

Callan



Chicago Teachers' Pension Fund

Executive Summary

December 31, 2016

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**Public School Teachers' Pension and Retirement Fund of Chicago
Performance Evaluation Executive Summary
Fourth Quarter 2016**

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Total Fund Commentary

The Fund was valued at \$9.8 billion at the end of the fourth quarter, representing a decrease of \$272 million from September 30, 2016. Net cash outflow activity of \$296 million exceeded investment gains of \$24 million during the quarter, resulting in a reduction in assets compared to the prior quarter. Overall, the portfolio's asset allocation was within acceptable parameters relative to the target asset allocation, except for domestic equity, which exhibited a slight overweight position of approximately 1.5% at quarter-end relative to the upper limit of 34%. We propose servicing future cash flow needs out of the domestic equity portfolio to bring it back in-line with target objectives.

The S&P 500 Index gained 3.8% for the fourth quarter of 2016 and 12% for the year. Small stocks, as measured by the Russell 2000 Index, roared 8.8% for the quarter and surged 21.3% for the year. The bond market did not fare as well, especially post-election. The prospect of increased fiscal spending and other stimulative proposals on the part of the new administration sparked concerns over higher inflation and tighter monetary policy, leading to a sharp sell-off in U.S. Treasuries. The 10-year Treasury yield climbed 85 bps, the largest quarterly increase since 1994. The year was a volatile one for bonds; the 10-year Treasury yield started the year at 2.27%, reached an all-time low of 1.37% in July (post-Brexit) and ended the year sharply higher at 2.45%.

In this environment, the Fund registered a positive return, underperforming the peer group median and the Policy Benchmark by a slight margin. The Fund continues to outperform its policy market benchmark and the 7.75% target return assumption, net of fees, over the trailing 5-year period. In addition, it continues to rank within the top third of its peer group over the trailing 5- and 7-year periods (gross of fees). Performance is competitive relative to the market benchmark over longer periods measured, net of fees.

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Key Issues, Observations and Recommendations

- **Watch Status Report and IPS:** Callan worked closely with Staff to update the Fund's Investment Policy Statement, including CTPF's Watch Status guidelines. The new Watch Status guidelines follow a holistic approach in evaluating investment performance, taking into account a variety of metrics, including performance consistency and relative and risk-adjusted performance. We believe the proposed guidelines will help Staff and the Board evaluate investment performance more completely to determine whether to add or remove investment managers from the Watch List.
- **Manager Due Diligence Exercise:** Per the Board's request, we have been working diligently with Staff to do a "deep dive" on all the managers that currently comprise the liquid portion of the Fund, including all active public equity and fixed income managers. This analysis will provide additional insights to what was provided during the structure analysis that was requested and completed in 2016.
- **Performance Measurement – Modification to Executive Summary:** The Executive Summary now includes two tables. One of the tables focuses on investment results, net of fees, relative to corresponding market benchmarks. The second table provides relative performance, gross of fees, against both market benchmarks and peer groups. We strongly believe this is a better model to evaluate investment performance.
- **Observations:**
 1. By definition, active managers will underperform during periods that may not be favorable to the strategy in question. As with any investment style, active managers will go in and out of favor over time. For example, 2016 was a difficult year for active managers in many segments of the market. However, we do expect managers to provide value added over full market cycles, but are mindful of the dynamic nature of active management and the time that may be required to fully appreciate the potential for excess returns.
 2. Performance rankings can change very quickly: Though this is an important component of our performance measurement process, it only represents one of the tools we consider in evaluating investment results. It is important to note that one single quarter can have a meaningful effect on historical results. As we mentioned in prior communications, we need to be careful not to terminate managers that may be well positioned to provide excess returns over the long-term, even if they show weakness over recent periods. Every dollar we spend to terminate relationships comes out of the Fund. Therefore, we want to exercise caution, and have good justification, to terminate relationships or implement any changes in the Fund. *Relying only on historical performance to terminate investment manager relationships is not in the best interest of the Fund or its participants.*
- **Real Estate Update:**
 - The Board approved the hiring of Oak Street Real Estate Capital at the November Board Meeting

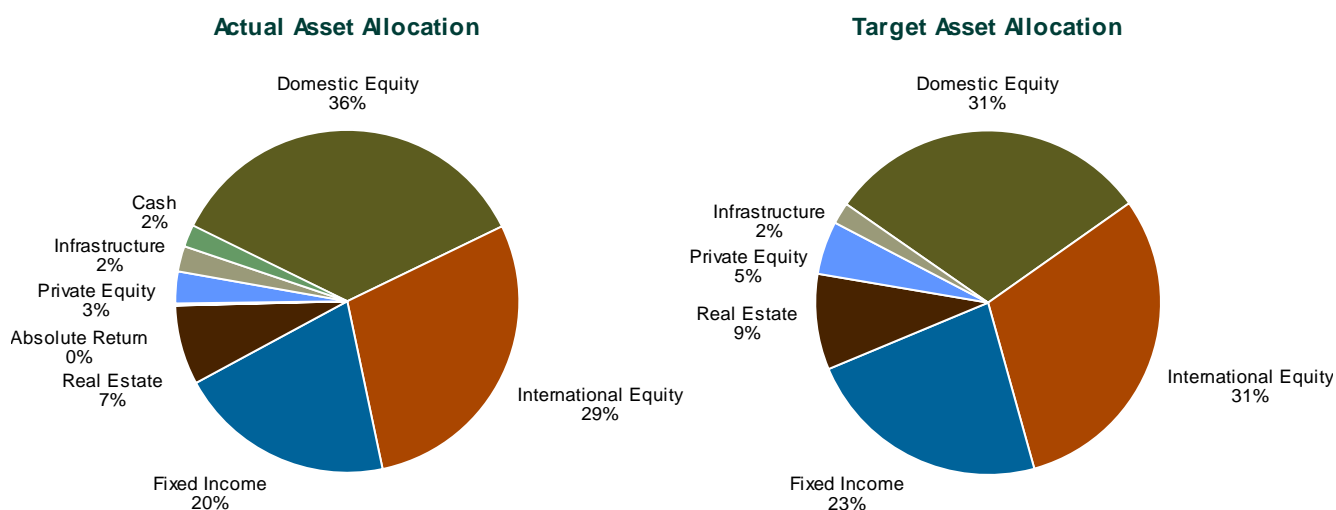
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- The Board will consider an investment with GreenOak, an MWDBE manager at its February Board meeting
- **Watch Status Report:** Based on CTPF's current Watch List Policy, the following managers remain on the Watch List until further notice:
 - Waddell & Reed: Included on the Watch List due to inconsistent rolling three-year performance relative to the market index and peer group median.
 - Taplin Canida Habacht (TCH): Included on the Watch List due to inconsistent rolling three-year performance relative to the market index and peer group median. TCH was already on the Watch List due to planned organizational changes; Tere Canida and Alan Habacht retired at the end of 2016. It has been a year since TCH was on watch for organizational changes, Callan is comfortable with the outcome of the organizational changes and the succession plan provided by TCH.
 - Holland continues to be on Watch due to performance results relative to CTPF's policy guidelines.
 - Morgan Stanley continues to be on Watch for performance results relative to CTPF's policy guidelines.
 - Zevenbergen, Channing, and William Blair Small Cap International should be added to the Watch List due to inconsistent rolling three-year performance relative to the market index and peer group median.
 - Based on the Proposed Watch List Policy, the managers that would remain on watch due to performance issues are Holland and Zevenbergen.

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Asset Allocation

The Fund was valued at \$9.8 billion at the end of the fourth quarter, representing a decrease of \$272 million from September 30, 2016. Net cash outflow activity of \$296 million exceeded investment gains of \$24 million during the quarter, resulting in a reduction in assets compared to the prior quarter. Overall, the portfolio's asset allocation was within acceptable parameters relative to the target asset allocation, except for domestic equity, which exhibited a slight overweight position of approximately 1.5% at quarter-end relative to the upper limit of 34%. We propose servicing future cash flow needs out of the domestic equity portfolio to bring it back in-line with target objectives.

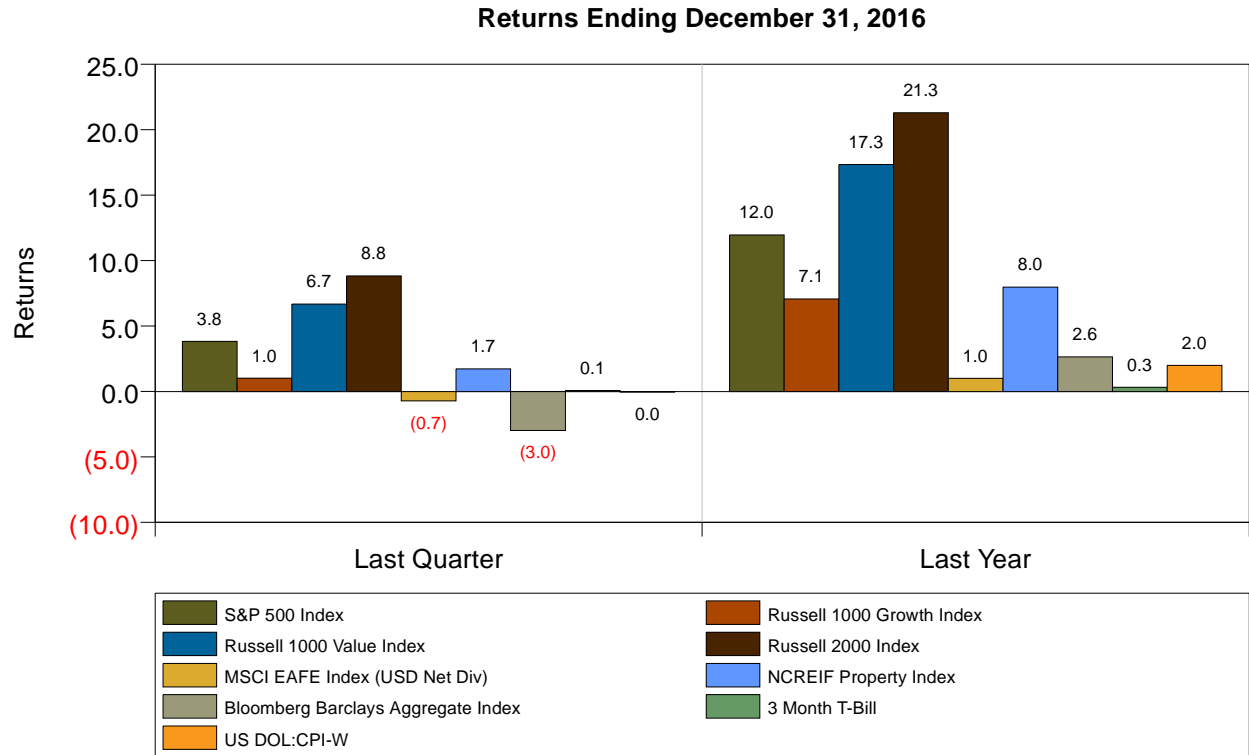


Asset Class	\$000s Actual	Weight Actual	Target	Percent Difference	\$000s Difference
Domestic Equity	3,488,900	35.6%	30.5%	5.1%	498,193
International Equity	2,834,232	28.9%	30.5%	(1.6%)	(156,475)
Fixed Income	1,995,803	20.4%	23.0%	(2.6%)	(259,484)
Real Estate	734,011	7.5%	9.0%	(1.5%)	(148,493)
Absolute Return	19,523	0.2%	0.0%	0.2%	19,523
Private Equity	290,845	3.0%	5.0%	(2.0%)	(199,434)
Infrastructure	237,043	2.4%	2.0%	0.4%	40,931
Cash	205,237	2.1%	0.0%	2.1%	205,237
Total	9,805,596	100.0%	100.0%		

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Select Market Returns

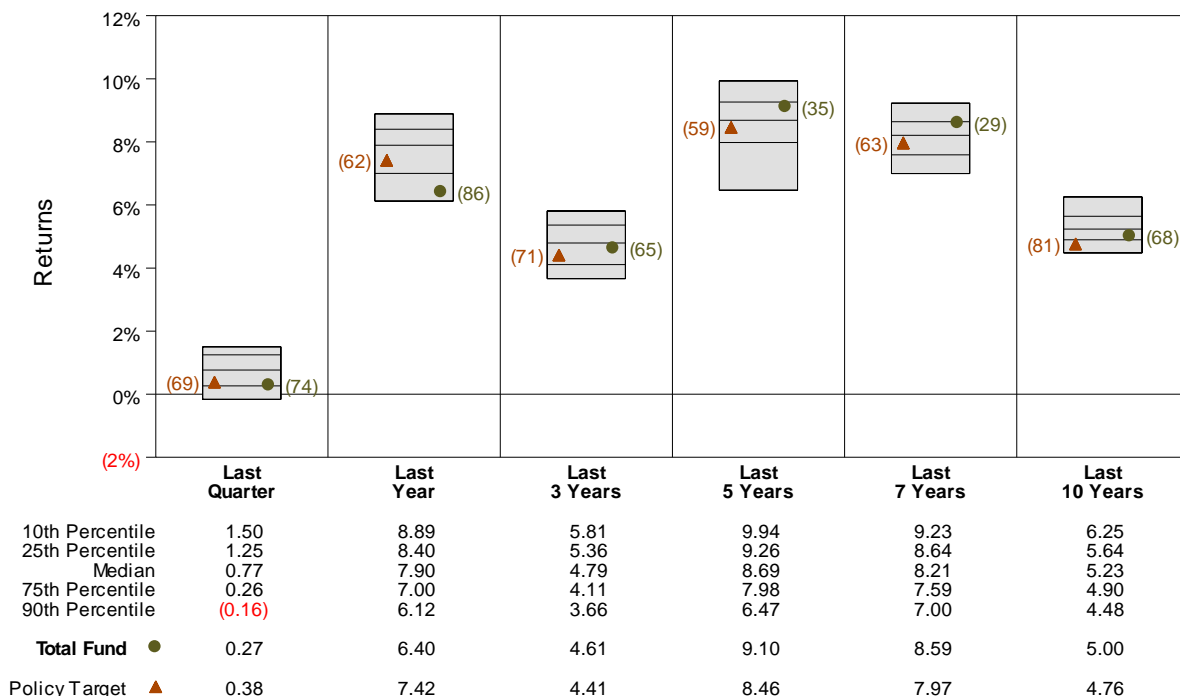


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Total Fund Performance vs. Target

CAI 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, 5% NFI ODCE Value Weight Index, 5% Russell 3000 Index and 2% Annualized 8% Return.

For the fourth quarter, the Fund underperformed the market benchmark and ranked in the 74th percentile of its peers. For the trailing one-year period, the Fund underperformed the Policy Target by 102 basis points, gross of investment management fees (128 basis points net of investment management fees) and ranked in the bottom 14 percent of its peer group.

Key detractors from performance for the quarter (performance commentary relative to benchmarks is net of fees and performance commentary relative to peers is gross of fees):

- Fixed Income:** The fixed income composite underperformed its market benchmark by 9 basis points for the quarter, ranking in the 89th percentile of its peers. WAMCO and Pugh underperformed their market benchmarks. All of the other fixed income active managers outperformed their respective benchmarks over the quarter. All of the active fixed income managers have outperformed the market index over the trailing one-, three-, and five-year periods.
- International Equity:** Performance was mixed for the international equity managers this quarter. However, the international equity composite underperformed the custom international equity benchmark by 98 basis points over the period. Ariel, Lazard, Morgan Stanley, Strategic Global Advisors and William Blair International Small Cap posted the weakest relative performance over the fourth quarter.

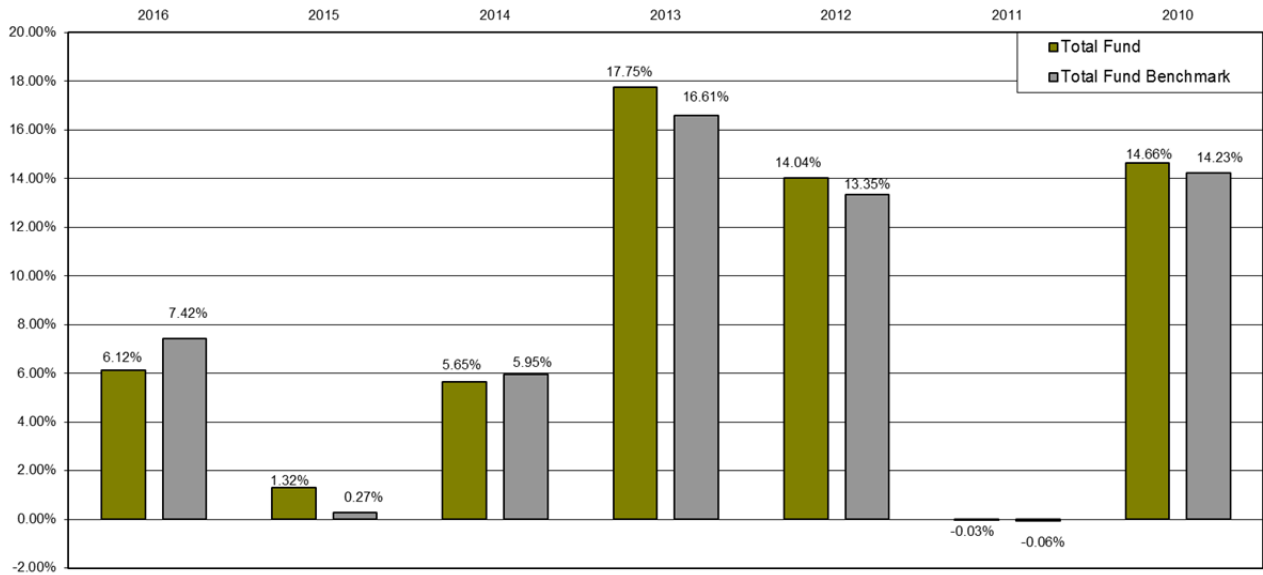
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- **Alternative Investments:** Real estate, private equity and infrastructure detracted from results over the quarter on a time-weighted return basis.

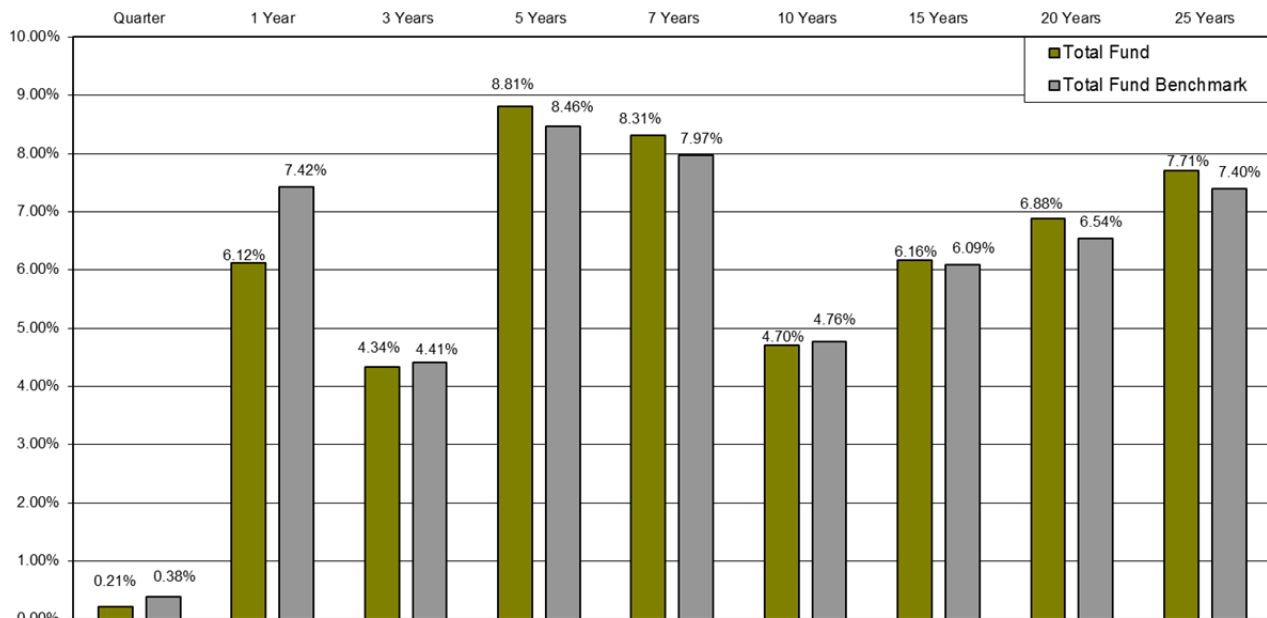
Additional observations:

- Hedge funds provided favorable results over the quarter and domestic equity performed in line with its target; however, the hedge fund gains were not enough to offset the underperformance incurred in other areas of the portfolio over the period.

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 12/31/2016						Inception Date	Qtr-End MV
	FUND	Qtr	1 Yr	3 Yr	5 Yr	7 Yr		
Fixed Income								
Northern Trust Gov/ Credit Index Fund	-3.37	3.05	3.00	2.28	3.78	5.40	Jan-94	\$938m
Bloomberg Barclays Gov/Credit Index	-3.39	3.05	3.04	2.29	3.79	5.38		
Variance	0.02	0.00	-0.04	-0.01	-0.01	0.02		
Garcia Hamilton	-2.51	2.96	3.81	4.26	-	4.03	Oct-10	\$103m
Bloomberg Barclays Aggregate Index	-2.98	2.65	3.03	2.23	-	2.80		
Variance	0.47	0.31	0.78	2.03	-	1.23		
LM Capital*	-2.53	3.70	3.41	2.66	3.86	4.29	Nov-04	\$209m
Bloomberg Barclays Aggregate Index	-2.98	2.65	3.03	2.23	3.63	4.13		
Variance	0.45	1.05	0.38	0.43	0.23	0.16		
Pugh Capital Management	-3.08	2.66	3.07	2.52	-	3.04	Oct-10	\$166m
Bloomberg Barclays Aggregate Index	-2.98	2.65	3.03	2.23	-	2.80		
Variance	-0.10	0.01	0.04	0.29	-	0.24		
Taplin, Canida & Habacht	-2.17	5.72	3.39	3.09	4.33	4.06	Nov-04	\$122m
Bloomberg Barclays Aggregate Index	-2.98	2.65	3.03	2.23	3.63	4.13		
Variance	0.81	3.07	0.36	0.86	0.70	-0.07		
Western Asset Management	-3.15	5.46	4.13	4.06	5.49	5.27	Feb-03	\$411m
Bloomberg Barclays Aggregate Index	-2.98	2.65	3.03	2.23	3.63	4.21		
Variance	-0.17	2.81	1.10	1.83	1.86	1.06		

*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 12/31/2016						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	3.87	12.25	8.94	14.69	12.87	9.54	Apr-90	\$843m
S&P 500 Index	3.82	11.96	8.87	14.66	12.83	9.61		
Variance	0.05	0.29	0.07	0.03	0.04	-0.07		
Rhumbline Russell 1000 Index Fund	3.87	12.11	8.52	14.68	12.90	6.52	Jun-07	\$1,386m
Russell 1000 Index	3.83	12.05	8.59	14.69	12.90	6.41		
Variance	0.04	0.06	-0.07	-0.01	0.00	0.11		
Waddell & Reed	0.00	4.00	4.97	13.52	13.04	11.18	Jan-91	\$123m
Russell 1000 Index	3.83	12.05	8.59	14.69	12.90	10.13		
Variance	-3.83	-8.05	-3.62	-1.17	0.14	1.05		
Holland Capital	-0.66	2.63	5.78	12.24	11.56	9.00	Feb-94	\$252m
Russell 1000 Growth Index	1.01	7.08	8.55	14.50	13.03	8.44		
Variance	-1.67	-4.45	-2.77	-2.26	-1.47	0.56		
Zevenbergen Capital Management	-2.72	-2.98	2.29	13.26	10.76	9.78	Oct-92	\$107m
Russell 3000 Growth Index	1.20	7.39	8.27	14.44	13.04	8.41		
Variance	-3.92	-10.37	-5.98	-1.18	-2.28	1.37		
Channing*	6.37	11.82	6.02	15.39	12.44	15.08	Jul-09	\$135m
Channing Benchmark	7.24	18.40	8.55	14.81	13.68	16.73		
Variance	-0.87	-6.58	-2.53	0.58	-1.24	-1.65		
BMO Harris Investment Management	8.12	12.15	8.33	15.05	13.26	6.99	Jul-99	\$271m
Harris Benchmark**	6.68	17.34	8.59	14.80	12.72	4.94		
Variance	1.44	-5.19	-0.26	0.25	0.54	2.05		
Small Cap Equity								
Northern Trust Small Cap	9.22	21.67	8.07	15.71	14.92	12.39	Jan-91	\$151m
Russell 2000 Index	8.83	21.31	6.74	14.46	13.24	10.90		
Variance	0.39	0.36	1.33	1.25	1.68	1.49		
Phocas Small Cap Value	12.45	-	-	-	-	19.13	Jul-16	\$144m
Russell 2000 Value Index	14.07	-	-	-	-	24.19		
Variance	-1.62	-	-	-	-	-5.06		
Manager of Managers								
Attucks***	0.36	6.65	3.45	--	--	--	Jul-04	\$205m
Custom Benchmark	2.05	11.07	3.65	--	--	--		
Variance	-1.69	-4.42	-0.20	--	--	--		

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

CTPF Investment Strategies	Net Investment Returns as of 12/31/2016						Inception Date	Qtr-End MV	
	FUND	Qtr	1 Yr	3 Yr	5 Yr	7 Yr			Since Inception
International Equity									
Ariel Investments	-5.17	-	-	-	-	-	0.88	Jul-16	\$70m
MSCI EAFE Index	-0.71	-	-	-	-	-	5.67		
Variance	-4.46	-	-	-	-	-	-4.79		
EARNEST Partners	-0.02	6.44	-0.43	5.91	5.02	5.02	3.98	Apr-07	\$494m
MSCI ACWI ex-US Index	-1.25	4.50	-1.78	5.00	2.93	2.93	0.61		
Variance	1.23	1.94	1.35	0.91	2.09	2.09	3.37		
Lazard	-3.42	0.82	-0.80	7.16	5.11	5.11	5.13	Jan-01	\$519m
MSCI ACWI ex-US Index	-1.25	4.50	-1.78	5.00	2.93	2.93	3.89		
Variance	-2.17	-3.68	0.98	2.16	2.18	2.18	1.24		
Morgan Stanley	-1.94	-1.96	-1.98	6.50	4.62	4.62	8.15	Apr-95	\$514m
MSCI EAFE Index	-0.71	1.00	-1.60	6.53	3.81	3.81	4.53		
Variance	-1.23	-2.96	-0.38	-0.03	0.81	0.81	3.62		
Strategic Global Advisors	-1.65	-	-	-	-	-	4.33	Jul-16	\$68m
MSCI EAFE Index	-0.71	-	-	-	-	-	5.67		
Variance	-0.94	-	-	-	-	-	-1.34		
William Blair Growth	-3.95	-2.01	-1.03	7.70	-	-	6.78	Feb-10	\$502m
MSCI ACWI ex-US IMI Growth Index	-5.77	0.06	-1.00	5.58	-	-	4.55		
Variance	1.82	-2.07	-0.03	2.12	-	-	2.23		
William Blair International Small Cap	-7.00	-3.74	-0.83	8.49	7.68	7.68	2.80	Apr-07	\$164m
William Blair ISCE Benchmark*	-6.08	-0.28	0.79	6.99	5.65	5.65	1.07		
Variance	-0.92	-3.46	-1.62	1.50	2.03	2.03	1.73		
Dimensional Fund Advisors	1.69	8.19	2.22	--	--	--	12.92	Jun-12	\$165m
MSCI World Small Cap ex-US	-2.74	4.32	1.36	--	--	--	9.87		
Variance	4.43	3.87	0.86	--	--	--	3.05		
EARNEST Partners Emerging Markets	-3.06	9.81	-1.35	--	--	--	-2.75	Mar-13	\$145m
MSCI Emerging Markets Index	-4.16	11.19	-2.55	--	--	--	-2.70		
Variance	1.10	-1.38	1.20	--	--	--	-0.05		
International Manager of Managers									
Leading Edge	-1.63	4.55	-1.15	7.16	-	-	3.82	Apr-10	\$111m
MSCI ACWI ex-US Index	-1.25	4.50	-1.78	5.00	-	-	2.80		
Variance	-0.38	0.05	0.63	2.16	-	-	1.02		

* 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 12/31/2016						Inception Date	Qtr-End MV
	FUND	Qtr	1 Yr	3 Yr	5 Yr	7 Yr		
Infrastructure								
Infrastructure Composite	-0.35	6.22	1.87	5.37	4.66	5.09	Nov-08	\$237m
8% Annualized Return	1.94	8.00	8.00	8.00	8.00	8.00		
Variance	-2.29	-1.78	-6.13	-2.63	-3.34	-2.91		
Hedge Funds								
Pluscios	1.49	-0.85	0.30	3.75	-	2.61	Nov-10	\$20m
T-Bill + 5% (1-mo lag)	1.32	5.32	5.13	5.11	-	5.11		
Variance	0.17	-6.17	-4.83	-1.36	-	-2.50		
Real Estate								
Real Estate Composite	0.64	8.91	11.97	10.86	11.64	7.25	Jan-02	\$734m
NFI-ODCE Value Weight	1.88	7.79	11.04	11.16	12.27	7.15		
Variance	-1.24	1.12	0.93	-0.30	-0.63	0.10		
Private Equity								
Private Equity Composite	3.66	7.18	12.03	10.41	11.52	8.37	Jan-02	\$291m
Russell 3000 Index	4.21	12.74	8.43	14.67	12.92	7.11		
Variance	-0.55	-5.56	3.60	-4.26	-1.40	1.26		

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. CTPF Private Equity data is reported for Q3 2016 and the benchmark represents Q4 2016. Comments on Infrastructure, REITS and Real Estate and 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 12/31/2016						Inception Date	Qtr-End MV
	FUND	Qtr	1 Yr	3 Yr	5 Yr	7 Yr		
Fixed Income								
Northern Trust Gov/ Credit Index Fund	-3.37	3.06	3.01	2.28	3.79	5.41	Jan-94	\$938m
Bloomberg Barclays Gov/Credit Index	-3.39	3.05	3.04	2.29	3.79	5.38		
Variance	0.02	0.01	-0.03	-0.01	0.00	0.03		
Peer Ranking – CAI Core Bond	100	53	87	96	91			
Garcia Hamilton	-2.46	3.16	4.01	4.47	-	4.22	Oct-10	\$103m
Bloomberg Barclays Aggregate Index	-2.98	2.65	3.03	2.23	-	2.80		
Variance	0.52	0.51	0.98	2.24	-	1.42		
Peer Ranking – CAI Core Bond	12	48	6	1	-			
LM Capital*	-2.49	3.86	3.58	2.83	4.03	4.48	Nov-04	\$209m
Bloomberg Barclays Aggregate Index	-2.98	2.65	3.03	2.23	3.63	4.13		
Variance	0.49	1.21	0.55	0.60	0.40	0.35		
Peer Ranking - CAI Core Plus Bond	69	72	48	98	100			
Pugh Capital Management	-3.04	2.83	3.24	2.69	-	3.22	Oct-10	\$166m
Bloomberg Barclays Aggregate Index	-2.98	2.65	3.03	2.23	-	2.80		
Variance	-0.06	0.18	0.21	0.46	-	0.42		
Peer Ranking - CAI Core Bond	94	73	73	68	-			
Taplin, Canida & Habacht	-2.13	5.88	3.55	3.25	4.49	4.22	Nov-04	\$122m
Bloomberg Barclays Aggregate Index	-2.98	2.65	3.03	2.23	3.63	4.13		
Variance	0.85	3.23	0.52	1.02	0.86	0.09		
Peer Ranking - CAI Core Bond	5	2	34	24	26			
Western Asset Management	-3.10	5.65	4.32	4.25	5.68	5.46	Feb-03	\$411m
Bloomberg Barclays Aggregate Index	-2.98	2.65	3.03	2.23	3.63	4.21		
Variance	-0.12	3.00	1.29	2.02	2.05	1.25		
Peer Ranking - CAI Core Plus Bond	99	21	14	24	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 12/31/2016						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	3.87	12.26	8.95	14.70	12.87	9.54	Apr-90	\$843m
S&P 500 Index	3.82	11.96	8.87	14.66	12.83	9.61		
Variance	0.05	0.30	0.08	0.04	0.04	-0.07		
Peer Ranking – CAI Large Cap	48	33	22	41	37			
Rhumblin Russell 1000 Index Fund	3.87	12.12	8.53	14.70	12.91	6.53	Jun-07	\$1,386m
Russell 1000 Index	3.83	12.05	8.59	14.69	12.90	6.41		
Variance	0.04	0.07	-0.06	0.01	0.01	0.12		
Peer Ranking – CAI Large Cap	48	34	36	41	36			
Waddell & Reed	0.06	4.23	5.19	13.75	13.26	11.40	Jan-91	\$123m
Russell 1000 Index	3.83	12.05	8.59	14.69	12.90	10.13		
Variance	-3.77	-7.82	-3.40	-0.94	0.36	1.27		
Peer Ranking - CAI Large Cap Core	97	97	97	74	29			
Holland Capital	-0.58	2.98	6.13	12.61	11.91	9.38	Feb-94	\$252m
Russell 1000 Growth Index	1.01	7.08	8.55	14.50	13.03	8.44		
Variance	-1.59	-4.10	-2.42	-1.89	-1.12	0.94		
Peer Ranking - CAI Large Cap Growth	55	60	72	83	58			
Zevenbergen Capital Management	-2.63	-2.57	2.71	13.71	11.21	10.21	Oct-92	\$107m
Russell 3000 Growth Index	1.20	7.39	8.27	14.44	13.04	8.41		
Variance	-3.83	-9.96	-5.56	-0.73	-1.83	1.80		
Peer Ranking - CAI All Cap	71	91	75	25	60			
Channing*	6.49	12.36	6.53	15.94	13.02	15.68	Jul-09	\$135m
Channing Benchmark	7.24	18.40	8.55	14.81	13.68	16.73		
Variance	-0.75	-6.04	-2.02	1.13	-0.66	-1.05		
Peer Ranking – CAI All Cap Value	69	86	68	26	31			
BMO Harris Investment Management	8.18	12.42	8.57	15.30	13.52	7.28	Jul-99	\$271m
Harris Benchmark**	6.68	17.34	8.59	14.80	12.72	4.94		
Variance	1.50	-4.92	-0.02	0.50	0.80	2.34		
Peer Ranking - CAI Large Cap Value	32	81	40	33	17			
Small Cap Equity								
Northern Trust Small Cap	9.24	21.77	8.16	15.77	14.97	12.47	Jan-91	\$151m
Russell 2000 Index	8.83	21.31	6.74	14.46	13.24	10.90		
Variance	0.41	0.46	1.42	1.31	1.73	1.57		
Peer Ranking - CAI Small Cap	48	39	44	46	41			
Phocas Small Cap Value	12.66	-	-	-	-	19.36	Jul-16	\$144m
Russell 2000 Value Index	14.07	-	-	-	-	24.19		
Variance	-1.41	-	-	-	-	-4.83		
Peer Ranking - CAI Small Cap Value	69	-	-	-	-			
Manager of Managers								
Attucks***	0.51	7.28	4.03	--	--	--	Jul-04	\$205m
Custom Benchmark	2.05	11.07	3.65	--	--	--		
Variance	-1.54	-3.79	0.38	--	--	--		

*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 12/31/2016						Inception Date	Qtr-End MV	
	FUND	Qtr	1 Yr	3 Yr	5 Yr	7 Yr			Since Inception
International Equity									
Ariel Investments	-4.99	-	-	-	-	-	1.06	Jul-16	\$70m
MSCI EAFE Index	-0.71	-	-	-	-	-	5.67		
Variance	-4.28	-	-	-	-	-	-4.61		
Peer Ranking - CAI Non-US Equity	86	-	-	-	-	-			
EARNEST Partners	0.09	6.88	-0.02	6.35	5.45	5.45	4.49	Apr-07	\$494m
MSCI ACWI ex-US Index	-1.25	4.50	-1.78	5.00	2.93	2.93	0.61		
Variance	1.34	2.38	1.76	1.35	2.52	2.52	3.88		
Peer Ranking - CAI Non-US Equity	24	7	39	77	42				
Lazard	-3.38	1.00	-0.62	7.34	5.31	5.31	5.50	Jan-01	\$519m
MSCI ACWI ex-US Index	-1.25	4.50	-1.78	5.00	2.93	2.93	3.89		
Variance	-2.13	-3.50	1.16	2.34	2.38	2.38	1.61		
Peer Ranking - CAI Non-US Equity	70	56	51	52	44				
Morgan Stanley	-1.83	-1.53	-1.53	6.97	5.07	5.07	8.61	Apr-95	\$514m
MSCI EAFE Index	-0.71	1.00	-1.60	6.53	3.81	3.81	4.53		
Variance	-1.12	-2.53	0.07	0.44	1.26	1.26	4.08		
Peer Ranking - CAI Non-US Equity	50	82	64	62	51				
Strategic Global Advisors	-1.52	-	-	-	-	-	4.47	Jul-16	\$68m
MSCI EAFE Index	-0.71	-	-	-	-	-	5.67		
Variance	-0.81	-	-	-	-	-	-1.20		
Peer Ranking - CAI Non-US Equity	47	-	-	-	-	-			
William Blair Growth	-3.86	-1.65	-0.67	8.10	-	-	7.18	Feb-10	\$502m
MSCI ACWI ex-US IMI Growth Index	-5.77	0.06	-1.00	5.58	-	-	4.55		
Variance	1.91	-1.71	0.33	2.52	-	-	2.63		
Peer Ranking - CAI Core Growth Int'l Equity	40	72	58	20	-	-			
William Blair International Small Cap	-6.80	-2.90	0.02	9.43	8.60	8.60	3.81	Apr-07	\$164m
William Blair ISCE Benchmark*	-6.08	-0.28	0.79	6.99	5.65	5.65	1.07		
Variance	-0.72	-2.62	-0.77	2.44	2.95	2.95	2.74		
Peer Ranking - CAI Int'l Small Cap Equity	83	79	86	81	68				
Dimensional Fund Advisors	1.69	8.19	2.33	--	--	--	13.07	Jun-12	\$165m
MSCI World Small Cap ex-US	-2.74	4.32	1.36	--	--	--	11.18		
Variance	4.43	3.87	0.97	--	--	--	1.89		
Peer Ranking - CAI Int'l Small Cap Equity	4	8	51	--	--	--			
EARNEST Partners Emerging Markets	-2.93	10.40	-0.84	--	--	--	-2.26	Mar-13	\$145m
MSCI Emerging Markets Index	-4.16	11.19	-2.55	--	--	--	-2.70		
Variance	1.23	-0.79	1.71	--	--	--	0.44		
Peer Ranking - CAI EM Equity	25	49	41	--	--	--			
International Manager of Managers									
Leading Edge	-1.43	5.40	-0.38	8.00	-	-	4.64	Apr-10	\$111m
MSCI ACWI ex-US Index	-1.25	4.50	-1.78	5.00	-	-	2.80		
Variance	-0.18	0.90	1.40	3.00	-	-	1.84		
Peer Ranking - CAI Non-US Equity	46	15	47	34	-	-			

* 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 12/31/2016						Inception Date	Qtr-End MV
	FUND	Qtr	1 Yr	3 Yr	5 Yr	7 Yr		
Infrastructure								
Infrastructure Composite	-0.19	6.89	2.44	5.97	5.27	5.60	Nov-08	\$237m
8% Annualized Return	1.94	8.00	8.00	8.00	8.00	8.00		
Variance	-2.13	-1.11	-5.56	-2.03	-2.73	-2.40		
Hedge Funds								
Pluscios	1.49	-0.85	0.30	3.75	-	2.61	Nov-10	\$20m
T-Bill + 5% (1-mo lag)	1.32	5.32	5.13	5.11	-	5.11		
Variance	0.17	-6.17	-4.83	-1.36	-	-2.50		
Real Estate								
Real Estate Composite	0.82	9.69	12.73	11.62	12.30	7.68	Jan-02	\$734m
NFI-ODCE Value Weight	1.88	7.79	11.04	11.16	12.27	7.15		
Variance	-1.06	1.90	1.69	0.46	0.03	0.53		
Private Equity								
Private Equity Composite	3.72	7.43	12.19	10.57	11.63	8.43	Jan-02	\$291m
Russell 3000 Index	4.21	12.74	8.43	14.67	12.92	7.11		
Variance	-0.49	-5.31	3.76	-4.10	-1.29	1.32		

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. CTPF Private Equity data is reported for Q3 2016 and the benchmark represents Q4 2016. Comments on Infrastructure, REITS and Real Estate and covered in the quarterly Real Estate Report. Private Equity is discussed in the quarterly Private Equity Report.

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MANAGER COMMENTARIES

Please note that performance commentary relative to a managers' market benchmark is made on a net of fee basis. Performance commentary relative to a managers' peer group is made on a gross of fee basis.

Active Domestic Equity Manager Commentary

- Waddell & Reed underperformed the Russell 1000 Index for the quarter and ranked in the 97th percentile among their peers. The one-, three-, and five-year returns also lagged the benchmark, but the fund has outperformed over the last ten years and since inception. Waddell & Reed's underperformance for the quarter was mostly due to an underweight in the Financials sector and poor stock selection in the Industrials, Health Care, Financials and Information Technology sectors.
- Holland underperformed the Russell 1000 Growth Index in the fourth quarter and ranked in the 55th percentile in the large cap growth equity peer group. Holland's poor selection in Consumer Discretionary, Health Care, Information Technology and Consumer Staples stocks detracted from performance. Holland's one-, three-, and five-year performance is challenged relative to the Russell 1000 Growth Index and peer group median. Since inception, Holland has outperformed the market index.
- Zevenbergen, the Fund's all-cap growth manager, underperformed the Russell 3000 Growth Index by 392 basis points this quarter and ranked in the 71st percentile in its peer group. The portfolio's underperformance was mainly attributable to security selection in Information Technology and Health Care. Since inception, returns continue to be favorable compared to the Russell 3000 Growth Index.
- Channing, the Fund's all-cap value manager, underperformed the index and ranked in the 69th percentile among its peers for the quarter. Stock selection in the Consumer Discretionary and Health Care sectors detracted from relative results over the quarter. Performance over longer time periods is mixed relative to the index.
- BMO Harris outperformed the market index in the fourth quarter and ranked in the 32nd percentile among its peers. Positive stock selection in the Industrials and Financials sectors boosted relative quarterly results. Performance over five and ten year time periods continues to be attractive relative to the benchmark.
- The Northern Trust Small Cap Fund outperformed the Russell 2000 Index for the quarter and ranked in the 48th percentile in its peer group. Strong stock selection in the Health Care and Consumer Discretionary sectors contributed most to relative quarterly performance. The Fund has outperformed the market benchmark over the trailing three, five, and ten year time periods.
- Phocas underperformed the Russell 2000 Value Index in the fourth quarter and ranked in the 69th percentile in its peer group. Poor security selection in the Energy and Real Estate sectors detracted from relative quarterly performance. The Ariel Small Cap Value strategy was transitioned to Phocas in June 2016.

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Active International Equity Manager Commentary

- Ariel underperformed its benchmarks in the fourth quarter and ranked in the 86th percentile among peers. Ariel outperformed its benchmarks in the third quarter. Ariel was added to the international equity lineup in July.
- EARNEST Partners outperformed its benchmark in the fourth quarter and ranked in the 24th percentile in its peer group. Performance continues to be favorable relative to the market index over the five-year period and since inception.
- Lazard underperformed the MSCI ACWI ex US index in the quarter and ranked in the 70th percentile in its peer group. Performance is strong relative to the market benchmark and the peer group median over the long term.
- Morgan Stanley underperformed the MSCI EAFE Index in the fourth quarter and ranked in the 50th percentile in its peer group. Morgan Stanley's long term performance is mixed relative to the market benchmark and below the peer group median.
- Strategic Global Advisors underperformed its benchmark and ranked in the 47th percentile among peers over the fourth quarter. Strategic Global Advisors was added to the lineup in July 2016.
- During the fourth quarter, William Blair International Growth outperformed its benchmark index and ranked in the 40th percentile in its peer group. The portfolio exhibits mixed results relative to the market benchmark and peer group median over longer periods measured.
- William Blair International Small Cap underperformed its benchmark index and ranked in the 83rd percentile in its peer group for the quarter. Performance relative to the market benchmark has been mixed over long-term trailing time periods.
- International MWBDE manager-of-managers, Leading Edge, underperformed the MSCI ACWI ex US Index for the quarter but ranked above median in its peer group at the 46th percentile. Long-term performance is above the MSCI ACWI ex-US Index and above the peer group median.
- Dimensional Fund Advisors (DFA) outperformed the MSCI World Small Cap ex US Index and ranked in the 4th percentile in its peer group for the quarter. The strategy's since long term performance continues to be favorable relative to the market benchmark.
- EARNEST Partners outperformed the MSCI Emerging Markets Index in the fourth quarter and ranked in the 25th percentile in its peer group. EARNEST Partner's long term performance is mixed relative to the market benchmark but above the peer group median.

Fixed Income

- Taplin, Canida & Habacht outperformed the Barclay's Aggregate Bond Index and ranked in the 5th percentile of their peer group for the quarter. Performance is strong relative to the market benchmark and the peer group median over the long term.

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- Western Asset Management underperformed the Barclays Capital Aggregate Index for the quarter, and ranked in the 99th percentile in its peer group. The strategy has registered strong performance compared to the benchmark and peers over longer time periods.
- Pugh underperformed the Barclays Capital Aggregate Index and ranked in the 94th percentile in its peer group for the quarter. The strategy's long term performance is strong compared to the Barclay's Aggregate Index, but challenged compared to the median member of the Core Bond peer group.
- Garcia Hamilton outperformed the Barclays Capital Aggregate Bond Index in the fourth quarter and ranked in the 12th percentile in its peer group. The strategy's performance is very favorable over the trailing three and five year periods.
- LM Capital outperformed the Barclays Capital Aggregate Bond Index and ranked in the 69th percentile in the Core Plus Bond peer group for the quarter. Long term performance is above the market benchmark and mixed relative to the peer group median.

Hedge Funds

- Pluscios returned 1.49% in the fourth quarter. The fund has added 2.61%, on an annualized basis, since inception.

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Manager Watch List

MANAGER	DATE WATCH STARTED, REASON	LAST DUE DILIGENCE MEETING	ACTIONS TAKEN	POLICY/ RECOMMENDED ACTIONS	AUM as of 12/31/2016
Holland	August – 14 Performance	Feb - 17	Monitor	Monitor	\$252 mil.
Morgan Stanley	December – 15 Brokerage & August – 15 Performance	Nov - 16	Monitor	Monitor	\$514 mil.
TCH	February – 16 Org Changes & June –16 Performance	Nov - 16	Monitor	Monitor	\$122 mil.
William Blair ILCG	December – 15 Brokerage	Nov - 16	Monitor	Remove	\$502 mil.
Pugh Capital	December – 15 Brokerage	Oct - 16	Monitor	Remove	\$166 mil.
Waddell & Reed	February – 16 Performance	Feb - 17	Monitor	Monitor	\$123 mil.
Channing	December – 16 Performance	Jan - 17	Monitor	Monitor	\$135 mil.
Zevenbergen	December – 16 Performance	Jan - 17	Monitor	Monitor	\$107 mil.
William Blair Int'l SC	December – 16 Performance	Nov - 16	Monitor	Monitor	\$164 mil.

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

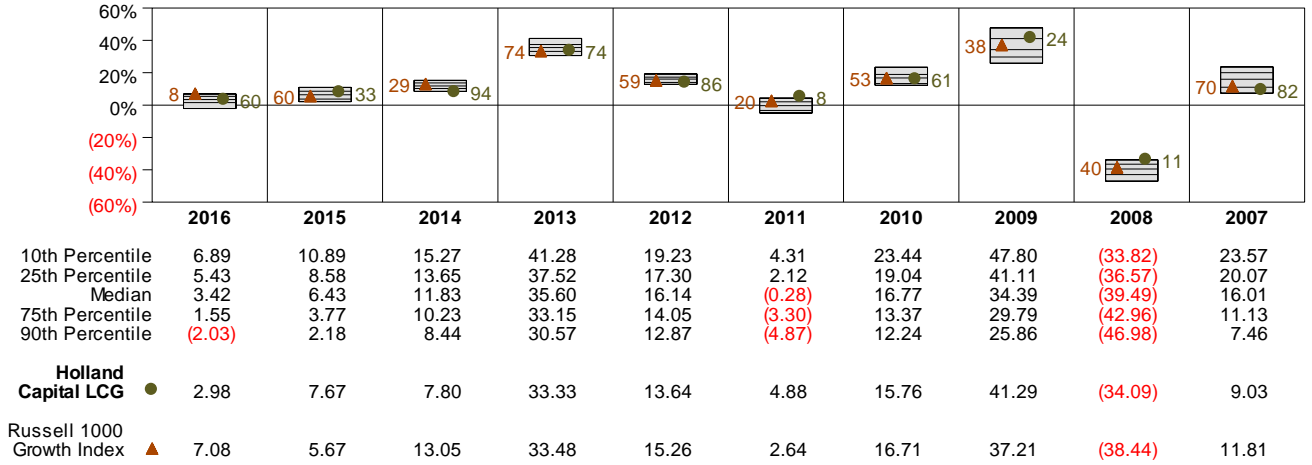
Monitor = Recommended action for the Board

Search = Board authorized a manager search

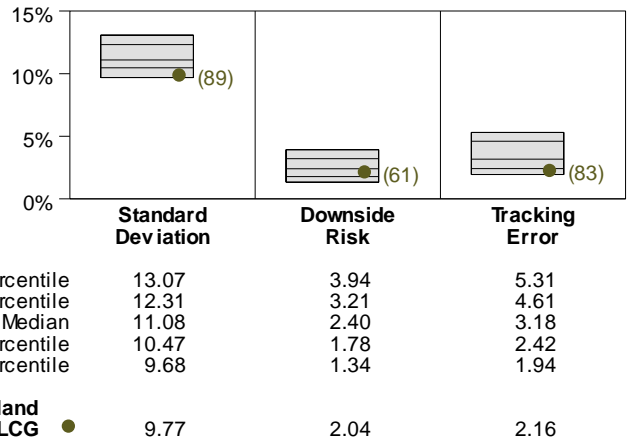
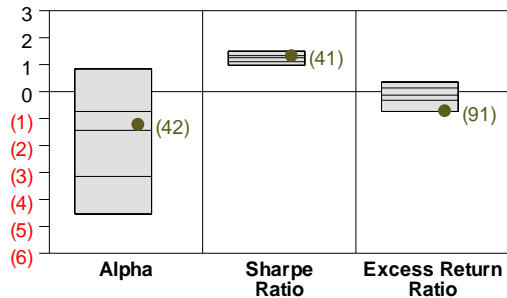
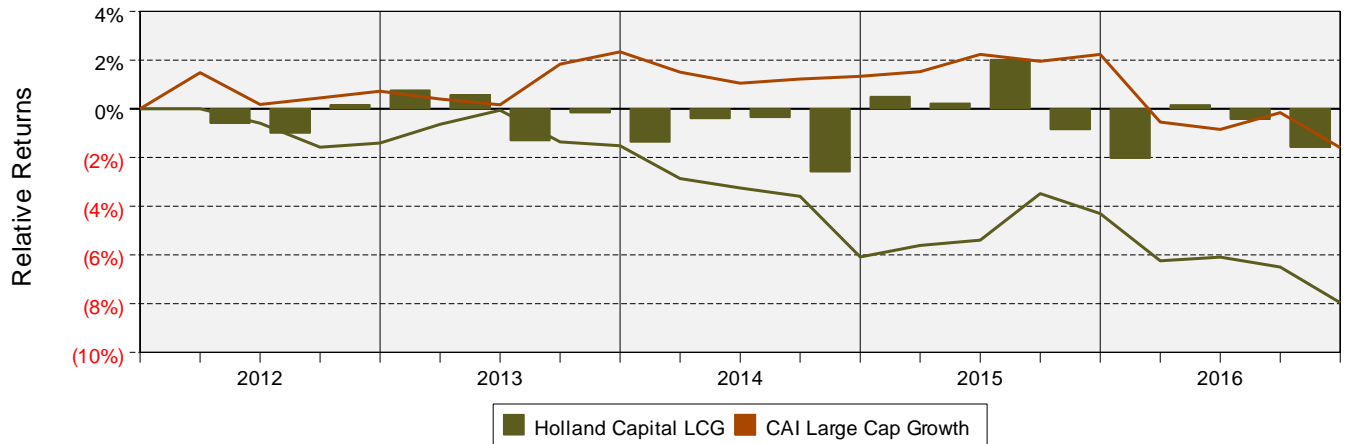
**Public School Teachers' Pension and Retirement Fund of Chicago
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Manager Watch List: Holland

Performance vs CAI Large Cap Growth (Gross)



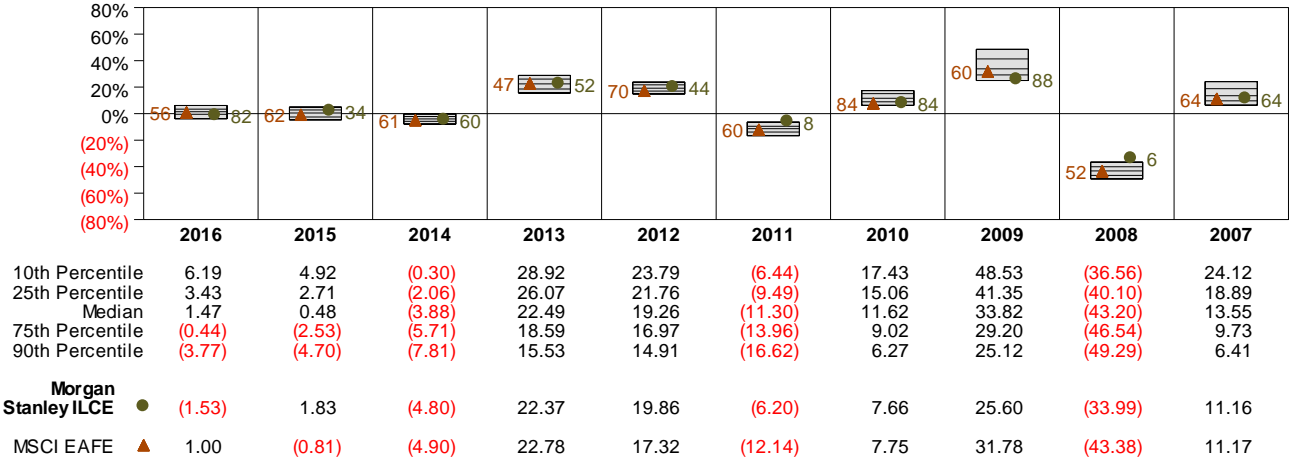
Cumulative and Quarterly Relative Return vs Russell 1000 Growth Index



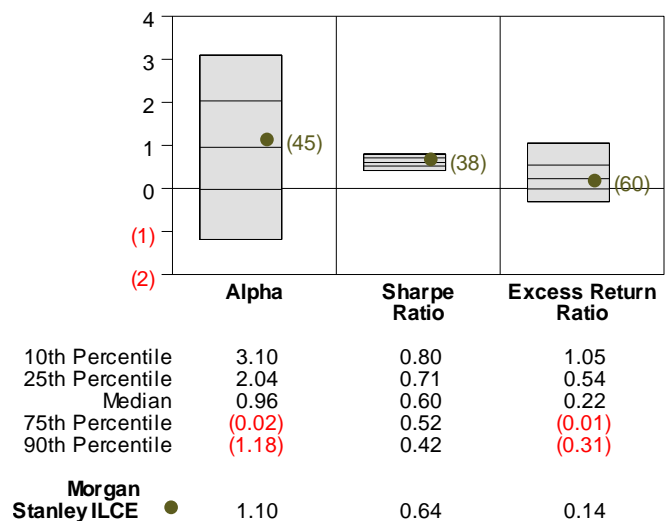
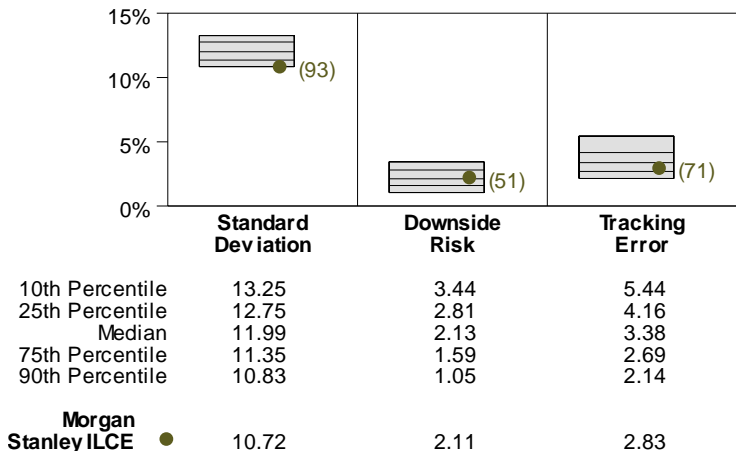
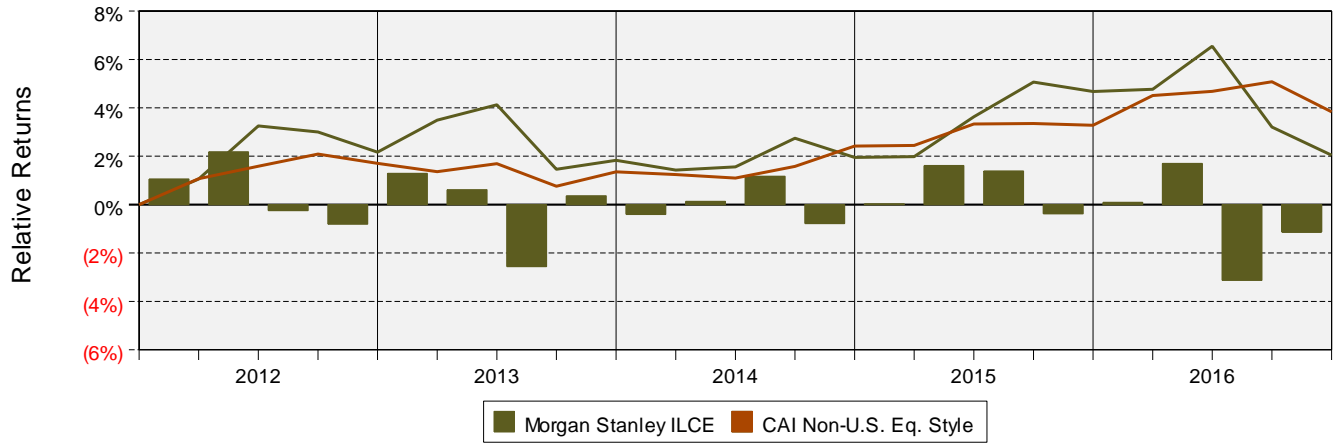
**Public School Teachers' Pension and Retirement Fund of Chicago
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Manager Watch List: Morgan Stanley

Performance vs CAI Non-U.S. Equity Style (Gross)



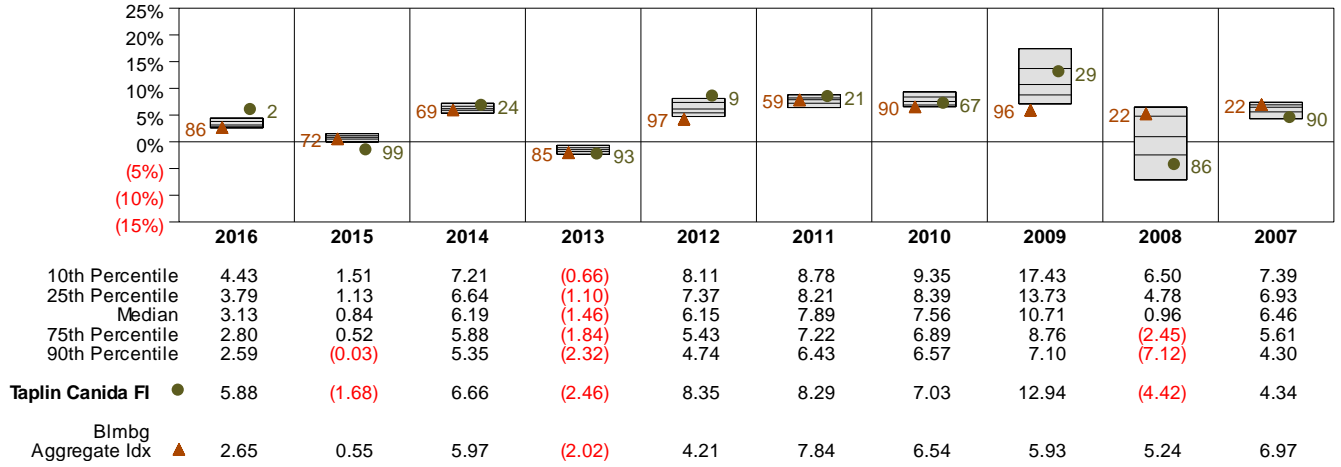
Cumulative and Quarterly Relative Return vs MSCI EAFE



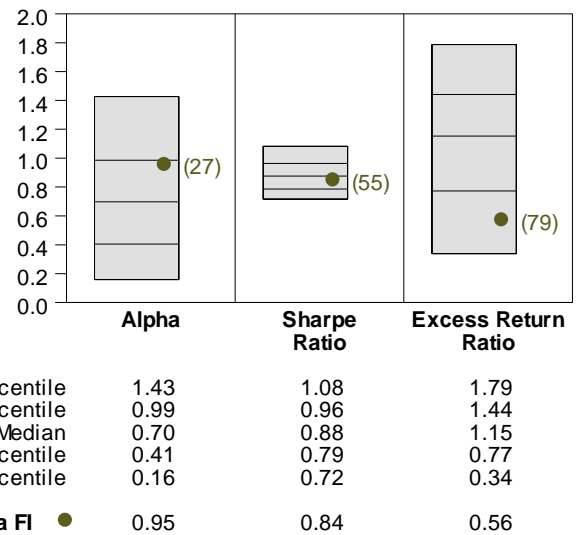
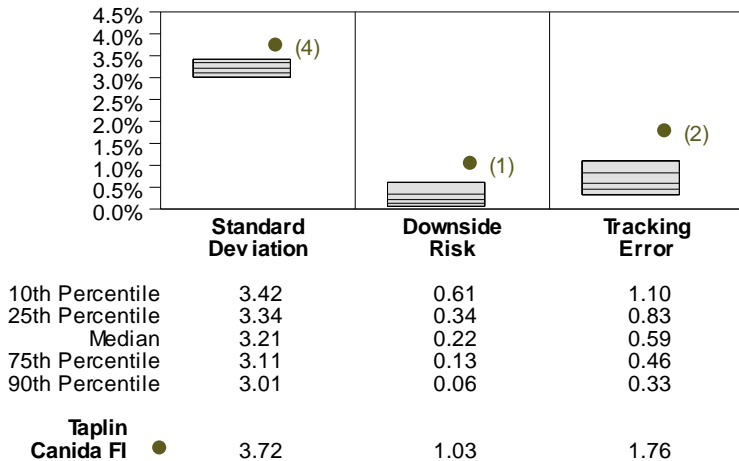
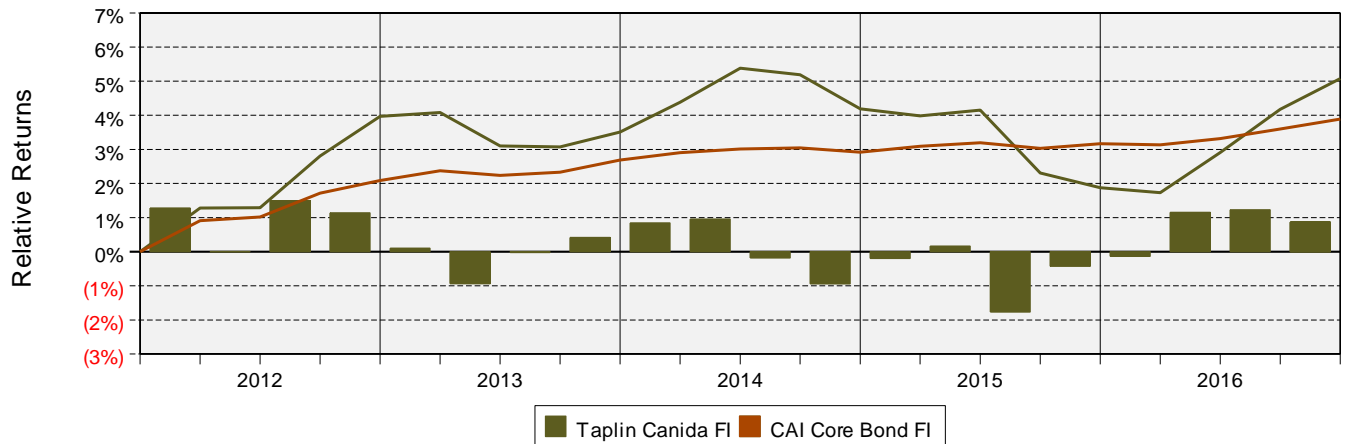
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Manager Watch List: Taplin, Canida & Habacht

Performance vs CAI Core Bond Fixed Income (Gross)



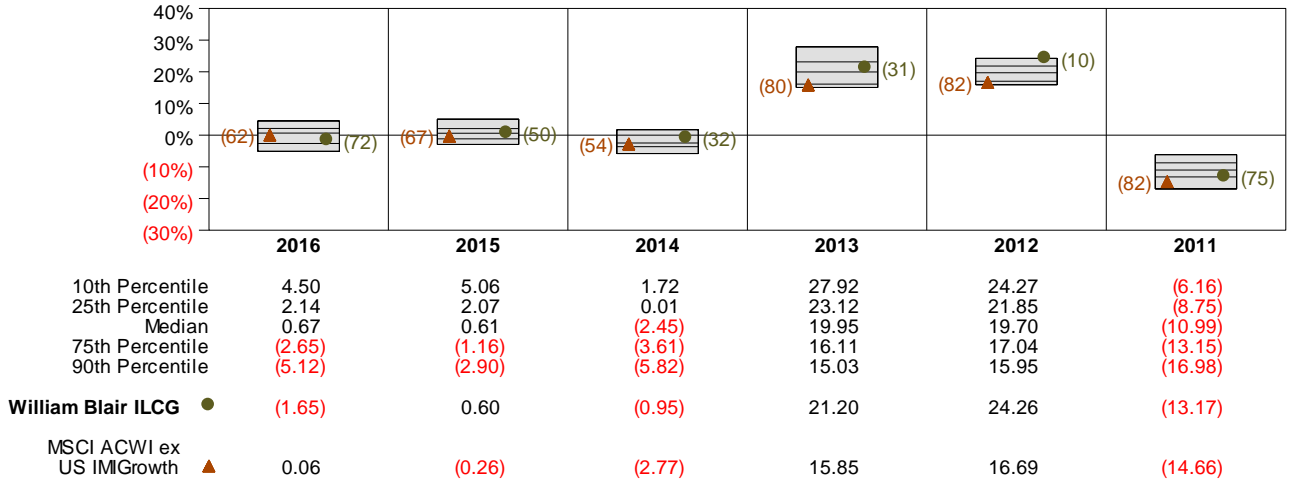
Cumulative and Quarterly Relative Return vs Blmbg Aggregate Idx



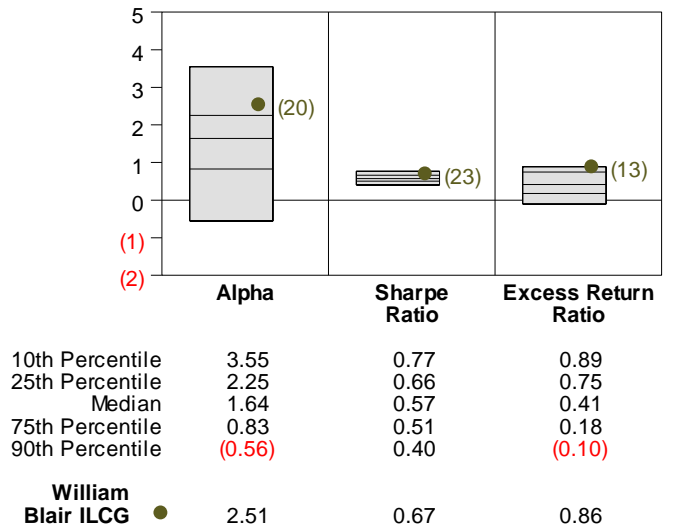
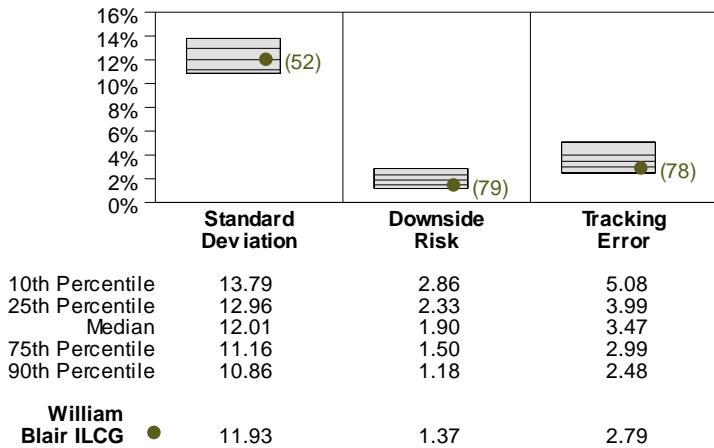
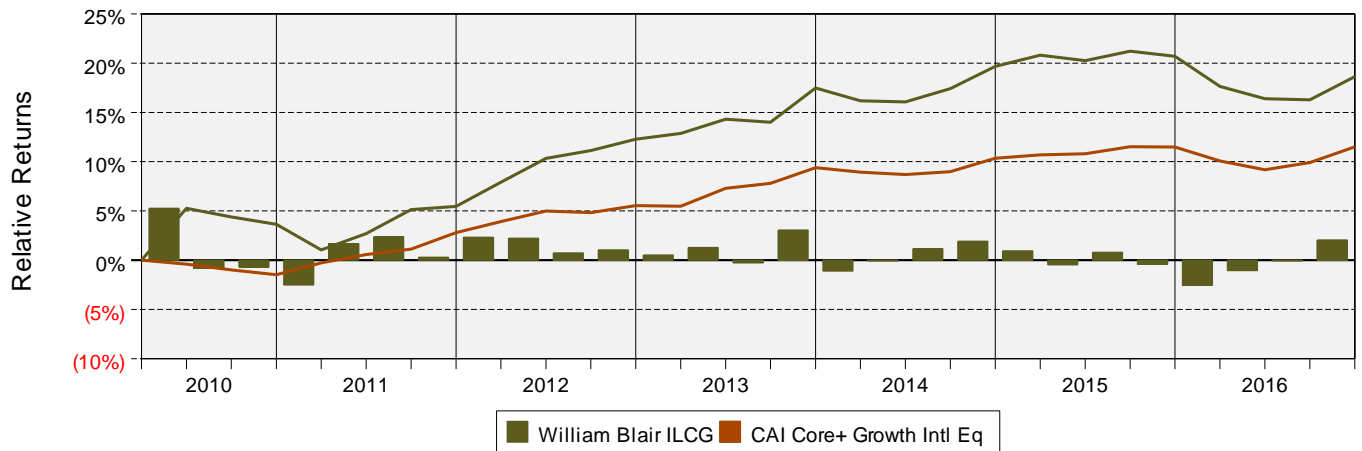
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Manager Watch List: William Blair ILCG

Performance vs CAI Core+ Growth Int'l Eq Style (Gross)



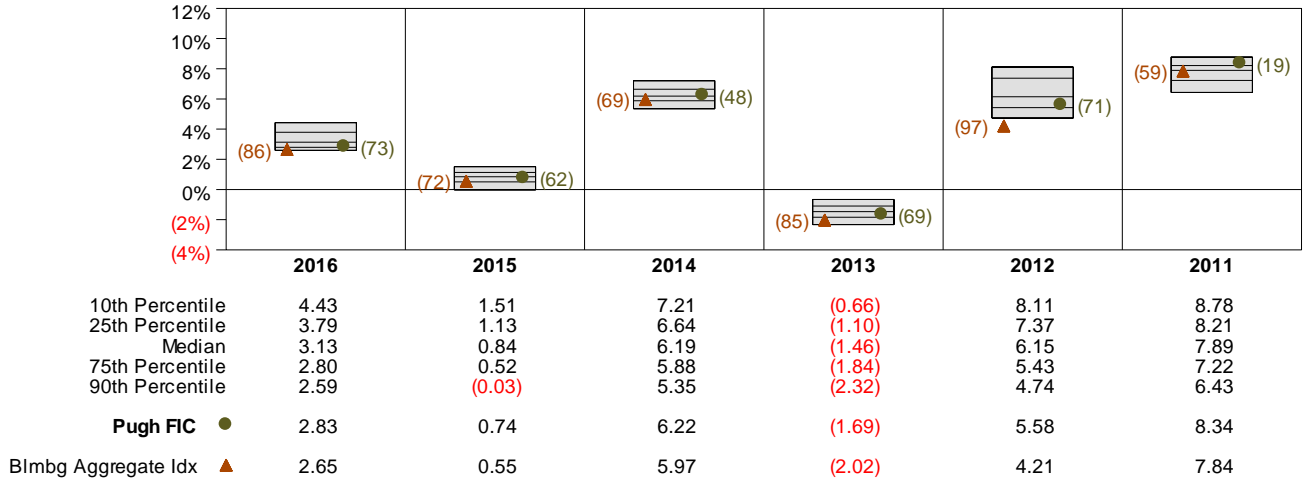
Cumulative and Quarterly Relative Return vs MSCI ACWI ex US IMIGrowth



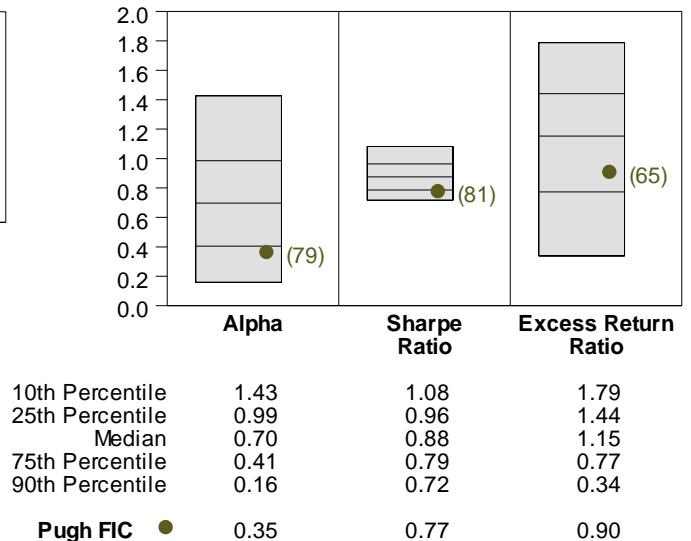
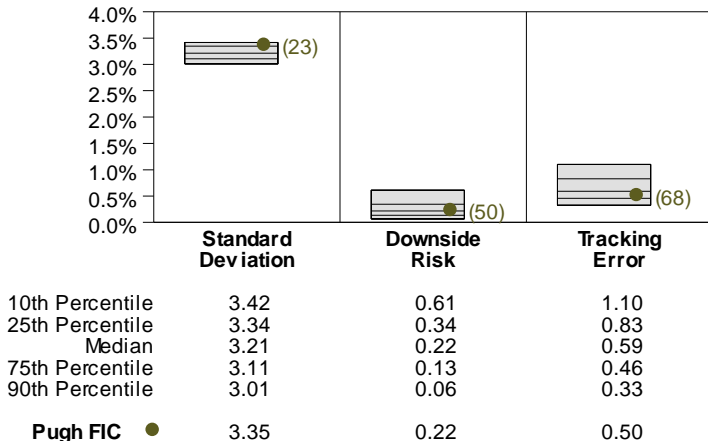
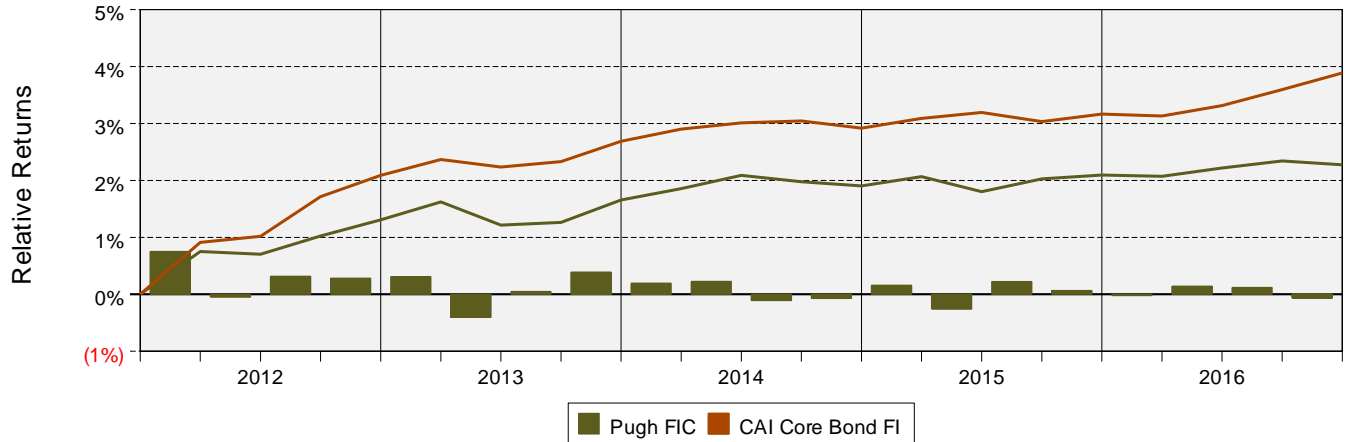
**Public School Teachers' Pension and Retirement Fund of Chicago
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Manager Watch List: Pugh Capital

Performance vs CAI Core Bond Fixed Income (Gross)



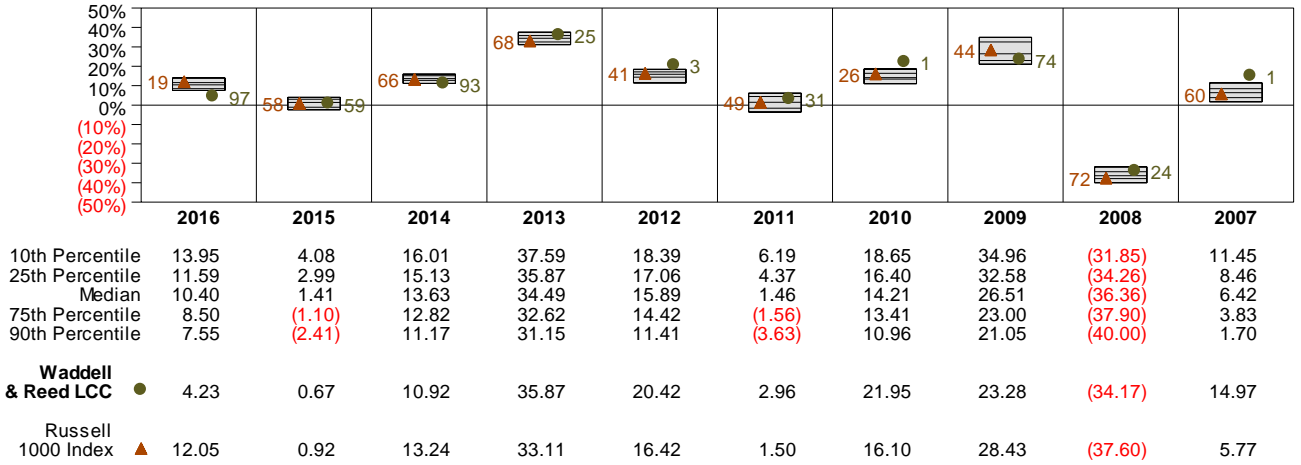
Cumulative and Quarterly Relative Return vs Blmgb Aggregate Idx



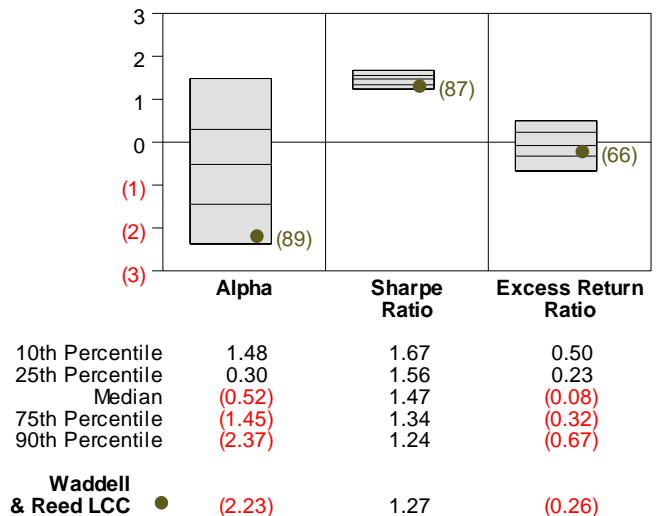
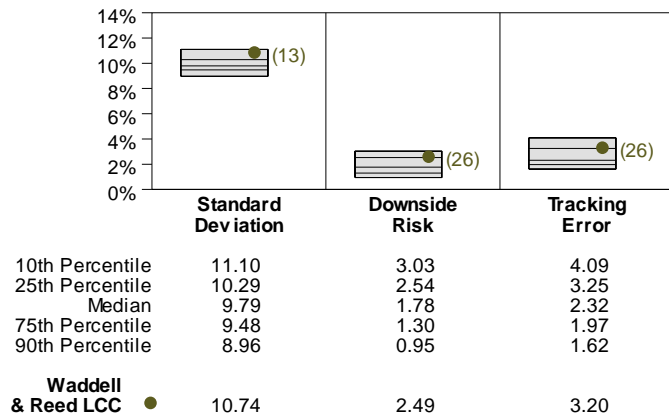
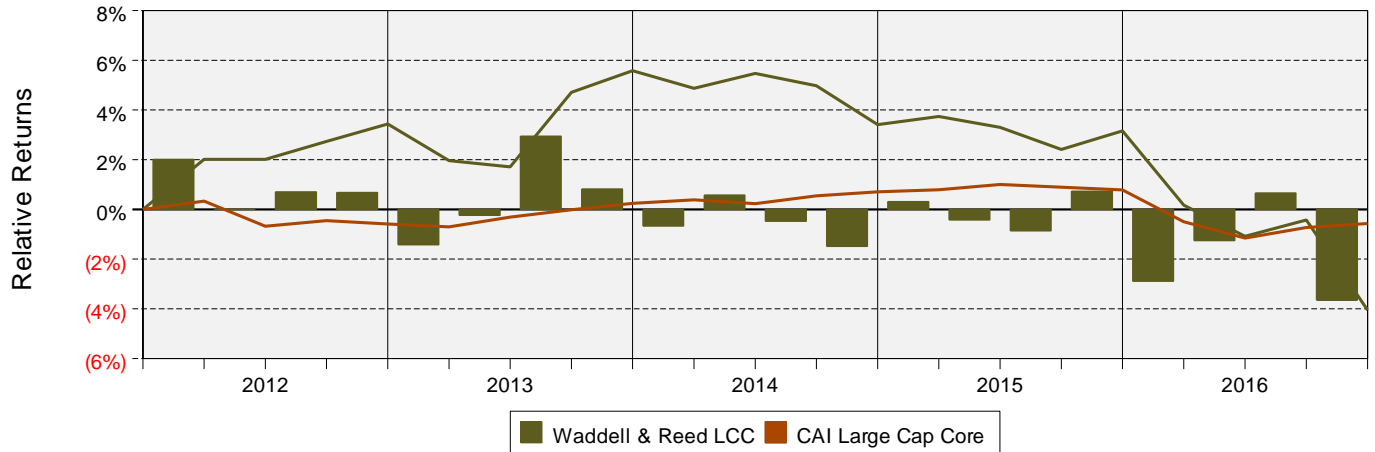
**Public School Teachers' Pension and Retirement Fund of Chicago
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Manager Watch List: Waddell & Reed

Performance vs CAI Large Cap Core (Gross)



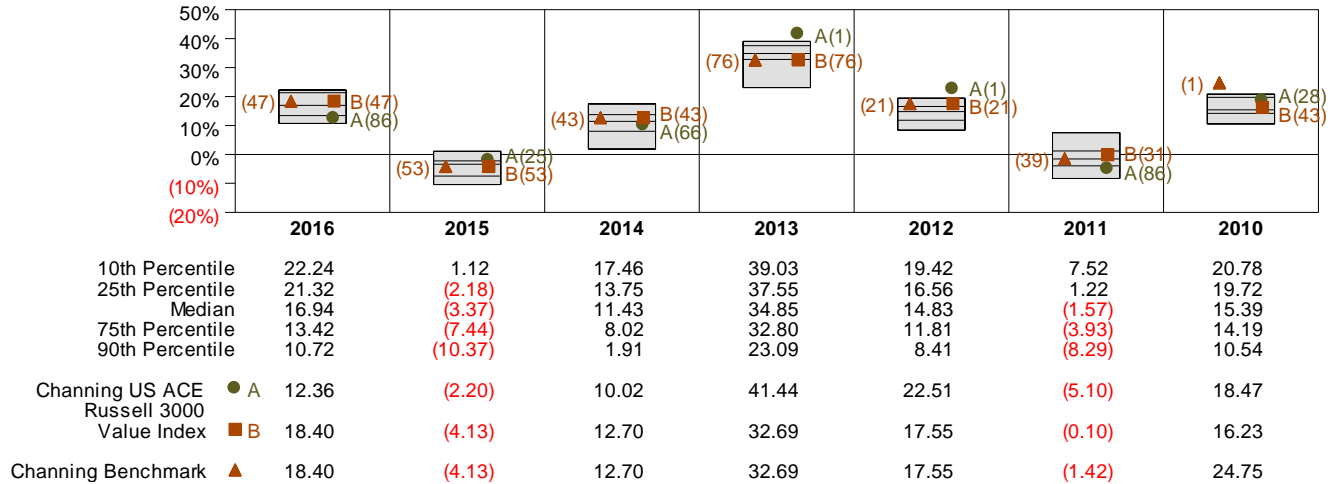
Cumulative and Quarterly Relative Return vs Russell 1000 Index



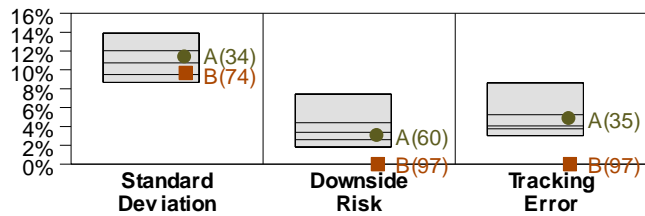
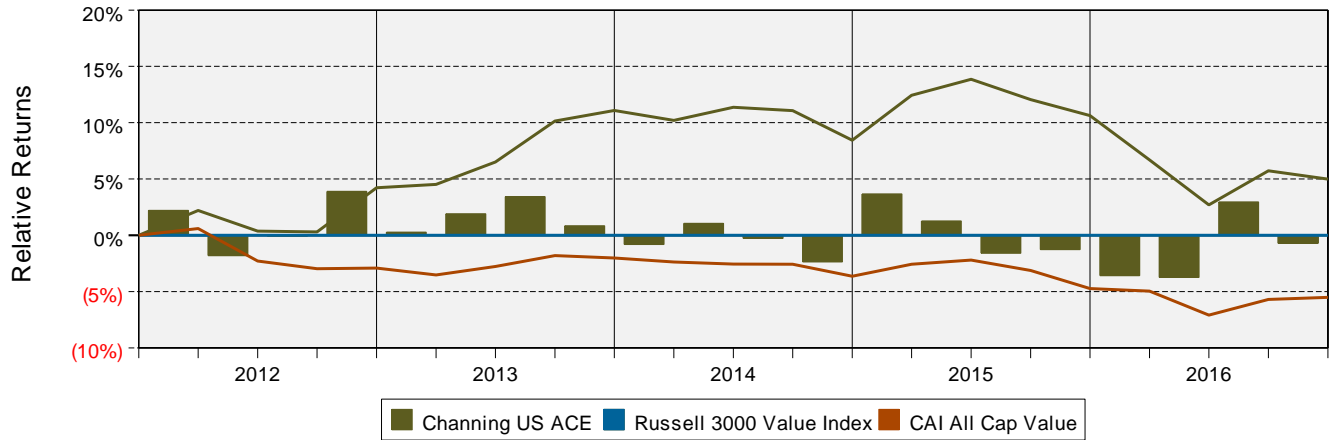
**Public School Teachers' Pension and Retirement Fund of Chicago
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Manager Watch List: Channing

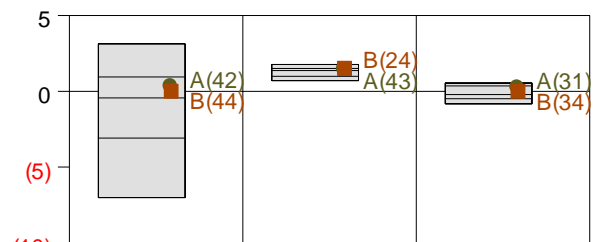
Performance vs CAI All Cap Value (Gross)



Cumulative and Quarterly Relative Return vs Channing Benchmark



	Standard Deviation	Downside Risk	Tracking Error
10th Percentile	13.89	7.44	8.61
25th Percentile	12.04	4.40	5.26
Median	10.74	3.38	4.06
75th Percentile	9.50	2.61	3.75
90th Percentile	8.67	1.82	3.03
Channing US ACE ● A	11.28	2.93	4.73
Russell 3000 Value Index ■ B	9.67	0.00	0.00

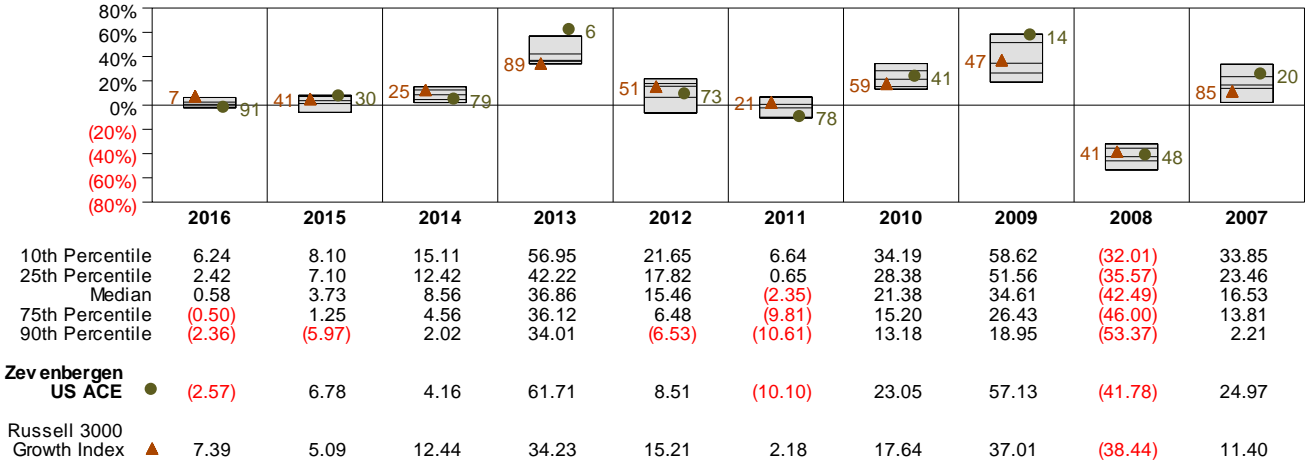


	Alpha	Sharpe Ratio	Excess Return Ratio
10th Percentile	3.13	1.78	0.55
25th Percentile	0.95	1.51	0.35
Median	(0.45)	1.37	(0.22)
75th Percentile	(3.09)	1.00	(0.49)
90th Percentile	(7.01)	0.71	(0.82)
Channing US ACE ● A	0.29	1.40	0.21
Russell 3000 Value Index ■ B	(0.00)	1.52	0.00

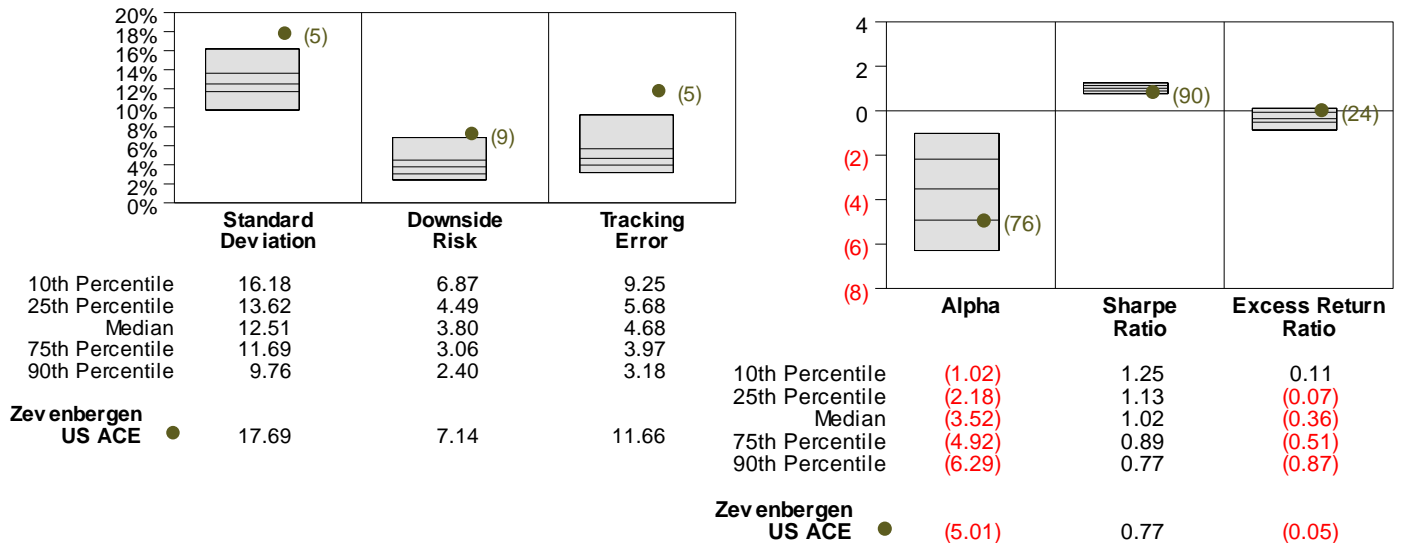
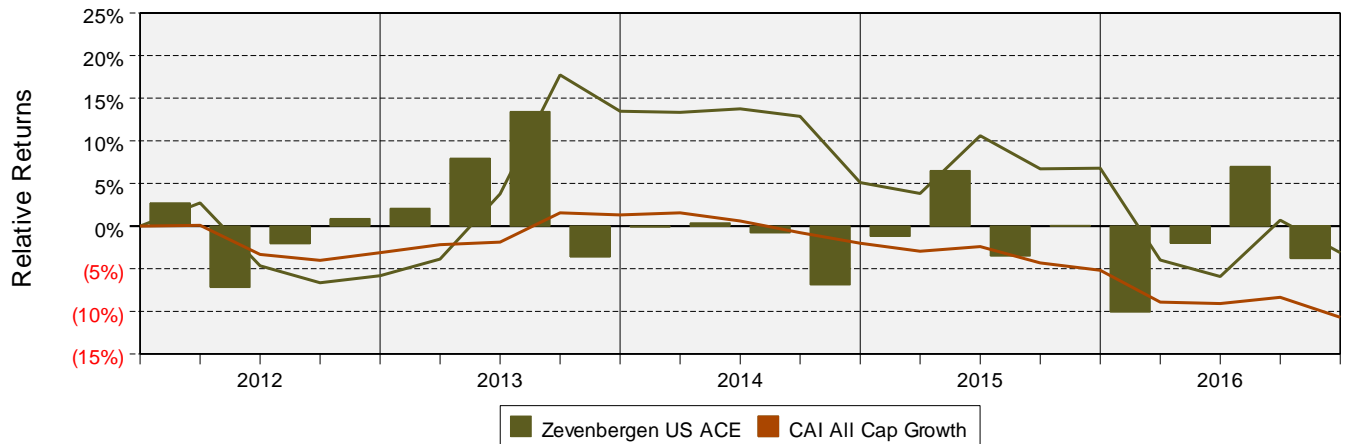
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Manager Watch List: Zevenbergen

Performance vs CAI All Cap Growth (Gross)



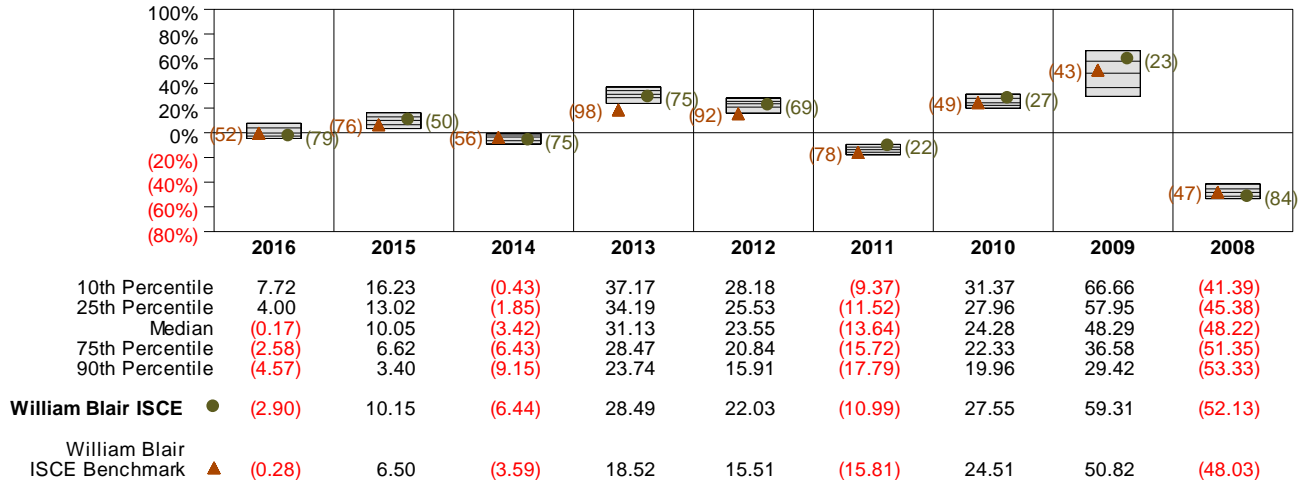
Cumulative and Quarterly Relative Return vs Russell 3000 Growth Index



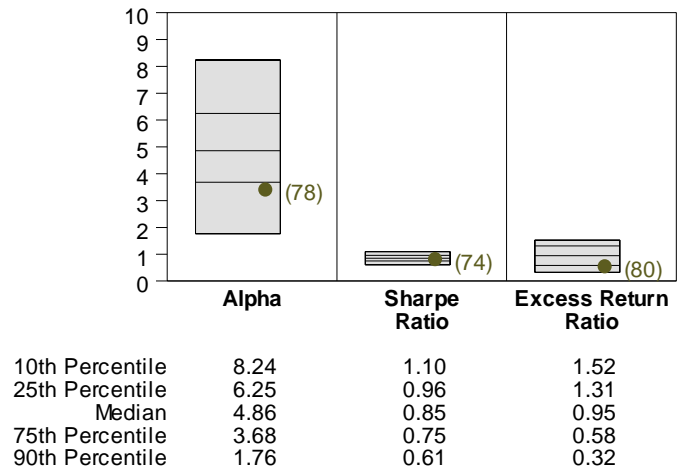
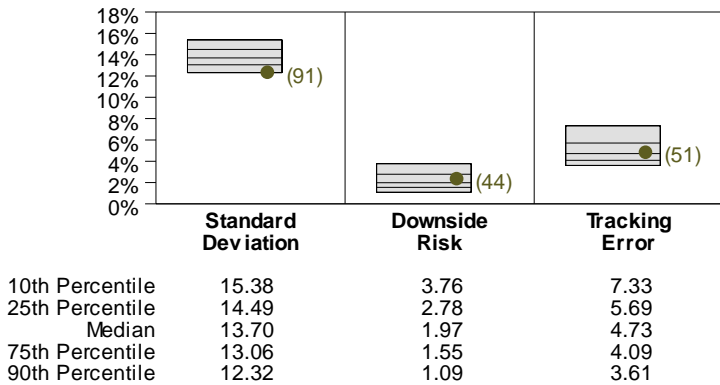
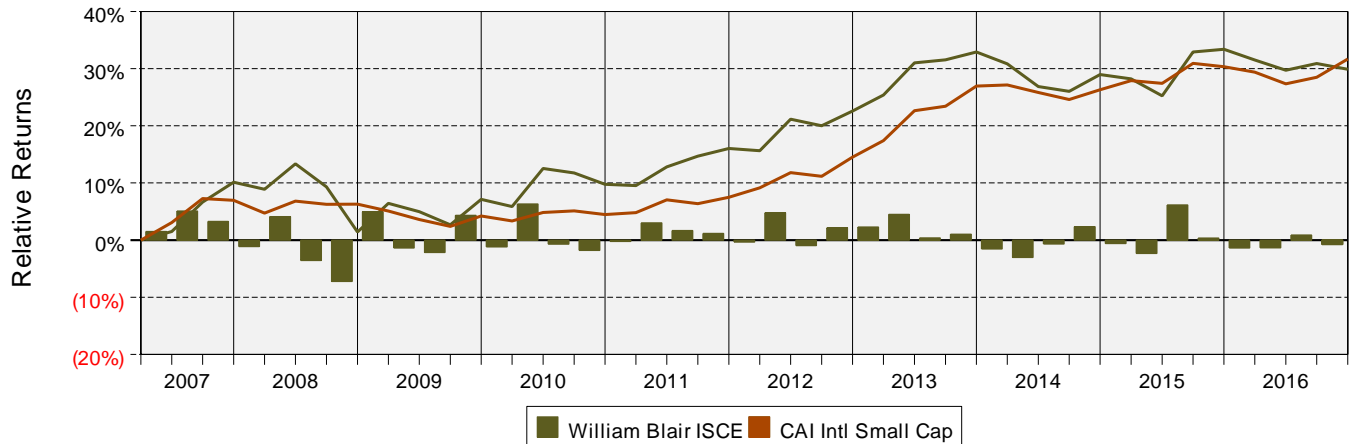
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Manager Watch List: William Blair Int'l SC

Performance vs CAI International Small Cap (Gross)



Cumulative and Quarterly Relative Return vs William Blair ISCE Benchmark



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General Market and Economic Conditions

Real GDP growth in the U.S. came in at a modest 1.9% in the fourth quarter, down from the 3.5% gain in the third quarter that represented the sharpest quarterly increase in two years. The unemployment rate is now 4.7% after reaching a nine-year low of 4.6% in November and jobless claims remained relatively muted. Initial jobless claims fell to less than 300,000 in early 2015 and remained below this key level for more than 90 weeks, the longest streak since 1970. Consumer confidence, as measured by the Conference Board Consumer Confidence Index, hit its highest level in 15 years in December. Auto sales are on pace to beat last year's record of 17.5 million light vehicles. Even the manufacturing sector showed signs of improvement with the ISM Composite Index of factory sector activity showing consistent gains through the quarter.

Inflation, while still benign, is rising. For the trailing 12-month period, the CPI rose 2.1% in December. Core CPI (excluding food and energy) was slightly higher at 2.2%. The Fed's preferred metric, the Personal Consumption Expenditures Index, rose 1.6% over the same time period but remains short of the 2% target. Oil prices surged to their highest level in 17 months to close the year at \$54 per barrel. The U.S. dollar soared, hitting a multi-year high versus the euro and the yen and appreciating roughly 7% versus a basket of currencies for the quarter.

The Fed, in a widely anticipated move, raised the Fed Funds rate 25 bps to a range of 0.50% – 0.75% in December. This turned out to be the Fed's only move for the year although at the end of 2015 it had projected four hikes in 2016. As communicated in its "dot plot," the Fed expects three additional hikes in 2017, though the markets expect fewer. Interest rates began to creep up early in the fourth quarter as investors gained confidence that the Fed would make a move in response to encouraging U.S. economic data. Trump's win propelled rates sharply higher fueled by expectations for escalating inflation in tandem with more debt. The 10-year U.S. Treasury closed the year at 2.45% but hit an intra-quarter high of 2.60%, the highest since September 2014.

Overseas, the European Central Bank announced that it would extend its asset purchase program beyond March, 2017 when it was set to expire, but purchases will be lower (€60 billion per month down from €80 billion per month). Italians voted "no" to reforms and a rescue fund was created for troubled banks in response to acute challenges at Monte dei Paschi di Siena. Deutsche Bank settled with the U.S. Department of Justice for its role in selling mortgages during the crisis, agreeing to a \$7.2 billion payment (roughly half of what was originally suggested). The unemployment rate in the euro zone declined to 9.6% in December; it has been falling since reaching a record high of 12.1% in April, 2013. The range in unemployment rates is highly divergent among euro zone countries, with Spain's at 18.4% and Germany's at 3.9%. Consumer prices in the euro zone increased 0.6% year-over-year in November, the highest since April 2014, but well below the 2% target. GDP is expected to have picked up in the final months of the year from the 0.3% (1.6% year-over-year) pace registered in the third quarter to 0.4% – 0.5%.

In Asia, the Japanese economy advanced 0.3% (1.0% year-over-year) in the third quarter, below the preliminary estimate of 0.5%. The economy continues to struggle in spite of aggressive stimulus measures. The Bank of Japan made no changes to its monetary policy but upgraded the

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outlook for 2017 given the yen's weakness versus the U.S. dollar, which should provide a boost to exports. The dollar reached a 14-year high versus the yen.

Despite worries at the start of 2016, China ended the year with growth expected to be in line with its target of 6.5%. Its stock market stabilized and is up 19% since its low in late January, 2016. Its currency has depreciated, but in an orderly fashion. However, challenges remain in the form of a high debt load and an overheated property sector.

Fourth Quarter 2016 Market Performance

Equities posted strong returns in the fourth quarter, cheered by relatively good economic data, a rebound in corporate earnings, and speculation that Trump's presidency will bring lower taxes, lighter regulation and increased spending. The S&P 500 climbed to an all-time high of 2,239 on December 30 and closed up 3.8% for the quarter. However, there were stark differences in sector returns. Financials (+21.1%) were beneficiaries of Trumponomics, riding expectations for a more lenient regulatory environment and higher interest rates while Health Care (-4.0%) was one of the worst performing sectors. While smaller cap bio tech stocks performed well, uncertainty over the future of Obamacare hurt hospitals. The newly established REIT sector (-4.4%) was punished by rising interest rates. Small capitalization stocks outperformed large by a wide margin; the Russell 2000 rose 8.8% in the quarter and is up 21.3% for the year while the Russell 1000 gained 3.8% and 12.1% for the same periods. Value gained favor after prolonged underperformance. While this trend was in place before the election, Trump's win boosted Financials and Energy stocks, which make up a significant portion of the value indices. The largest difference between growth and value was in small caps. The Russell 2000 Value outperformed its Growth counterpart by 10.5% (+14.1% versus +3.6%) in the quarter and by double that amount, 20.4%, over the year (+31.7% versus +11.3%).

Foreign developed and emerging market indices trailed the S&P 500. The MSCI ACWI ex-US fell 1.3%, modestly below the MSCI EAFE's -0.7% result. Dollar strength was broad-based and thus detracted from returns for U.S. investors. In developed markets, Italy (+11%) was the top performer in the fourth quarter, although it remains at the bottom of the pack for the year (-11%). The MSCI Emerging Markets Index dropped 4.2% for the quarter. Among emerging markets, Russia posted the best return (+19%) while Turkey (-14%) sank. Turkey's economy shrank 1.8% in the third quarter, its first year-over-year decline since 2009. Mexico, hurt by Trumponomic concerns, was down 8%.

Interest rates in the U.S. rose sharply in the fourth quarter, driven both by encouraging economic data and worries that the pro-growth agenda put forth by President-elect Donald Trump will have an inflationary effect. The 10-year U.S. Treasury yield rose 85 bps and returned -6.8% for the quarter in the sharpest quarterly selloff in more than two decades. TIPS outperformed nominal Treasuries, bolstered by rising expectations for inflation. The Bloomberg Barclays TIPS Index returned -2.4% for the quarter but ended the year up 4.7%. The 10-year inflation breakeven rate was 1.95% as of December 30th.

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The Bloomberg Barclays U.S. Aggregate returned -3.0% for the quarter but was up 2.6% for the year. The Corporate sector returned -2.8% and +6.1% for the same periods. Issuance by U.S. corporations hit another record high in 2016 at roughly \$1.3 trillion. Long maturity bonds performed the best, in relative terms, with long corporates outperforming like-duration Treasuries by 436 bps. Mortgages underperformed Treasuries as durations extended with the increase in interest rates. The Bloomberg Barclays High Yield Index gained 1.8% in the quarter and more than 17% for the year.

The municipal bond sector faced headwinds in the fourth quarter with robust supply, concerns over Trump's desire for lower taxes, and rising interest rates contributing to outflows from the sector. Supply in 2016 was \$445 billion, breaking its record from 2010 (\$443 billion). The Bloomberg Barclays Municipal Bond Index fell 3.6% for the quarter and was essentially flat (+0.2%) for the year.

Overseas, yields were also higher though dollar strength was the primary driver of sharply negative returns for unhedged indices. The Bloomberg Barclays Global Aggregate ex-US Index fell 10.3% for the quarter (-1.9% on a hedged basis). The U.S. dollar benefited from higher interest rates as well as prospects for growth. The yen lost more than 13% versus the dollar over the course of the quarter and the euro depreciated by more than 6%. Emerging markets debt underperformed developed markets. The JP Morgan EMBI Global Diversified Index dropped 4.0% for the quarter and the local currency GBI-EM Global Diversified lost 6.1%.

Commodities benefitted from OPEC (Organization of the Petroleum Exporting Countries) announced cuts as well as the prospect of increased infrastructure spending. In November, OPEC agreed to production cuts to reduce output by 1.2 million barrels per day or roughly 1% of global output. Several non-OPEC nations also agreed to cut output by around half a million barrels per day. Oil closed the year at \$54 per barrel, the highest level since July, 2015. The S&P GSCI Commodity Index rose 5.8% for the quarter and 11.4% for the year. MLPs were up modestly during the quarter (Alerian MLP Index +2.0%) with stronger results for the year (+18.3%).

Closing Thoughts

We enter 2017 with U.S. stock markets at new highs, rising interest rates and historically low volatility. The U.S. economy continues to gain traction and there are glimmers of hope that a bottom has been reached overseas. However, a whole host of geopolitical challenges continue to cause angst. Further, the election of Donald Trump has resulted in widespread speculation as to the impact his policies will have on markets, but much uncertainty remains with respect to the scope, implementation and timing of these policies. With this in mind, we caution investors to maintain a long-term perspective. As always, prudent asset allocation with appropriate levels of diversification remains Callan's recommended course.

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Appendix

Appendix

Five Year Rankings Above Median (Net of Fees)

Manager	9/30/08	12/31/08	3/31/09	6/30/09	9/30/09	12/31/09	3/31/10	6/30/10	9/30/10	12/31/10	3/31/11	6/30/11	9/30/11	12/31/2011	03/31/2012	06/30/2012	09/30/2012	12/31/2012	03/31/2013	06/30/2013	09/30/2013	12/31/2013	03/31/2014	06/30/2014	09/30/2014	12/31/2014	03/31/2015	06/30/2015	09/30/2015	12/31/2015	03/31/2016	06/30/2016	09/30/2016	12/31/2016		
Large Cap Core Equity Waddell & Reed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	
Large Cap Growth Equity Holland	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	
Large Cap Value Equity Harris	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Small Cap Equity NTGI Structured Small Cap											No	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
All Cap Growth Equity Zeverbergen	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No	Yes	Yes	
All Cap Value Equity Channing														NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
International Equity EARNEST Partners	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	
Lazard	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Morgan Stanley	No	Yes	Yes	No	No	No	Hired	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No	No	No	No	No	No	No	No	
Leading Edge							Hired	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Yes	No	No	No	No	No	No	No	
William Blair							Hired	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Yes	No	No	No	Yes	Yes	Yes	Yes	
International Small Cap William Blair DFA*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	NA	NA	
Emerging Market Equity EARNEST Partners*																					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Active Core Fixed Income Taplin, Canida & Habacht	NA	NA	NA	NA	NA	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes
Pugh																																				
Garcia Hamilton Jackson																																				
Active Core Plus Fixed Income LM Capital**	NA	NA	NA	NA	NA	No	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Active Opportunistic Fixed Income WAMCO	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	

*Manager does not yet have 5 years of portfolio data.
 **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.

Appendix

Five Year Above Benchmark Index (Net of Fees)

Manager	9/30/08	12/31/08	3/31/09	6/30/09	9/30/09	12/31/09	3/31/10	6/30/10	9/30/10	12/31/10	3/31/11	6/30/11	9/30/11	12/31/2011	03/31/2012	06/30/2012	09/30/2012	12/31/2012	03/31/2013	06/30/2013	09/30/2013	12/31/2013	03/31/2014	06/30/2014	09/30/2014	12/31/2014	03/31/2015	06/30/2015	09/30/2015	12/31/2015	03/31/2016	06/30/2016	09/30/2016	12/31/2016			
Large Cap Core Equity Waddell & Reed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Large Cap Growth Equity Holland	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	
Large Cap Value Equity Harris	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Small Cap Equity NTGI Structured Small Cap											Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
All Cap Growth Equity Zeverbergen	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	
All Cap Value Equity Channing														NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
International Equity EARNEST Partners	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Lazard	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Morgan Stanley	No	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Leading Edge						Hired	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
William Blair						Hired	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
International Small Cap William Blair DFA*	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	NA
Emerging Market Equity EARNEST Partners*																					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Active Core Fixed Income Taplin, Canids & Habacht	NA	NA	NA	NA	NA	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pugh														Hired	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Garcia Hamilton Jackson														Hired	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Active Core Plus Fixed Income LM Capital**	NA	NA	NA	NA	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Active Opportunistic Fixed Income WAMCO	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Manager does not yet have 5 years of portfolio data.
 **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.