The concentrated nature of this portfolio makes it susceptible to prolonged periods of underperformance and high tracking error. Over calendar year 2017, the portfolio outperformed the Russell 1000 Index by 23 basis points. Continue to monitor this strategy, but expect it to continue to exhibit high tracking error going forward.
 - Zevenbergen: Included on the Watch List due to inconsistent rolling three-year and seven-year performance relative to the market index and peer group median and missing the five-year down market capture criteria. This is also a high conviction strategy, which is susceptible to high tracking error relative to its benchmark. Over calendar year 2017, the strategy outperformed the Russell 3000 Growth Index by 579 basis points. It is recommended that the Board remove this manager from the watch list, but expect it to continue to exhibit high tracking error going forward.
 - LM Capital: Included on the Watch List due to personnel turnover.
 - Channing Capital: Included on the Watch List due to personnel changes.

- **RFP Activity:** The following RFPs have been approved by the Board and are currently in progress:
 1. Active Small Cap Growth Equity
 2. Private Non-Core Real Estate
 3. Open-End Infrastructure
 4. Private Equity MWDBE
 5. Private Equity Direct Fund

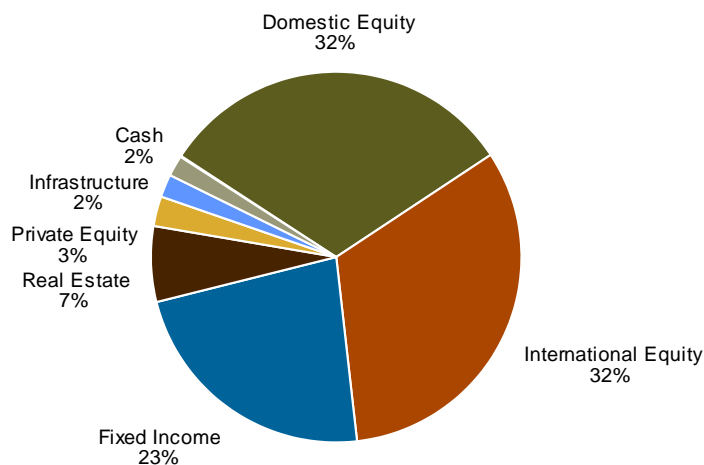
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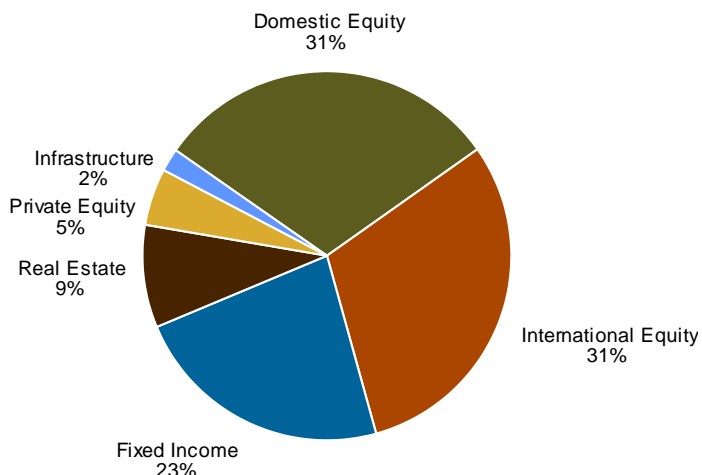
Asset Allocation

The Fund was valued at \$10.9 billion at the end of the fourth quarter, representing an increase of \$158.6 million from September 30, 2017. Investment gains of \$437.9 million exceeded net cash outflow activity of \$279.3 million during the quarter. Overall, the portfolio's asset allocation was close to its strategic targets at quarter-end, reflecting a slight underweight to private equity and real estate.

Actual Asset Allocation



Target Asset Allocation



Asset Class	\$Millions Actual	Weight Actual	Target	Percent Difference	\$Millions Difference
Domestic Equity	3,453	31.5%	30.5%	1.0%	113
International Equity	3,555	32.5%	30.5%	2.0%	214
Fixed Income	2,508	22.9%	23.0%	(0.1%)	(11)
Real Estate	728	6.6%	9.0%	(2.4%)	(258)
Private Equity	289	2.6%	5.0%	(2.4%)	(259)
Infrastructure	217	2.0%	2.0%	(0.0%)	(2)
Cash	202	1.8%	0.0%	1.8%	202
Total	10,953	100.0%	100.0%		

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INVESTMENT MANAGER ASSET ALLOCATIONS

Investment Manager Asset Allocation

The table below contrasts the distribution of assets across the Fund's investment managers as of December 31, 2017, with the distribution as of September 30, 2017. 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.

	December 31, 2017		Net New Inv.	Inv. Return	September 30, 2017	
	Market Value	Weight			Market Value	Weight
DOMESTIC EQUITY	\$3,453,308,948	31.53%	\$(205,853,786)	\$208,936,469	\$3,450,226,265	31.96%
Large Cap	\$3,060,300,710	27.94%	\$(204,167,903)	\$194,832,014	\$3,069,636,600	28.44%
Large Cap Core Index	\$2,004,392,320	18.30%	\$(200,904,752)	\$128,254,025	\$2,077,043,048	19.24%
NTGI 500 Index LCC	353,056,096	3.22%	(193,440,759)	26,934,799	519,562,056	4.81%
Rhumbline Rsl 1000 LCC	1,651,336,225	15.08%	(7,463,993)	101,319,226	1,557,480,992	14.43%
Large Cap Core Equity	\$136,095,302	1.24%	\$(494,728)	\$8,558,538	\$128,031,492	1.19%
Ivy LCC	136,095,302	1.24%	(494,728)	8,558,538	128,031,492	1.19%
Large Cap Growth Equity	\$453,520,754	4.14%	\$(459,564)	\$28,017,946	\$425,962,371	3.95%
Rhumbline Rsl 1000 LCG	308,973,162	2.82%	(195,507)	22,254,123	286,914,546	2.66%
Zevenbergen US ACE	144,547,592	1.32%	(181,071)	5,763,812	138,964,851	1.29%
Large Cap Value Equity	\$466,292,334	4.26%	\$(2,308,859)	\$30,001,504	\$438,599,689	4.06%
Channing US ACE	145,089,927	1.32%	(544,962)	6,341,189	139,293,700	1.29%
BMO Global-Harris LCV	321,202,407	2.93%	(1,763,897)	23,660,315	299,305,989	2.77%
Small Cap Equity	\$323,653,776	2.96%	\$(1,395,509)	\$9,952,897	\$315,096,388	2.92%
NTGI Structured SCC	169,497,222	1.55%	(561,307)	5,610,145	164,448,384	1.52%
Phocas SCV	154,156,554	1.41%	(834,202)	4,342,752	150,648,003	1.40%
Attucks Domestic Equity (Mgr of Mgrs)	\$69,354,462	0.63%	\$(290,374)	\$4,151,558	\$65,493,278	0.61%
Attucks Matarin SCC	22,391,917	0.20%	(62,981)	985,669	21,469,229	0.20%
Attucks Paradigm LCV	23,035,177	0.21%	(116,097)	1,478,179	21,673,096	0.20%
Attucks Stoneridge LCE	23,778,697	0.22%	(111,389)	1,686,457	22,203,629	0.21%
INTERNATIONAL EQUITY	\$3,554,721,440	32.46%	\$(26,722,902)	\$162,509,312	\$3,418,935,029	31.67%
Ariel EAFE ILCV	79,322,835	0.72%	(599,508)	163,090	79,759,254	0.74%
DFA ISCV	191,473,071	1.75%	(10,533,549)	7,120,027	194,886,593	1.81%
Eamest Partners EME	192,886,507	1.76%	(1,455,159)	14,449,342	179,892,324	1.67%
Eamest Partners ILCE	629,952,794	5.75%	(2,772,967)	27,737,547	604,988,214	5.60%
Lazard Asst Mgt ILCE	631,455,886	5.77%	(2,694,285)	30,982,821	603,167,351	5.59%
Leading Edge IE MOM	138,241,556	1.26%	(779,867)	6,349,179	132,672,245	1.23%
Morgan Stanley ILCE	632,206,400	5.77%	(3,458,490)	26,079,724	609,585,166	5.65%
NTGI EAFE ILCE	144	0.00%	(10,977)	9,195	1,926	0.00%
NTGI EAFE ILCV	4	0.00%	(8,084)	5,792	2,295	0.00%
Strategic Global Adv. EAFE	82,820,171	0.76%	(354,856)	2,723,454	80,451,574	0.75%
William Blair ILCG	640,939,382	5.85%	(2,270,584)	28,346,317	614,863,649	5.70%
William Blair ISCE	214,028,823	1.95%	(1,122,644)	10,948,095	204,203,372	1.89%
TOTAL FUND	\$10,952,668,334	100.0%	\$(279,313,716)	\$437,917,652	\$10,794,064,399	100.0%

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Asset Distribution Across Investment Managers

	December 31, 2017			September 30, 2017		
	Market Value	Weight	Net New Inv.	Inv. Return	Market Value	Weight
Attucks Int'l Equity	\$121,393,867	1.11%	\$(661,931)	\$7,594,732	\$114,461,066	1.06%
Attucks APEX Int'l ACC	12,843	0.00%	(5,297)	4,829	13,311	0.00%
Attucks GlobeFlex Int'l ACC	9,870	0.00%	(644)	59	10,455	0.00%
Attucks GlobeFlex Global Eq	26,789,929	0.24%	(255,692)	1,591,902	25,453,720	0.24%
Attucks Brown Capital Int'l SCG	27,428,326	0.25%	(215,074)	2,141,628	25,501,773	0.24%
Attucks Ativo Capital EM	21,759,607	0.20%	(114,824)	1,317,569	20,556,862	0.19%
Attucks Glovista EM	21,487,421	0.20%	(13,975)	1,282,237	20,219,159	0.19%
Attucks Redwood Int'l ACC	23,905,872	0.22%	(56,424)	1,256,508	22,705,788	0.21%
FIXED INCOME	\$2,508,171,002	22.90%	\$(18,454,673)	\$16,764,303	\$2,509,861,372	23.25%
NT GI Gov/Credit Index FI	946,275,335	8.64%	(6,856,644)	5,018,835	948,113,144	8.78%
Garcia Hamilton FIC	229,633,797	2.10%	(1,058,367)	2,122,940	228,569,224	2.12%
LM Capital FICP	209,281,828	1.91%	(2,154,448)	868,409	210,567,867	1.95%
Pugh FIC	227,990,376	2.08%	(1,944,107)	1,403,902	228,530,581	2.12%
Taplin Canida FI	228,630,299	2.09%	(1,477,100)	1,597,207	228,510,191	2.12%
WAMCO FICP	612,716,351	5.59%	(4,669,249)	5,245,726	612,139,874	5.67%
Attucks Fixed Income	\$53,643,016	0.49%	\$(294,758)	\$507,283	\$53,430,491	0.49%
Attucks New Century GI TIPS	20,472,722	0.19%	(80,509)	239,039	20,314,192	0.19%
Attucks LM Capital EMD	14,477,217	0.13%	(166,493)	76,665	14,567,044	0.13%
Attucks Ramirez Fixed Income	18,693,077	0.17%	(47,757)	191,579	18,549,255	0.17%
INFRASTRUCTURE	\$217,339,911	1.98%	\$(54,861,520)	\$22,272,793	\$249,928,638	2.32%
Brookfield Infra III	16,503,195	0.15%	2,494,777	628,388	13,380,030	0.12%
JP Morgan Infr-OE	95,706,628	0.87%	(4,939,870)	10,158,053	90,488,445	0.84%
Macquarie Fd II Infr	77,323,821	0.71%	0	1,665,004	75,658,817	0.70%
Macquarie European Fund III Infr	27,806,267	0.25%	(52,416,428)	9,821,348	70,401,346	0.65%
TOTAL FUND	\$10,952,668,334	100.0%	\$(279,313,716)	\$437,917,652	\$10,794,064,399	100.0%

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Asset Distribution Across Investment Managers

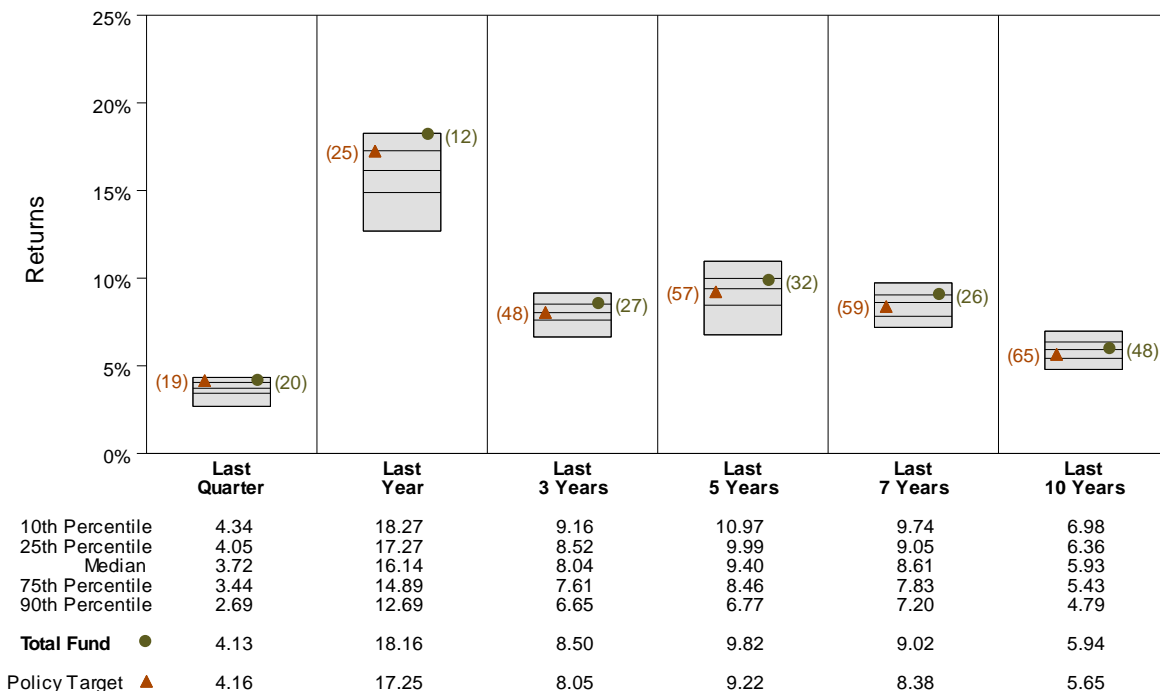
	December 31, 2017			September 30, 2017		
	Market Value	Weight	Net New Inv.	Inv. Return	Market Value	Weight
REAL ESTATE	\$728,049,539	6.65%	\$(23,965,469)	\$15,689,484	\$736,325,524	6.82%
BREDS HG LP	5,706,895	0.05%	5,706,895	0	-	-
Capri Select Fd II PRE	51,112	0.00%	0	0	51,112	0.00%
City View PRE	11,378,323	0.10%	(4,650,545)	381,983	15,646,885	0.14%
Clarion Lion Indus Tr	48,719,690	0.44%	(539,557)	1,723,242	47,536,005	0.44%
Europa Fd III PRE	5,432,917	0.05%	(3,195,748)	597,354	8,031,311	0.07%
Fortress Japan PRE	7,818,220	0.07%	0	(203,027)	8,021,247	0.07%
Fortress Japan Fd II PRE	8,103,468	0.07%	0	960,396	7,143,072	0.07%
Franklin Temp PREMOM	14,328,215	0.13%	(3,399,431)	343,568	17,384,078	0.16%
Fremont Realty PRE	1,285,621	0.01%	(420,000)	(13,253)	1,718,874	0.02%
Hudson Realty Fd V PRE	1,256,920	0.01%	(2,916,489)	51,982	4,121,427	0.04%
IC Berkeley Partners III	5,730,306	0.05%	(1,720,000)	237,825	7,212,481	0.07%
Intercontinental PRE	0	0.00%	(392,900)	(98,165)	491,065	0.00%
JP Morgan Strat PRE-OE	153,118,281	1.40%	(1,554,310)	2,706,003	151,966,587	1.41%
LaSalle Property PRE-OE	105,039,645	0.96%	(144,628)	2,957,522	102,226,751	0.95%
MB Asia RE Fd PRE	749,308	0.01%	(157,908)	(7,251)	914,467	0.01%
Newport Cap Fund II	19,257,945	0.18%	(4,624,915)	153,875	23,728,985	0.22%
Newport/DV Urban PRE	1,190,570	0.01%	0	(33,956)	1,224,526	0.01%
NMS Capital Fund III	1,815,456	0.02%	1,815,456	0	-	-
Oak Street Fund IV RE	1,209,395	0.01%	1,209,395	0	-	-
PRISA Fd I PRE-OE	140,476,829	1.28%	(3,284,167)	3,118,552	140,642,444	1.30%
PRISA Fd II PRE-OE	21,689,268	0.20%	(332,525)	378,170	21,643,623	0.20%
UBS Realty PRE-OE	150,468,786	1.37%	(1,573,521)	2,216,604	149,825,704	1.39%
Walton St Fd III PRE	141,011	0.00%	0	(1,984)	142,995	0.00%
Walton St Fd IV PRE	698,630	0.01%	(471,698)	7,257	1,163,071	0.01%
Walton St Fd V PRE	8,946,093	0.08%	(986,530)	3,067	9,929,556	0.09%
Walton St Fd VI PRE	10,239,498	0.09%	(516,887)	256,887	10,499,498	0.10%
Walton St Mexico Fd I PRE	5,012,592	0.05%	0	(47,168)	5,059,760	0.05%
PRIVATE EQUITY	\$288,810,488	2.64%	\$(10,982,195)	\$11,270,777	\$288,521,906	2.67%
Adams St Many Fd PE	142,872,699	1.30%	(754,780)	6,552,187	137,075,292	1.27%
HarbourVest Ptrs VI PE	4,885,775	0.04%	(604,346)	(577,664)	6,067,785	0.06%
HarbourVest Ptrs VII PE	9,097,386	0.08%	691,150	402,016	8,004,220	0.07%
HarbourVest Ptrs VIII PE	9,934,392	0.09%	(1,310,152)	835,273	10,409,271	0.10%
HVP Buyout X PE	3,941,541	0.04%	840,000	275,866	2,825,675	0.03%
HVP Venture X PE	2,569,104	0.02%	662,184	142,055	1,764,865	0.02%
Hispania Fd II PE	3,658,951	0.03%	318,748	(2,731)	3,342,934	0.03%
ICV Capital Ptrs PE	1,590,748	0.01%	0	(235)	1,590,983	0.01%
ICV III Capital Ptrs PE	10,143,401	0.09%	0	134,197	10,009,204	0.09%
KKR Americas Fd XII	167,842	0.00%	379,114	(211,272)	-	-
Mesirow Fd I PE	2,063,531	0.02%	(199,704)	14,467	2,248,768	0.02%
Mesirow Fd II PE	8,004,274	0.07%	(224,914)	238,323	7,990,865	0.07%
Mesirow Fd IV PE	11,400,428	0.10%	(1,195,546)	436,528	12,159,446	0.11%
Mesirow Fd V PE	16,942,823	0.15%	(824,440)	600,147	17,167,116	0.16%
Mesirow Fd VII A PE	372,288	0.00%	243,750	(33,962)	162,500	0.00%
Mesirow Fd VII B PE	1,324,807	0.01%	0	21,057	1,303,750	0.01%
Mesirow Fd VIII PE	1,385,422	0.01%	(1,080,000)	(5,116)	2,470,538	0.02%
Mesirow Fd X PE	10,557,153	0.10%	(5,380,927)	908,503	15,029,577	0.14%
Muller M2 ILPEFF PE	13,510	0.00%	(477,656)	(4,739)	495,905	0.00%
Muller M2 MPEFF PE	2,724,292	0.02%	(1,116,150)	138,545	3,701,896	0.03%
Palladium Ptrs PE	3,464,285	0.03%	0	(2,667)	3,466,952	0.03%
Palladium IV	6,122,289	0.06%	(2,103,822)	687,242	7,538,869	0.07%
Pantheon Asia Fd V PE	2,711,069	0.02%	(65,000)	91,737	2,684,332	0.02%
Pantheon Europe Fd II PE	94,532	0.00%	18,980	(367)	75,919	0.00%
Pantheon Europe Fd VI PE	4,979,402	0.05%	(896,742)	128,622	5,747,522	0.05%
Pantheon GI Fd 2014	6,866,141	0.06%	750,494	342,081	5,773,566	0.05%
Pantheon USA Fd III PE	342,099	0.00%	0	(11,836)	353,935	0.00%
Pantheon USA Fd IV PE	614,121	0.01%	(350,000)	26,793	937,328	0.01%
Pharos Fd II PE	4,406,297	0.04%	0	(76,630)	4,482,927	0.04%
Pharos Fd III PE	10,057,427	0.09%	(117,892)	677,475	9,497,844	0.09%
RLJ Equity Fund II	1,519,825	0.01%	0	(454,969)	1,974,794	0.02%
Syncom Venture PE	2,167,178	0.02%	0	(150)	2,167,328	0.02%
CASH	\$202,267,007	1.85%	\$61,526,828	\$474,514	\$140,265,665	1.30%
Cash Appropriation Acct	67,384,641	0.62%	0	218,896	67,165,745	0.62%
Cash Equivalent CTPF	133,424,397	1.22%	61,526,828	250,867	71,646,702	0.66%
Global Transition	1,445,279	0.01%	0	4,802	1,440,477	0.01%
STEP Holding	12,690	0.00%	0	(51)	12,741	0.00%
TOTAL FUND	\$10,952,668,334	100.0%	\$(279,313,716)	\$437,917,652	\$10,794,064,399	100.0%

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Total Fund Performance vs. Target

Callan Public Fund Sponsor - Large (>1B)



Note: Performance is shown gross-of-fees.

Current quarter Policy Target = 30.5% Russell 3000 Index, 30.5% MSCI ACWI ex US Index, 23% BB BC Aggregate Bond Index, 9% NFI ODCE Value Weight Index, 5% Russell 3000 Index+3.0% and 2% FTSE Developed Core Infrastructure 50/50 Net.

For the fourth quarter, the Fund underperformed the market benchmark by 10 basis points, but ranked in the 20th percentile of its peers. For the trailing one-year period, the Fund outperformed the Policy Target by 91 basis points, gross of investment management fees (60 basis points net of investment management fees) and ranked in the top 12 percent of its peer group.

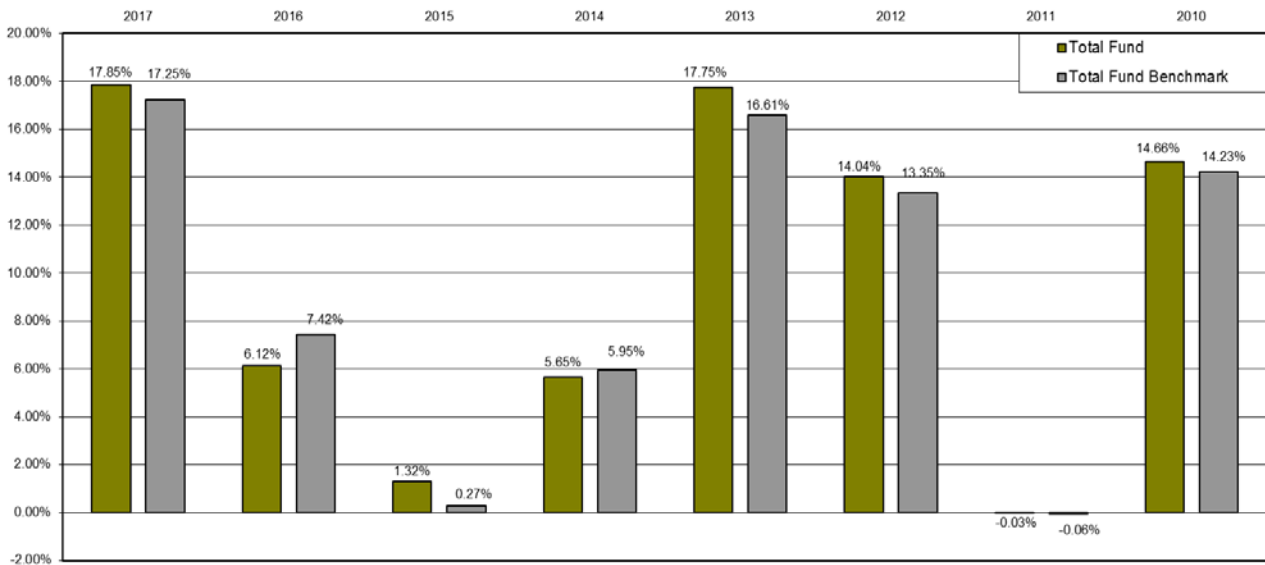
Private Equity, international equity and cash detracted most from the Fund's performance relative to the Policy Target for the quarter. The following is a brief synopsis of the contribution of each major asset class over the period (performance commentary relative to benchmarks is net of fees and performance commentary relative to peers is gross of fees):

- Domestic Equity:** The domestic equity composite underperformed the Russell 3000 Index by 13 basis points for the quarter, ranking in the 21st percentile of the peer group. Performance was mixed for the domestic equity managers over the quarter. Zevenbergen and Channing posted the weakest relative performance over the period. Zevenbergen posted particularly weak returns this quarter, underperforming the Russell 3000 Growth Index by 346 basis points.
- International Equity:** The international equity composite underperformed its MSCI ACWI Ex-US IMI benchmark by 56 basis points for the fourth quarter, ranking in the 69th percentile of the peer group. Performance was mixed for the international equity managers over the quarter. DFA, William Blair ISCE, William Blair Growth and Strategic Global Advisors posted the weakest relative performance over the period.

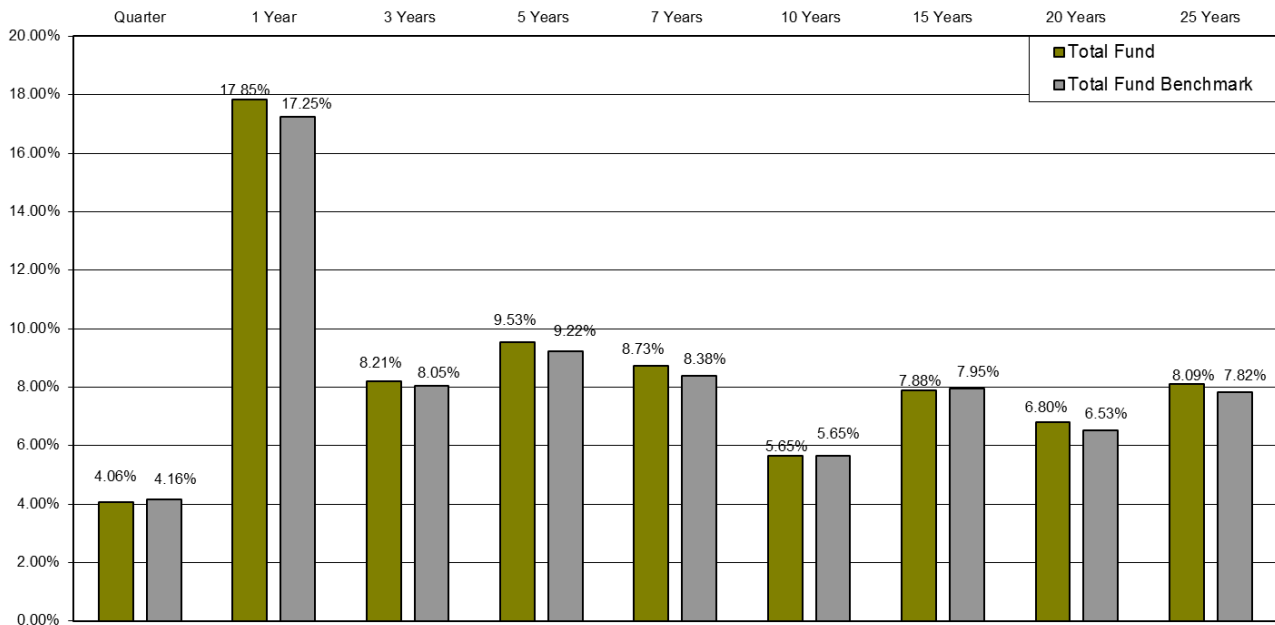
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- Fixed Income:** The fixed income composite outperformed its market benchmark by 26 basis points for the quarter, ranking in the 27th percentile of its peers. All of the active fixed income managers outperformed their respective benchmarks this quarter, except for LM Capital (-1 basis point).
- Alternative Investments:** The infrastructure and real estate portfolios registered positive relative returns for the quarter while the private equity portfolio underperformed its respective target by 241 basis points. The infrastructure portfolio performed particularly well, outperforming its target return by 665 basis points this quarter.

Total Fund Calendar Year Performance Net of Fees



Total Fund Trailing Year Performance Net of Fees



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MANAGER PERFORMANCE

Table 1 presents returns for the public market domestic and international equity and fixed income managers and composites in the Chicago Teacher Pension Fund relative to appropriate benchmarks on a net of fee basis. Managers highlighted in red are currently on the Watch List.

Table 1 (Net-of-Fees):

CTPF Investment Strategies	Net Investment Returns as of 12/31/2017						Inception Date	Qtr-End MV
	FUND	Qtr	1 Yr	3 Yr	5 Yr	7 Yr		
Fixed Income								
Northern Trust Gov/ Credit Index Fund	0.53	4.07	2.35	2.13	3.41	5.34	Jan-94	\$946m
Bloomberg Barclays Gov/Credit Index	0.49	4.00	2.38	2.13	3.43	5.33		
Variance	0.04	0.07	-0.03	0.00	-0.02	0.01		
Garcia Hamilton	0.90	3.63	2.39	2.99	4.28	3.97	Oct-10	\$230m
Bloomberg Barclays Aggregate Index	0.39	3.54	2.24	2.10	3.20	2.91		
Variance	0.51	0.09	0.15	0.89	1.08	1.06		
LM Capital*	0.38	4.09	2.88	2.42	3.59	4.28	Nov-04	\$209m
Bloomberg Barclays Aggregate Index	0.39	3.54	2.24	2.10	3.20	4.09		
Variance	-0.01	0.55	0.64	0.32	0.39	0.19		
Pugh Capital Management	0.58	3.93	2.38	2.23	3.49	3.16	Oct-10	\$228m
Bloomberg Barclays Aggregate Index	0.39	3.54	2.24	2.10	3.20	2.91		
Variance	0.19	0.39	0.14	0.13	0.29	0.25		
Taplin, Canida & Habacht	0.68	4.65	2.79	2.41	4.02	4.10	Nov-04	\$229m
Bloomberg Barclays Aggregate Index	0.39	3.54	2.24	2.10	3.20	4.09		
Variance	0.29	1.11	0.55	0.31	0.82	0.01		
Western Asset Management	0.82	6.26	3.93	3.48	4.80	5.34	Feb-03	\$613m
Bloomberg Barclays Aggregate Index	0.39	3.54	2.24	2.10	3.20	4.16		
Variance	0.43	2.72	1.69	1.38	1.60	1.18		

*LM mandate changed from Core Bond to Core Plus Bond as of 7/1/13. Peer group rankings are not applicable to the full track record given the change in mandates.

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Table 1 (Net-of-Fees, Continued):

CTPF Investment Strategies	Net Investment Returns as of 12/31/2017						Inception Date	Qtr-End MV
	FUND	Qtr	1 Yr	3 Yr	5 Yr	7 Yr		
Large Cap Equity								
Northern Trust S&P 500 Index Fund	6.39	21.43	11.41	15.75	13.74	9.94	Apr-90	\$353m
S&P 500 Index	6.64	21.83	11.41	15.79	13.76	10.02		
Variance	-0.25	-0.40	0.00	-0.04	-0.02	-0.08		
Rhumbline Russell 1000 Index Fund	6.52	21.45	11.17	15.63	13.65	7.84	Jun-07	\$1,651m
Russell 1000 Index	6.59	21.69	11.23	15.71	13.66	7.77		
Variance	-0.07	-0.24	-0.06	-0.08	-0.01	0.07		
Ivy	6.64	21.92	8.41	13.85	13.06	11.56	Jan-91	\$136m
Russell 1000 Index	6.59	21.69	11.23	15.71	13.66	10.54		
Variance	0.05	0.23	-2.82	-1.86	-0.60	1.02		
Rhumbline Russell 1000 Growth Index Fund	7.75	-	-	-	-	7.75	Oct-17	\$309m
Russell 1000 Growth Index	7.86	-	-	-	-	7.86		
Variance	-0.11	-	-	-	-	-0.11		
Zevenbergen Capital Management	4.05	35.38	11.79	18.48	12.35	10.69	Oct-92	\$145m
Russell 3000 Growth Index	7.61	29.59	13.51	17.16	14.62	9.17		
Variance	-3.56	5.79	-1.72	1.32	-2.27	1.52		
Channing*	4.44	17.08	8.42	14.46	12.35	15.32	Jul-09	\$145m
Channing Benchmark	5.08	13.19	8.71	13.95	12.11	16.31		
Variance	-0.64	3.89	-0.29	0.51	0.24	-0.99		
BMO Harris Investment Management	7.88	21.14	10.18	15.95	14.20	7.72	Jul-99	\$321m
Harris Benchmark**	5.33	13.66	8.65	14.04	12.46	5.39		
Variance	2.55	7.48	1.53	1.91	1.74	2.33		
Small Cap Equity								
Northern Trust Small Cap	3.42	13.96	10.49	15.03	13.08	12.45	Jan-91	\$169m
Russell 2000 Index	3.34	14.65	9.96	14.12	11.62	11.04		
Variance	0.08	-0.69	0.53	0.91	1.46	1.41		
Phocas Small Cap Value	2.70	8.44	-	-	-	18.62	Jul-16	\$154m
Russell 2000 Value Index	2.05	7.84	-	-	-	21.50		
Variance	0.65	0.60	-	-	-	-2.88		
Manager of Managers								
Attucks***	5.12	21.30	8.55	--	--	8.08	Dec-13	\$244m
Custom Benchmark	4.75	19.83	8.96	--	--	7.69		
Variance	0.37	1.47	-0.41	--	--	0.39		

*Channing mandate changed from Mid Cap Value to All Cap Value as of 10/1/11. Channing Benchmark reflects Russell MC Value Index through 9/30/11 and Russell 3000 Value thereafter. Peer group rankings are not applicable to the full track record given the change in mandates.

**BMO Harris benchmark reflects the S&P 500 from inception to 12/31/2002 and the Russell 1000 Value benchmark thereafter.

***In 4Q13, Attucks was transitioned from a domestic equity portfolio to a Best in Class portfolio.

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Table 1 (Net-of-Fees, Continued):

CTPF Investment Strategies		Net Investment Returns as of 12/31/2017					Inception Date	Qtr-End MV
FUND	Qtr	1 Yr	3 Yr	5 Yr	7 Yr	Since Inception		
International Equity								
Ariel Investments	0.04	16.65	-	-	-	11.46	Jul-16	
MSCI EAFE Index	4.23	25.03	-	-	-	20.41		
Variance	-4.19	-8.38	-	-	-	-8.95		
EARNEST Partners	4.49	30.31	9.20	7.82	6.43	6.18	Apr-07	
MSCI ACWI ex-US Index	5.00	27.19	7.83	6.80	4.93	2.82		
Variance	-0.51	3.12	1.37	1.02	1.50	3.36		
Lazard	5.11	24.31	7.53	7.70	6.87	6.17	Jan-01	
MSCI ACWI ex-US Index	5.00	27.19	7.83	6.80	4.93	5.14		
Variance	0.11	-2.88	-0.30	0.90	1.94	1.03		
Morgan Stanley	4.19	26.05	7.82	7.67	7.07	8.88	Apr-95	
MSCI EAFE Index	4.23	25.03	7.80	7.90	6.04	5.36		
Variance	-0.04	1.02	0.02	-0.23	1.03	3.52		
Strategic Global Advisors	3.27	25.75	-	-	-	19.85	Jul-16	
MSCI EAFE Index	4.23	25.03	-	-	-	20.41		
Variance	-0.96	0.72	-	-	-	-0.56		
William Blair Growth	4.53	30.47	8.62	8.85	7.28	9.51	Feb-10	
MSCI ACWI ex-US IMI Growth Index	5.97	32.25	9.69	8.25	5.76	7.70		
Variance	-1.44	-1.78	-1.07	0.60	1.52	1.81		
William Blair International Small Cap	5.17	33.09	11.85	10.57	8.46	5.30	Apr-07	
William Blair ISCE Benchmark*	7.19	33.64	12.38	10.15	6.72	3.73		
Variance	-2.02	-0.55	-0.53	0.42	1.74	1.57		
Dimensional Fund Advisors	3.79	27.73	12.83	12.55	--	15.44	Jun-12	
MSCI World Small Cap ex-US	5.83	31.04	12.96	11.37	--	13.39		
Variance	-2.04	-3.31	-0.13	1.18	--	2.05		
EARNEST Partners Emerging Markets	7.94	36.01	7.40	--	--	4.24	Mar-13	
MSCI Emerging Markets Index	7.44	37.28	9.10	--	--	4.48		
Variance	0.50	-1.27	-1.70	--	--	-0.24		
International Manager of Managers								
Leading Edge	4.61	26.92	9.14	8.44	6.11	6.55	Apr-10	
MSCI ACWI ex-US Index	5.00	27.19	7.83	6.80	4.93	5.67		
Variance	-0.39	-0.27	1.31	1.64	1.18	0.88		

* The William Blair ISCE benchmark is comprised of the MSCI ACWI ex US Small Cap Index through 5/31/12 and the MSCI ACWI ex US Small Cap Growth Index thereafter.

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Table 1 (Net-of-Fees, Continued):

CTPF Investment Strategies		Net Investment Returns as of 12/31/2017					Inception Date	Qtr-End MV
FUND	Qtr	1 Yr	3 Yr	5 Yr	7 Yr	Since Inception		
Infrastructure								
Infrastructure Composite	8.65	15.22	6.57	6.21	6.48	6.15	Nov-08	
Infrastructure Benchmark*	2.00	8.07	8.02	8.01	8.01	8.01	\$217m	
Variance	6.65	7.15	-1.45	-1.80	-1.53	-1.86		
Real Estate								
Real Estate Composite	1.96	7.33	9.77	10.83	10.83	7.25	Jan-02	
NFI-ODCE Value Weight	1.85	6.66	9.42	10.52	11.04	7.12	\$728m	
Variance	0.11	0.67	0.35	0.31	-0.21	0.13		
Private Equity								
Private Equity Composite	3.93	16.70	11.46	12.58	11.67	8.87	Jan-02	
Russell 3000 Index	6.34	21.13	11.12	15.58	13.50	7.93	\$289m	
Variance	-2.41	-4.43	0.34	-3.00	-1.83	0.94		

*The Infrastructure Benchmark is 8% Annualized Return through 9/30/17 and FTSE Developed Core Infrastructure 50/50 (Net) thereafter.

Note: Private market investments shown above are typically reported on a one quarter lag. Private Equity returns are, at times, reported on a longer lag. Comments on Infrastructure, REITS and Real Estate are covered in the quarterly Real Estate Report. Private Equity is discussed in the quarterly Private Equity Report.

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MANAGER PERFORMANCE

Table 1 presents returns for the public market domestic and international equity and fixed income managers and composites in the Chicago Teacher Pension Fund relative to appropriate benchmarks on a gross of fee basis. Managers highlighted in red are currently on the Watch List.

Table 2 (Gross-of-Fees):

CTPF Investment Strategies	Gross Investment Returns as of 12/31/2017						Inception Date	Qtr-End MV
	FUND	Qtr	1 Yr	3 Yr	5 Yr	7 Yr		
Fixed Income								
Northern Trust Gov/ Credit Index Fund	0.53	4.09	2.36	2.14	3.42	5.35	Jan-94	\$946m
Bloomberg Barclays Gov/Credit Index	0.49	4.00	2.38	2.13	3.43	5.33		
Variance	0.04	0.09	-0.02	0.01	-0.01	0.02		
Peer Ranking – CAI Core Bond	39	43	90	90	85			
Garcia Hamilton	0.93	3.79	2.58	3.18	4.47	4.16	Oct-10	\$230m
Bloomberg Barclays Aggregate Index	0.39	3.54	2.24	2.10	3.20	2.91		
Variance	0.54	0.25	0.34	1.08	1.27	1.25		
Peer Ranking – CAI Core Bond	1	68	56	4	7			
LM Capital*	0.42	4.25	3.04	2.58	3.75	4.47	Nov-04	\$209m
Bloomberg Barclays Aggregate Index	0.39	3.54	2.24	2.10	3.20	4.09		
Variance	0.03	0.71	0.80	0.48	0.55	0.38		
Peer Ranking - CAI Core Plus Bond	75	80	63	83	97			
Pugh Capital Management	0.62	4.08	2.54	2.40	3.68	3.34	Oct-10	\$228m
Bloomberg Barclays Aggregate Index	0.39	3.54	2.24	2.10	3.20	2.91		
Variance	0.23	0.54	0.30	0.30	0.48	0.43		
Peer Ranking - CAI Core Bond	16	43	62	58	54			
Taplin, Canida & Habacht	0.70	4.79	2.94	2.56	4.18	4.27	Nov-04	\$229m
Bloomberg Barclays Aggregate Index	0.39	3.54	2.24	2.10	3.20	4.09		
Variance	0.31	1.25	0.70	0.46	0.98	0.18		
Peer Ranking - CAI Core Bond	10	10	31	39	18			
Western Asset Management	0.86	6.43	4.11	3.67	4.99	5.53	Feb-03	\$613m
Bloomberg Barclays Aggregate Index	0.39	3.54	2.24	2.10	3.20	4.16		
Variance	0.47	2.89	1.87	1.57	1.79	1.37		
Peer Ranking - CAI Core Plus Bond	12	6	8	12	17			

*LM mandate changed from Core Bond to Core Plus Bond as of 7/1/13. Peer group rankings are not applicable to the full track record given the change in mandates.

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Table 2 (Gross-of-Fees, Continued):

CTPF Investment Strategies	Gross Investment Returns as of 12/31/2017						Inception Date	Qtr-End MV
	FUND	Qtr	1 Yr	3 Yr	5 Yr	7 Yr		
Large Cap Equity								
Northern Trust S&P 500 Index Fund	6.39	21.44	11.42	15.76	13.75	9.95	Apr-90	\$353m
S&P 500 Index	6.64	21.83	11.41	15.79	13.76	10.02		
Variance	-0.25	-0.39	0.01	-0.03	-0.01	-0.07		
Peer Ranking – CAI Large Cap	60	55	40	49	46			
Rhumbline Russell 1000 Index Fund	6.52	21.46	11.18	15.64	13.66	7.85	Jun-07	\$1,651m
Russell 1000 Index	6.59	21.69	11.23	15.71	13.66	7.77		
Variance	-0.07	-0.23	-0.05	-0.07	0.00	0.08		
Peer Ranking – CAI Large Cap	59	55	45	52	48			
Ivy	6.70	22.18	8.63	14.08	13.29	11.78	Jan-91	\$136m
Russell 1000 Index	6.59	21.69	11.23	15.71	13.66	10.54		
Variance	0.11	0.49	-2.60	-1.63	-0.37	1.24		
Peer Ranking - CAI Large Cap Core	57	42	91	89	62			
Rhumbline Russell 1000 Growth Index Fund	7.75	-	-	-	-	7.75	Oct-17	\$309m
Russell 1000 Growth Index	7.86	-	-	-	-	7.86		
Variance	-0.11	-	-	-	-	-0.11		
Peer Ranking - CAI Large Cap Growth	19	-	-	-	-			
Zevenbergen Capital Management	4.15	35.88	12.23	18.95	12.79	11.13	Oct-92	\$145m
Russell 3000 Growth Index	7.61	29.59	13.51	17.16	14.62	9.17		
Variance	-3.46	6.29	-1.28	1.79	-1.83	1.96		
Peer Ranking - CAI All Cap	84	13	21	4	63			
Channing*	4.57	17.64	8.93	15.00	12.90	15.91	Jul-09	\$145m
Channing Benchmark	5.08	13.19	8.71	13.95	12.11	16.31		
Variance	-0.51	4.45	0.22	1.05	0.79	-0.40		
Peer Ranking – CAI All Cap Value	80	50	61	30	32			
BMO Harris Investment Management	7.94	21.41	10.42	16.21	14.45	8.00	Jul-99	\$321m
Harris Benchmark**	5.33	13.66	8.65	14.04	12.46	5.39		
Variance	2.61	7.75	1.77	2.17	1.99	2.61		
Peer Ranking - CAI Large Cap Value	8	6	30	16	12			
Small Cap Equity								
Northern Trust Small Cap	3.42	14.06	10.58	15.11	13.13	12.53	Jan-91	\$169m
Russell 2000 Index	3.34	14.65	9.96	14.12	11.62	11.04		
Variance	0.08	-0.59	0.62	0.99	1.51	1.49		
Peer Ranking - CAI Small Cap	50	45	54	52	46			
Phocas Small Cap Value	2.91	9.32	-	-	-	19.40	Jul-16	\$154m
Russell 2000 Value Index	2.05	7.84	-	-	-	21.50		
Variance	0.86	1.48	-	-	-	-2.10		
Peer Ranking - CAI Small Cap Value	65	49	-	-	-			
Manager of Managers								
Attucks***	5.27	22.00	9.13	--	--	8.68	Dec-13	\$244m
Custom Benchmark	4.75	19.83	8.96	--	--	7.69		
Variance	0.52	2.17	0.17	--	--			

*Channing mandate changed from Mid Cap Value to All Cap Value as of 10/1/11. Channing Benchmark reflects Russell MC Value Index through 9/30/11 and Russell 3000 Value thereafter. Peer group rankings are not applicable to the full track record given the change in mandates.

**Harris benchmark reflects the S&P 500 from inception to 12/31/2002 and the Russell 1000 Value benchmark thereafter.

***In 4Q13, Attucks was transitioned from a domestic equity portfolio to a Best in Class portfolio.

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Table 2 (Gross-of-Fees, Continued):

CTPF Investment Strategies	Gross Investment Returns as of 12/31/2017						Inception Date	Qtr-End MV
	FUND	Qtr	1 Yr	3 Yr	5 Yr	7 Yr		
International Equity								
Ariel Investments	0.22	17.43	-	-	-	12.09	Jul-16	\$79m
MSCI EAFE Index	4.23	25.03	-	-	-	20.41		
Variance	-4.01	-7.60	-	-	-	-8.32		
Peer Ranking - CAI Non-US Equity	100	99	-	-	-			
EARNEST Partners	4.60	30.82	9.64	8.26	6.86	6.69	Apr-07	\$630m
MSCI ACWI ex-US Index	5.00	27.19	7.83	6.80	4.93	2.82		
Variance	-0.40	3.63	1.81	1.46	1.93	3.87		
Peer Ranking - CAI Non-US Equity	44	25	38	70	60			
Lazard	5.15	24.50	7.72	7.88	7.04	6.54	Jan-01	\$631m
MSCI ACWI ex-US Index	5.00	27.19	7.83	6.80	4.93	5.14		
Variance	0.15	-2.69	-0.11	1.08	2.11	1.40		
Peer Ranking - CAI Non-US Equity	29	78	78	77	57			
Morgan Stanley	4.29	26.54	8.26	8.13	7.53	9.34	Apr-95	\$632m
MSCI EAFE Index	4.23	25.03	7.80	7.90	6.04	5.36		
Variance	0.06	1.51	0.46	0.23	1.49	3.98		
Peer Ranking - CAI Non-US Equity	57	64	68	72	42			
Strategic Global Advisors	3.39	26.35	-	-	-	20.33	Jul-16	\$83m
MSCI EAFE Index	4.23	25.03	-	-	-	20.41		
Variance	-0.84	1.32	-	-	-	-0.08		
Peer Ranking - CAI Non-US Equity	84	67	-	-	-			
William Blair Growth	4.62	30.91	9.00	9.23	7.67	9.92	Feb-10	\$641m
MSCI ACWI ex-US IMI Growth Index	5.97	32.25	9.69	8.25	5.76	7.70		
Variance	-1.35	-1.34	-0.69	0.98	1.91	2.22		
Peer Ranking - CAI Core Growth Int'l Equity	54	54	70	48	38			
William Blair International Small Cap	5.38	34.16	12.79	11.52	9.38	6.32	Apr-07	\$214m
William Blair ISCE Benchmark*	7.19	33.64	12.38	10.15	6.72	3.73		
Variance	-1.81	0.52	0.41	1.37	2.66	2.59		
Peer Ranking - CAI Int'l Small Cap Equity	72	60	69	80	73			
Dimensional Fund Advisors	3.79	27.73	12.83	12.69	--	15.57	Jun-12	\$191m
MSCI World Small Cap ex-US	5.83	31.04	12.96	11.37	--	13.39		
Variance	-2.04	-3.31	-0.13	1.32	--	2.18		
Peer Ranking - CAI Int'l Small Cap Equity	89	94	69	64	--			
EARNEST Partners Emerging Markets	8.08	36.70	7.94	--	--	4.76	Mar-13	\$193m
MSCI Emerging Markets Index	7.44	37.28	9.10	--	--	4.48		
Variance	0.64	-0.58	-1.16	--	--	0.28		
Peer Ranking - CAI EM Equity	21	53	77	--	--			
International Manager of Managers								
Leading Edge	4.80	27.88	9.97	9.28	6.94	7.38	Apr-10	\$138m
MSCI ACWI ex-US Index	5.00	27.19	7.83	6.80	4.93	5.67		
Variance	-0.20	0.69	2.14	2.48	2.01	1.71		
Peer Ranking - CAI Non-US Equity	39	54	31	43	59			

* The William Blair ISCE benchmark is comprised of the MSCI ACWI ex US Small Cap Index through 5/31/12 and the MSCI ACWI ex US Small Cap Growth Index thereafter.

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Table 2 (Gross-of-Fees, Continued):

CTPF Investment Strategies	Gross Investment Returns as of 12/31/2017						Inception Date	Qtr-End MV
	Qtr	1 Yr	3 Yr	5 Yr	7 Yr	Since Inception		
FUND								
Infrastructure								
Infrastructure Composite	8.89	15.94	7.22	6.80	7.15	6.69	Nov-08	\$217m
Infrastructure Benchmark*	2.00	8.07	8.02	8.01	8.01	8.01		
Variance	6.89	7.87	-0.80	-1.21	-0.86	-1.32		
Real Estate								
Real Estate Composite	2.15	8.10	10.58	11.59	11.58	7.70	Jan-02	\$728m
NFI-ODCE Value Weight	1.85	6.66	9.42	10.52	11.04	7.12		
Variance	0.30	1.44	1.16	1.07	0.54	0.58		
Private Equity								
Private Equity Composite	3.98	17.14	11.72	12.82	11.85	8.96	Jan-02	\$289m
Russell 3000 Index	6.34	21.13	11.12	15.58	13.50	7.93		
Variance	-2.36	-3.99	0.60	-2.76	-1.65	1.03		

*The Infrastructure Benchmark is 8% Annualized Return through 9/30/17 and FTSE Developed Core Infrastructure 50/50 (Net) thereafter.

Note: Private market investments shown above are typically reported on a one quarter lag. Private Equity returns are, at times, reported on a longer lag. Comments on Infrastructure, REITS and Real Estate are covered in the quarterly Real Estate Report. Private Equity is discussed in the quarterly Private Equity Report.

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Manager Watch List

MANAGER	DATE WATCH STARTED, REASON	LAST DUE DILIGENCE MEETING	ACTIONS TAKEN	POLICY/ RECOMMENDED ACTIONS	AUM as of 12/31/2017	Current Quarter Watch List Score	Previous Quarter Watch List Score
Ivy	February – 16 Performance	Nov - 17	Monitor	Monitor	\$136 mil.	1.0	1.0
Channing	January - 18 Personnel Turnover	Jan - 17	Monitor	Monitor	\$145 mil.	0.1	0.1
Zevenbergen	December – 16 Performance	Feb - 18	Monitor	Remove	\$145 mil.	0.5	0.6
LM Capital	March - 17 Personnel Turnover	March - 17	Monitor	Monitor	\$209 mil.	0.0	0.2

Policy/Recommended Actions Legend

Remove = Policy action taken due to IPS guidelines. Remove manager from the watch list as performance improves.

Termination = Recommended action for the Board

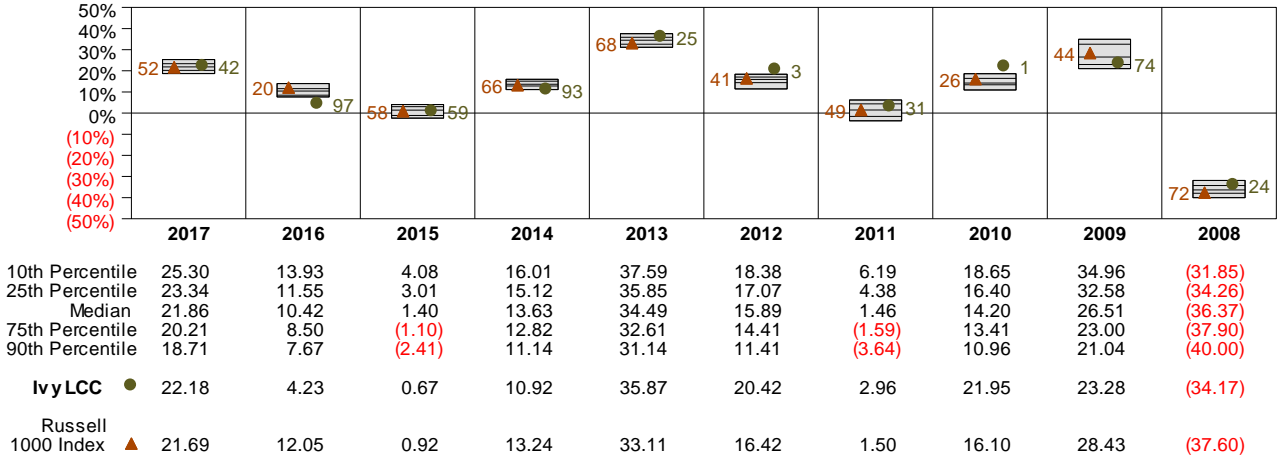
Monitor = Recommended action for the Board

Search = Board authorized a manager search

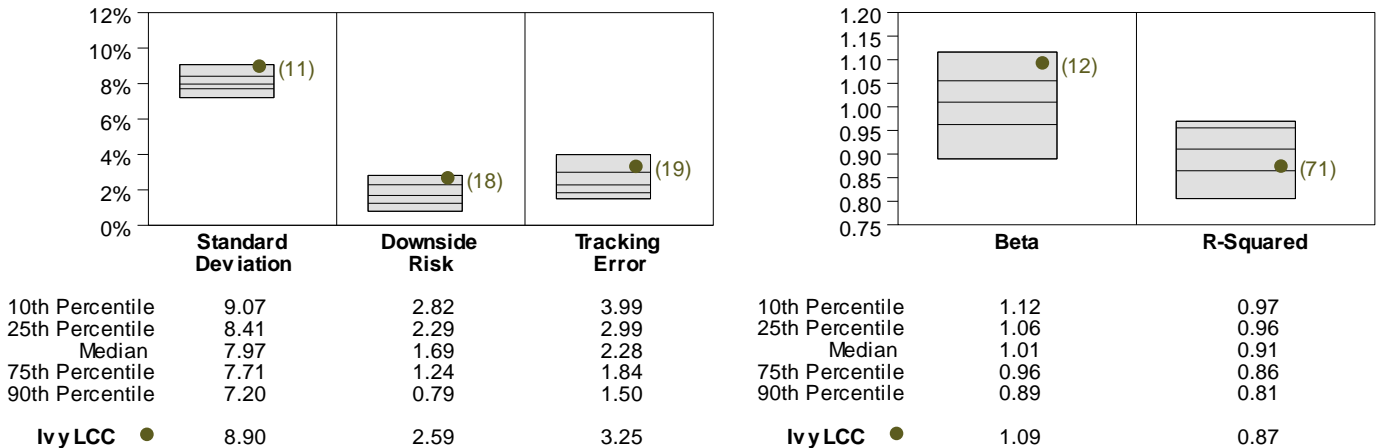
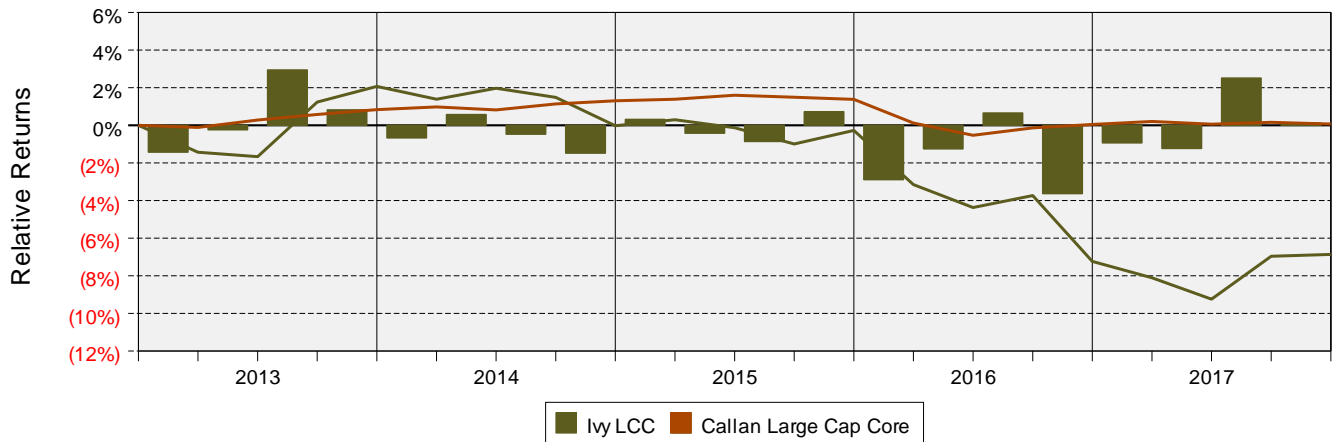
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Manager Watch List: Ivy

Performance vs Callan Large Cap Core (Gross)



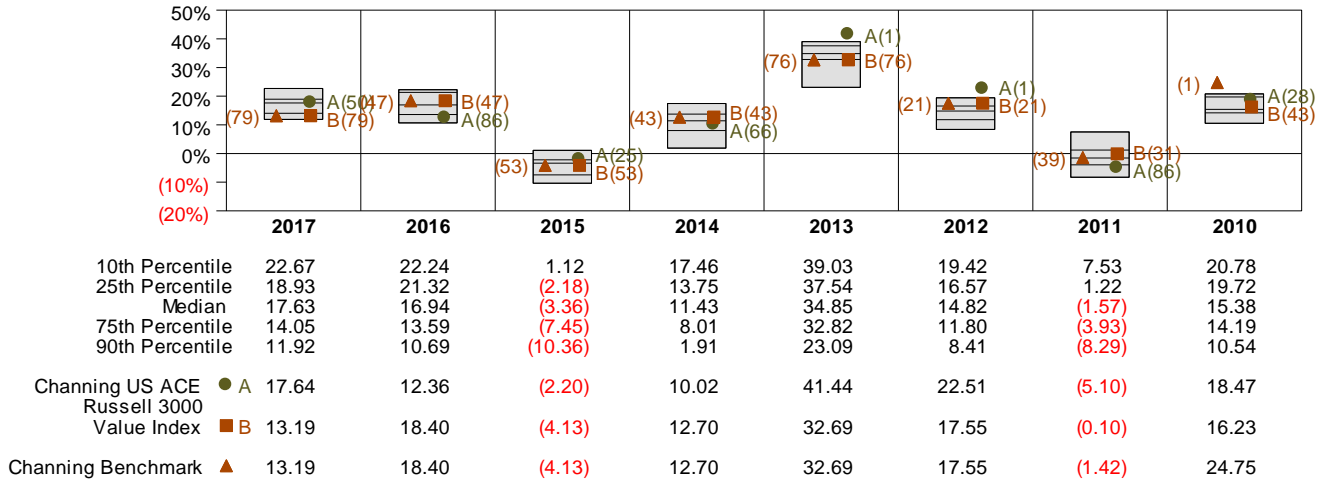
Cumulative and Quarterly Relative Return vs Russell 1000 Index



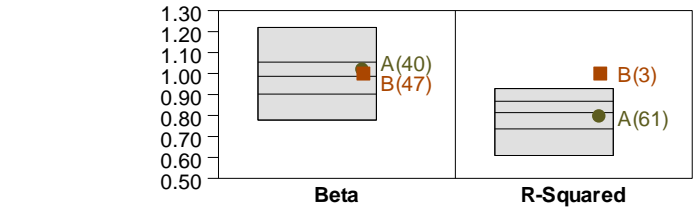
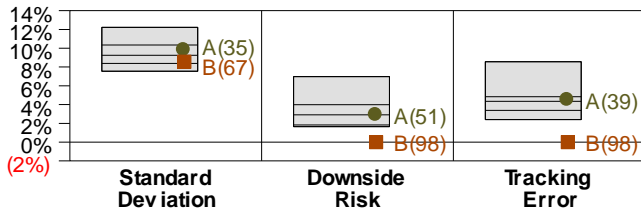
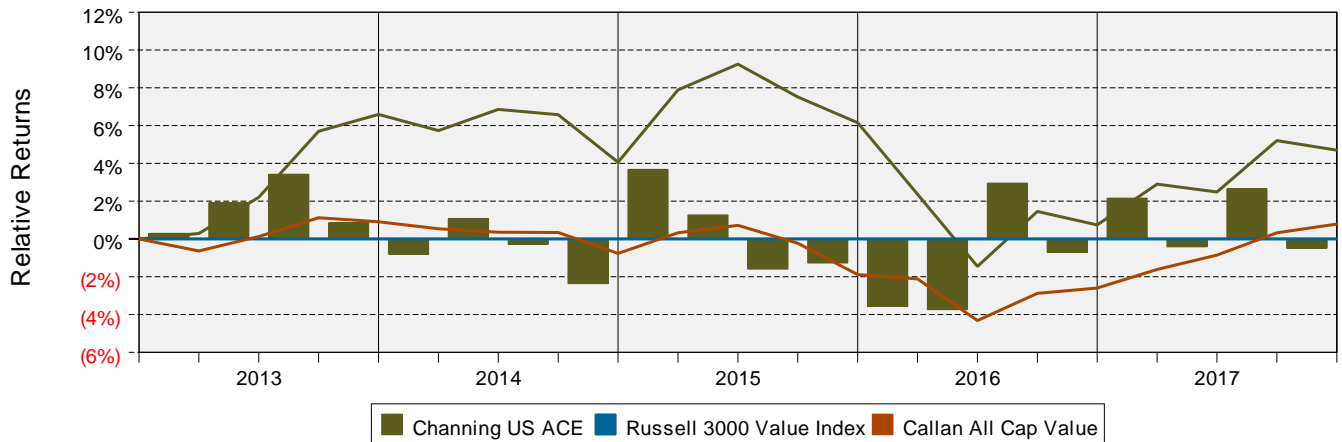
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Manager Watch List: Channing

Performance vs Callan All Cap Value (Gross)



Cumulative and Quarterly Relative Return vs Channing Benchmark

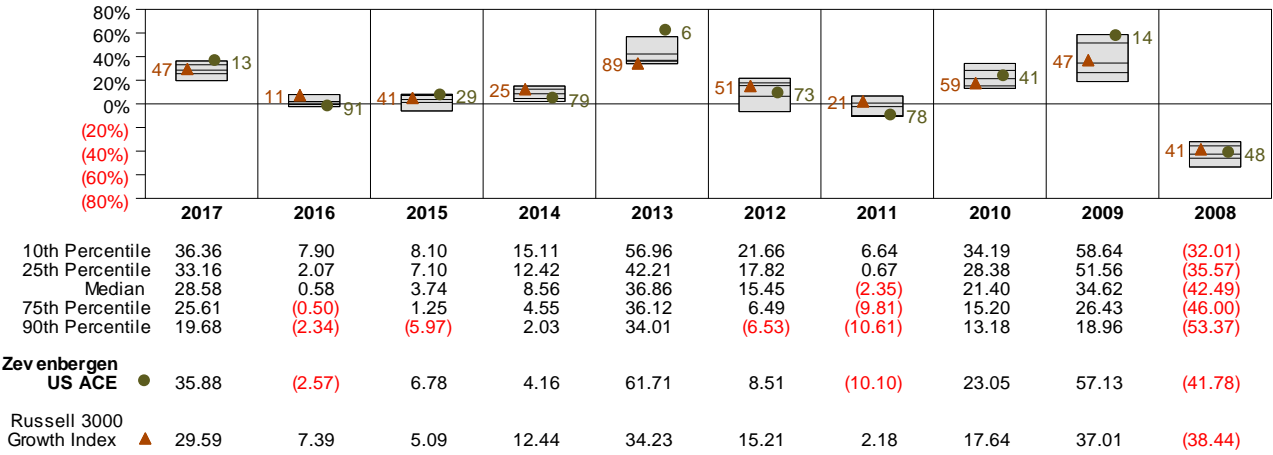


	Standard Deviation	Downside Risk	Tracking Error	Beta	R-Squared
10th Percentile	12.22	6.97	8.56	1.22	0.93
25th Percentile	10.35	3.98	4.83	1.05	0.87
Median	9.25	2.91	4.35	0.99	0.81
75th Percentile	8.39	1.83	3.38	0.90	0.74
90th Percentile	7.55	1.64	2.40	0.78	0.61
Channing US ACE ● A	9.76	2.84	4.46	1.01	0.79
Russell 3000 Value Index ■ B	8.56	0.00	0.00	1.00	1.00

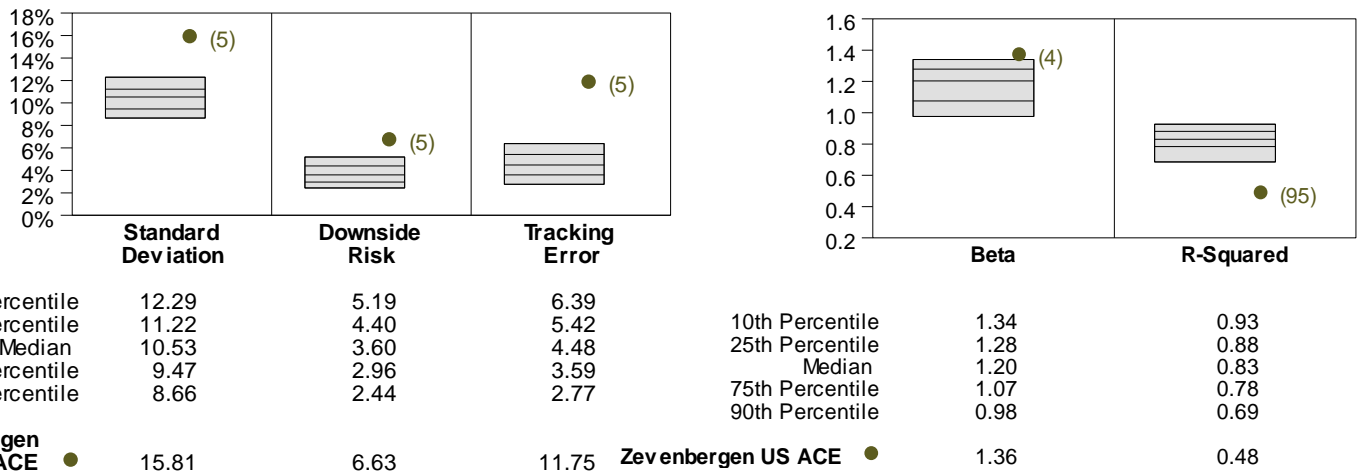
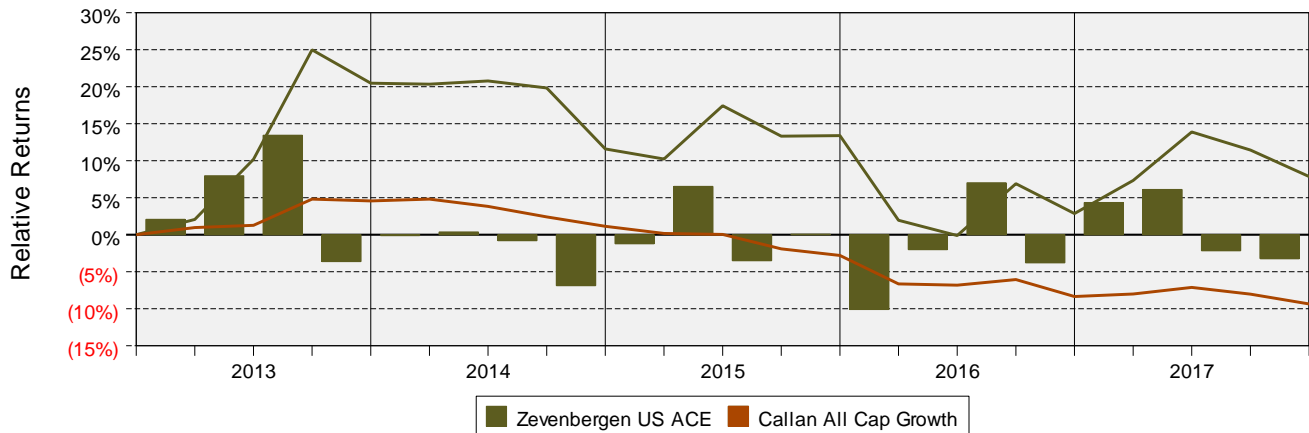
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Manager Watch List: Zevenbergen

Performance vs Callan All Cap Growth (Gross)



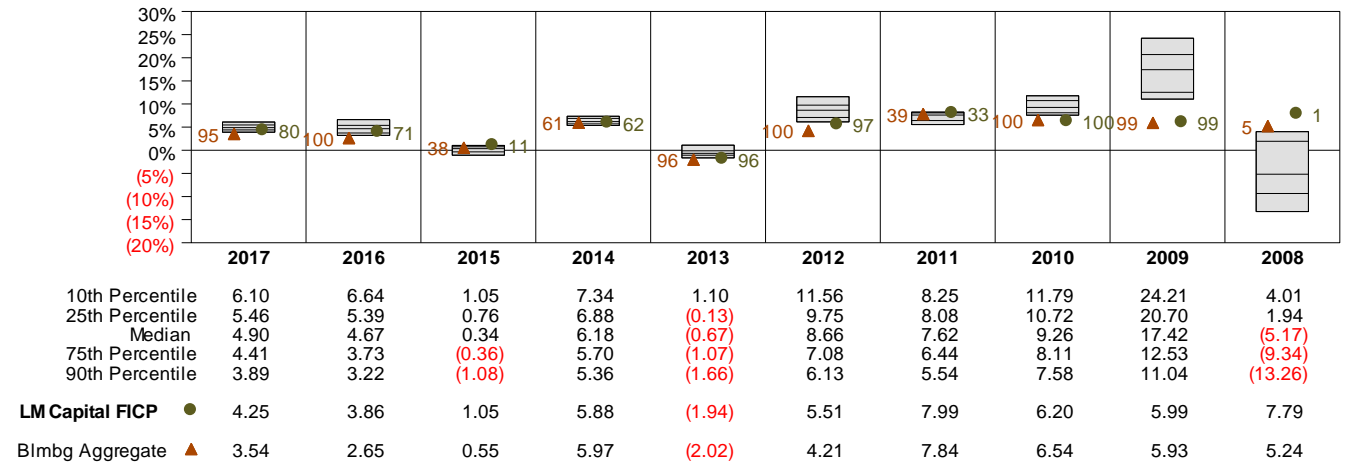
Cumulative and Quarterly Relative Return vs Russell 3000 Growth Index



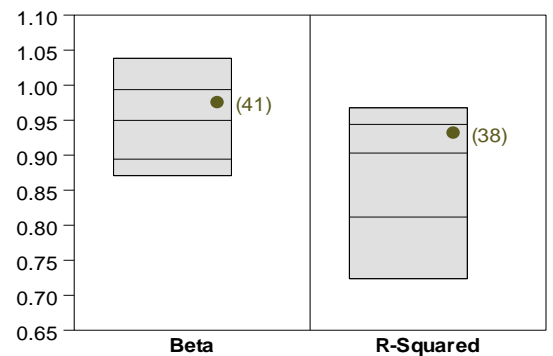
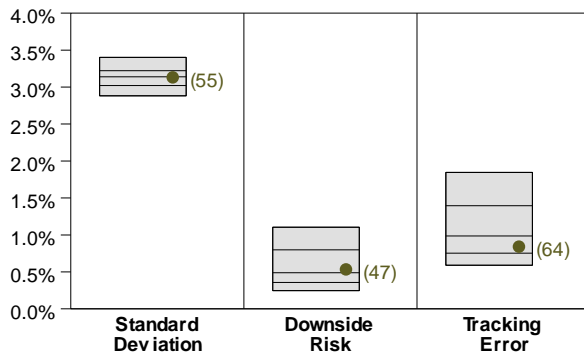
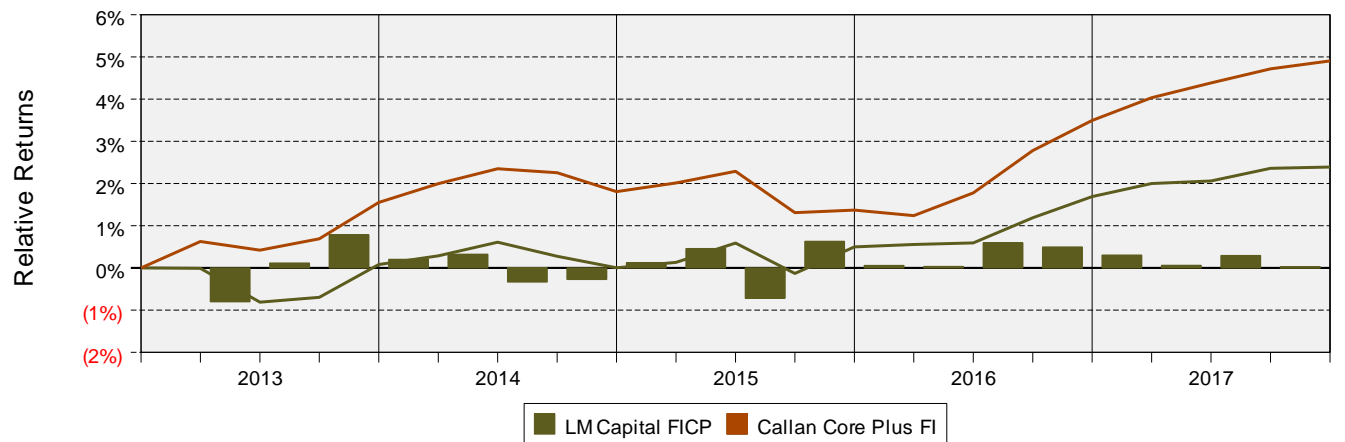
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Manager Watch List: LM Capital

Performance vs Callan Core Plus Fixed Income (Gross)



Cumulative and Quarterly Relative Return vs Blmbg Aggregate



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General Market and Economic Conditions

The U.S. economy closed out 2017 with decent momentum, recording a solid 2.6% gain in GDP in the fourth quarter after growth above 3% in each of the prior two quarters. After-tax corporate profits rose 4.7% (9.8% year-over-year), consumer spending gained 2.2% and business equipment spending soared 10.8%, the fastest in three years. Labor markets remained tight with the unemployment rate at 4.1%; the lowest since 2000, but average hourly earnings growth continued to languish at 2.5% for the trailing year (as of November). Fueled by high consumer confidence and a robust job market, U.S. retail sales in the holiday period rose at their best pace since 2011, according to Mastercard SpendingPulse, which tracks online and in-store spending. Manufacturing continued to show strength; the ISM manufacturing sector index exceeded 50 (indicating expansion) for 16 consecutive months through December. Inflation remained benign with headline CPI at 2.1% in December (y-o-y) and Core CPI (ex-food and energy) at 1.8%. Headline CPI was fueled by a 16.5% y-o-y leap in the price of gasoline. Prices of goods, however, fell 0.9% y-o-y with declines broad-based. The Fed's favored measure, the Core PCE price deflator, gained 1.5% y-o-y, remaining below the 2% target. As expected, the Fed hiked the Fed Funds target by 25 bps at its December meeting to 1.25% - 1.50%. This move marked the third increase of 25 bps during the year. Markets are pricing in an additional three hikes in 2018, while Fed projections are for rates to end 2018 between 2.0% and 2.25%. President Trump nominated Jerome Powell to become the next Fed Chair, replacing Janet Yellen, whose term expires in February 2018.

Non-U.S. developed economies continued to gain momentum. Fourth quarter GDP growth in the euro zone was 2.7% (y-o-y) while inflation remained low (1.4% y-o-y as of December). The European Central Bank (ECB) upgraded its 2018 forecast for growth from 1.8% to 2.3%, though growth in the U.K. is expected to slow given the yet-undetermined effects of Brexit. As expected by markets, the ECB kept its interest rates on hold in the fourth quarter, but it confirmed that it plans to reduce asset purchases to €30bn a month in January 2018, down from the current rate of €60bn. Unemployment in the euro zone fell to 8.8%, below 9% for the first time since 2009. Unemployment in Germany fell to a record low of 3.6%. Outside of Europe, Japan's economy continued to grow and unemployment reached a 24-year low at 2.7%. The Bank of Japan is expected to continue its stimulus measures in an effort to stimulate inflation (Core CPI +0.9% y-o-y in December).

Third Quarter 2017 Market Performance

The S&P 500 Index gained 6.6% in the fourth quarter and its 21.8% gain for the year was its best since 2013. The Index hit 62 record highs during the year and had only eight days of 1% or more fluctuations, the lowest number since 1964. The S&P 500 Price Index has nearly tripled (+295%) since its low in March 2009. Valuations are stretched by most measures, but estimates for future earnings are also strong. Markets were fanned by strong corporate earnings, expectations for tax cuts and deregulation, and share buybacks. Large growth stocks were the winners for the quarter and the year (R1000G: +7.9%, +30.2%) and small cap value pegged the lower end (R2000V: +2.0%, +7.8%). For both periods, value underperformed growth across the capitalization stack and small underperformed large across the style spectrum. Among the S&P 500 sectors, Technology

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was the clear leader for the year (+38.8%) but its 9.0% quarterly return was bested by Consumer Discretionary (+9.9%). All sectors posted positive results for the quarter, with Utilities eking out a 0.2% result. For the year, Energy (-1.0%) and Telecom (-1.3%) lost ground. Technology stocks now comprise 24% of the S&P 500 Index and 38% of the Russell 1000 Growth Index. The high flying quintet of tech stocks, better known as "FAAMG," continued to perform well in Q4.

	<u>4Q</u>	<u>2017</u>
Facebook	3.3%	53.4%
Apple	10.2%	48.4%
Amazon	21.6%	56.0%
Microsoft	15.4%	40.7%
Google (Alphabet A & C shs)	9.1%	35.6%

Overseas, the MSCI EAFE Index returned 4.2% for the quarter and 25.0% for the year. Annual gains were broad-based and further bolstered by a weakening U.S. dollar. Within the MSCI EAFE, the U.K. notched a record high in the fourth quarter and was up 22.3% for the year. Europe ex-UK posted a modest +0.9% result for the quarter and gained 26.8% for the year. Japan returned +8.5% for the quarter and +24.0% in 2017. From a sector perspective for the quarter, Energy (+7%) and Materials (+8%) did the best while Health Care and Telecommunications were laggards with results of just over 1%. For the year, Technology was the clear leader at +51%. Emerging market equities outperformed developed in the quarter and for the year (MSCI EM USD: +7.4%; +37.3%). Latin America was the only weak spot in the quarter (-2.3%) but was up a robust 23.7% for the year. Emerging Asia performed the best for the quarter and the year (+8.4%; +42.8%) driven by strong results from China (+7.6%, +54.1%) and Korea (+11.4%, +47.3%).

The U.S. yield curve continued its flattening trend in the fourth quarter. The 2-year U.S. Treasury yield climbed 42 bps to close at 1.89%, up 69 bps from 12/31/2016. At the long end of the yield curve, the 30-year U.S. Treasury yield fell 12 bps during the quarter, ending the year at 2.74% and 32 bps lower than its close in 2016. This trend reflects the Fed's tightening bias as well as benign inflation. As a result, longer-term bonds sharply outperformed short-term and intermediate-maturity bonds for the quarter and the year. The Bloomberg Barclays Long U.S. Treasury Index gained 2.4% in the quarter and 8.5% in 2017 versus a -0.4% quarterly and +1.1% annual return for the Bloomberg Barclays Intermediate Treasury Index. Consistent with the low volatility theme evident in the equity markets, the U.S Treasury 10-year traded in a narrow 60 bps band for the year, the lowest since 2000. The Bloomberg Barclays U.S. Aggregate Bond Index was roughly flat (+0.4%) for the quarter. Its 3.5% full year return was generated largely from its coupon. Corporate bonds outperformed for the quarter and the year and yield spreads reached a post-crisis tight of 93 bps over Treasuries. High yield corporates fared even better, with the Bloomberg Barclays U.S. Corporate High Yield Index up 0.5% for the quarter and 7.5% for the year. Default rates remained below average, but prices are high, relative to historical averages, for the sector. TIPS outperformed nominal U.S. Treasuries as expectations for future inflation rose. The Bloomberg Barclays U.S. TIPS Index rose 1.3% for the quarter and 3.0% for the year and the 10-year breakeven spread (the difference between nominal and real yields) rose to 1.96% as of year-end.

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Outside of the U.S., quarterly returns were mostly flat in developed markets. The Bloomberg Barclays Global Aggregate Bond Index returned +1.8% (unhedged) versus +0.8% for the hedged version. Emerging market debt delivered more muted returns than in earlier quarters. The JPM EMBI Global Diversified Index (\$ denominated) gained 1.2% in the quarter and 10.3% for the year. Returns were mixed, but beleaguered Venezuela was the outlier for the quarter (-29%) and the year (-34%). The local currency JPM GBI-EM Global Diversified Index returned +0.8% in the quarter and +15.2% for the year. In the quarter, Asian countries (+5%) performed best while Latin America sank nearly 5%. Argentina (-7%), Brazil (-3%), and Mexico (-9%) were underperformers for the quarter though Brazil and Mexico both posted double-digit returns for the year.

The municipal bond market performed well in 2017 as rates were steady and demand remained strong even in the face of uncertainty around tax changes. The tax reform package that recently passed is expected to have mixed effects on the municipal bond market. The change in personal income rates is not large enough to have a meaningful impact on the market while the decrease in corporate tax rates is expected to reduce demand for munis from certain corporations, namely banks and insurance companies. Limiting state and local tax deductions could increase demand for in-state munis in high tax states, and the elimination of advance refunding bonds (a small part of the market) will modestly reduce supply over time. Both aspects should be favorable for supply/demand dynamics. Issuance spiked going into year-end in anticipation of changing regulations, setting a record \$62.5 billion for December supply, but the market absorbed it well. The Bloomberg Barclays Municipal Bond Index returned 0.7% for the quarter and 5.4% for the year.

Brent crude oil prices closed the year at \$64/barrel, the highest since 2014 and up roughly 12% for the year. Global growth, improving supply/demand dynamics and OPEC agreements contributed to its rise. The energy-heavy S&P GSCI Commodity Index gained 9.9% in Q4 while the more diversified Bloomberg Commodity Index was up 4.7%. The Alerian MLP Index lost 0.9% for the quarter and sank 6.5% for the year in response to dividend cuts by some of its constituents. Gold gained 1.9% for the quarter and 13.7% in 2017; REITs were up modestly for both periods (MSCI: US REIT: +1.4%; +5.1%). U.S. TIPS outperformed nominal Treasuries; the Bloomberg Barclays U.S. TIPS Index returned +1.3% in Q4 and +3.0% for the year. The DJB Global Infrastructure Index gained 0.5% in the quarter and 15.8% in 2017.

Closing Thoughts

In spite of various simmering concerns, we ended 2017 the same way we started - with U.S. stock markets at record highs and volatility at historic lows. Meanwhile, there are no shortages of potential headwinds that we might encounter in 2018 and valuations across most asset classes remain stretched by many measures. It is impossible to predict what may spark volatility (bitcoin, Brexit, China, geopolitics, domestic politics, or, most likely a nebulous "other"). As a result, Callan still cautions investors to temper return expectations, to maintain a long-term perspective, and to adhere to prudent asset allocation with appropriate levels of diversification.

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Appendix

Appendix

Manager	Watch List Criteria: Rolling three year returns rank below median (Gross of Fees).		Watch List Criteria: Rolling three year returns are more than: 1. 200 basis points below the market index (Net of Fees) for equity managers. 2. 50 basis points below the market index (Net of Fees) for core fixed income managers. 3. 100 basis points below the market index (Net of Fees) for core plus fixed income managers.		Watch List Criteria: Rolling seven year returns rank below median (Gross of Fees).		Watch List Criteria: Rolling seven year returns are below the return of the index (Net of Fees).		Watch List Criteria: Five year information ratio is negative and ranks below median.		Watch List Criteria: Five year up market capture is below 90% and ranks below median.		Watch List Criteria: Five year down market capture is above 90% and ranks below median.		Weighted Averages	
	09/30/2017	12/31/2017	09/30/2017	12/31/2017	09/30/2017	12/31/2017	09/30/2017	12/31/2017	09/30/2017	12/31/2017	09/30/2017	12/31/2017	09/30/2017	12/31/2017	09/30/2017	12/31/2017
Manager																
<i>Large Cap Core Equity</i>																
Ivy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1.00	1.00
<i>Large Cap Value Equity</i>																
Harris	No	No	No	No	No	No	No	No	No	No	No	No	No	No	0.00	0.00
<i>Small Cap Value Equity</i>																
Phocas***	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	No	No	No	0.30	0.30
<i>Small Cap Equity</i>																
NTGI Structured Small Cap	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	0.00	0.10
<i>All Cap Growth Equity</i>																
Zevenbergen	No	No	Yes	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	0.60	0.50
<i>All Cap Value Equity</i>																
Channing	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	0.10	0.10
<i>International Equity</i>																
EARNEST Partners	No	No	No	No	Yes	Yes	No	No	No	No	No	No	Yes	Yes	0.30	0.30
Lazard	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	No	No	No	0.30	0.30
Morgan Stanley	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	0.10	0.10
Leading Edge	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No	0.20	0.20
William Blair	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	0.10	0.10
Ariel***	No	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No	No	0.40	0.50
Strategic Global***	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	0.00	0.10
<i>International Small Cap</i>																
William Blair	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	No	No	No	0.30	0.30
DFA**	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	No	No	No	0.30	0.30
<i>Emerging Market Equity</i>																
EARNEST Partners*	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	0.60	0.60
<i>Active Core Fixed Income</i>																
Taplin, Canida & Habacht	Yes	Yes	No	No	No	Yes	No	No	No	No	No	No	Yes	Yes	0.20	0.40
Pugh	Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	Yes	Yes	0.40	0.20
Garcia Hamilton	No	Yes	No	No	No	Yes	No	No	No	No	No	No	No	No	0.00	0.30
<i>Active Core Plus Fixed Income</i>																
LM Capital	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	0.20	0.00
<i>Active Opportunistic Fixed Income</i>																
WAMCO	No	No	No	No	No	No	No	No	No	No	No	No	No	No	0.00	0.00

*Manager does not yet have 5 years of portfolio data. CTPF portfolio data has been linked with a representative historical manager composite to populate Information Ratio, Up Market Capture, and Down Market Capture Watch List decisions as well as 7-year gross returns relative to a peer group and 7-year net returns relative to a market index.

**Manager does not yet have 7 years of portfolio data. CTPF portfolio data has been linked with a representative historical manager composite to populate 7-year gross returns relative to a peer group and 7-year net returns relative to a market index.

***Manager inception date was in 2016. Historical composite data is used to populate the above. Please note that Ariel International Equity (DM) only has historical data going back to the 1st quarter of 2012. We used the most data that was available to us in order to populate all five year and seven year fields above. For example, in order to populate seven year figures above for Ariel as of 12/31/17, we have used 6 year figures dating back to the 1st quarter of 2012.