Wilshire

WILSHIRE ASSOCIATES

Wilshire Consulting

Retirement Board of Allegheny County

Executive Summary of Investment Performance

December 31, 2017

MARKET UPDATE

Wilshire Consulting

ASSET CLASS PERFORMANCE

ASSET CLASS RETURNS - BEST TO WORST						ANNUALIZED 5-YEAR AS OF 12/2017
2012	2013	2014	2015	2016	2017	
Emrg Mrkts 18.6%	U.S. Equity 33.1%	REITs 31.8%	REITs 4.2%	MLPs 18.3%	Emrg Mrkts 37.7%	U.S. Equity 15.7%
Developed 17.9%	MLPs 27.6%	U.S. Equity 12.7%	U.S. Equity 0.7%	High Yield 17.1%	Developed 25.6%	REITs 9.3%
REITs 17.6%	Developed 23.3%	Core Bond 6.0%	Core Bond 0.6%	U.S. Equity 13.4%	U.S. Equity 21.0%	Developed 8.4%
U.S. Equity 16.1%	High Yield 7.4%	MLPs 4.8%	T-Bills 0.1%	Commodities 11.8%	High Yield 7.5%	High Yield 5.8%
High Yield 15.8%	REITs 1.9%	U.S. TIPS 3.6%	Developed -0.4%	Emrg Mrkts 11.6%	REITs 4.2%	Emrg Mrkts 4.7%
U.S. TIPS 7.0%	T-Bills 0.1%	High Yield 2.5%	U.S. TIPS -1.4%	REITs 7.2%	Core Bond 3.6%	Core Bond 2.1%
MLPs 4.8%	Core Bond -2.0%	T-Bills 0.0%	High Yield -4.5%	U.S. TIPS 4.7%	U.S. TIPS 3.0%	T-Bills 0.3%
Core Bond 4.2%	Emrg Mrkts -2.3%	Emrg Mrkts -1.8%	Emrg Mrkts -14.6%	Core Bond 2.6%	Commodities 1.7%	U.S. TIPS 0.1%
T-Bills 0.1%	U.S. TIPS -8.6%	Developed -4.5%	Commodities -24.7%	Developed 1.5%	T-Bills 0.8%	MLPs -0.1%
Commodities -1.0%	Commodities -9.5%	Commodities -17.0%	MLPs -32.6%	T-Bills 0.3%	MLPs -6.5%	Commodities -8.5%

Data sources: Wilshire Compass

Note: Developed asset class is developed equity markets ex-U.S., ex-Canada

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MARKET COMMENTARY

U.S. Equity

The U.S. stock market was up 6.4% for the fourth quarter of 2017. There was a relative lack of volatility during the year. The largest drawdown for the year was -2.75% and there were only 4 trading days where the market was down 1% or more. Several factors contributed to this success including a rebound in global economic growth and continued strength domestically.

The third quarter of 2017 was the second consecutive quarter of real GDP growth in excess of 3%, annualized. Businesses seem to be gaining confidence in the global economy and have been increasing spending on equipment while growing inventories during the quarter, contributing more than three-quarters of a percent to real GDP growth. Strong retail sales during the fourth quarter have helped raise expectations for economic growth during the final quarter of 2017.

Non-U.S. Equity

Equity markets outside of the U.S. produced strong returns during the fourth quarter of 2017, in both developed and emerging markets. Japan was one of the strongest developed markets during the quarter due to stimulative policies by both the Bank of Japan and the national government. Emerging Markets led all global equities during 2017 and produced their second consecutive positive annual gain.

Fixed Income

The U.S. Treasury yield curve continued to flatten during the quarter with short to intermediate term rates rising and long-term yields falling. The bellwether 10-year Treasury yield ended the quarter at 2.40%. The Federal Open Market Committee decided to increase its overnight rate by 25 basis points in December. Credit spreads continued to tighten during the quarter.

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DECEMBER 2017 ASSET CLASS ASSUMPTIONS

	EQUITY						FIXED INCOME						REAL ASSETS					
													REAL ESTATE					
	US STOCK	DEV EX-US STOCK	EMG MRKT STOCK	GLOBAL EX-US STOCK	GLOBAL STOCK	PRIVATE EQUITY	CASH	CORE BOND	LT CORE BOND	US TIPS	HIGH YIELD	NON-US BOND (HDG)	US RES	GLOBAL RES	PRIVATE RE	CMDTY	REAL ASSETS	US CPI
EXPECTED COMPOUND RETURN (%)	6.25	6.25	6.25	6.45	6.45	8.75	1.75	3.55	3.60	2.95	4.95	1.30	5.40	5.60	6.90	3.70	6.60	1.95
EXPECTED ARITHMETIC RETURN (%)	7.55	7.70	9.20	8.05	7.80	12.10	1.75	3.70	4.05	3.10	5.40	1.35	6.75	6.75	7.80	4.75	6.95	1.95
EXPECTED RISK (%)	17.00	18.00	26.00	18.75	17.15	28.00	1.25	5.15	9.85	6.00	10.00	3.50	17.00	15.80	14.00	15.00	8.40	1.75
CASH YIELD (%)	2.00	3.00	2.00	2.75	2.35	0.00	1.75	3.55	4.75	3.05	8.15	1.65	3.95	3.95	2.65	1.75	2.85	0.00
CORRELATIONS																		
US STOCK	1.00																	
DEV EX-US STOCK (USD)	0.81	1.00																
EMERGING MARKET STOCK	0.74	0.74	1.00															
GLOBAL EX-US STOCK	0.83	0.96	0.86	1.00														
GLOBAL STOCK	0.94	0.92	0.82	0.94	1.00													
PRIVATE EQUITY	0.74	0.64	0.62	0.67	0.74	1.00												
CASH EQUIVALENTS	-0.05	-0.09	-0.05	-0.08	-0.07	0.00	1.00											
CORE BOND	0.28	0.13	0.00	0.09	0.20	0.31	0.19	1.00										
LT CORE BOND	0.31	0.16	0.01	0.12	0.23	0.32	0.11	0.93	1.00									
US TIPS	-0.05	0.00	0.15	0.05	0.00	-0.03	0.20	0.60	0.47	1.00								
HIGH YIELD BOND	0.54	0.39	0.49	0.45	0.51	0.34	-0.10	0.25	0.32	0.05	1.00							
NON-US BOND (HDG)	0.16	0.25	-0.01	0.18	0.18	0.26	0.10	0.67	0.64	0.39	0.26	1.00						
US RE SECURITIES	0.59	0.47	0.44	0.49	0.56	0.50	-0.05	0.17	0.23	0.10	0.56	0.05	1.00					
GLOBAL RE SECURITIES	0.65	0.59	0.56	0.62	0.66	0.58	-0.05	0.17	0.22	0.11	0.62	0.03	0.94	1.00				
PRIVATE REAL ESTATE	0.54	0.44	0.44	0.47	0.52	0.51	-0.05	0.19	0.25	0.09	0.57	0.05	0.77	0.76	1.00			
COMMODITIES	0.25	0.34	0.39	0.38	0.32	0.27	0.00	-0.02	-0.02	0.25	0.29	-0.10	0.25	0.28	0.25	1.00		
REAL ASSET BASKET	0.42	0.43	0.50	0.48	0.47	0.43	0.01	0.24	0.25	0.41	0.53	0.06	0.65	0.69	0.69	0.59	1.00	
INFLATION (CPI)	-0.10	-0.15	-0.13	-0.15	-0.13	-0.10	0.10	-0.12	-0.12	0.15	-0.08	-0.08	0.05	0.03	0.05	0.44	0.26	1.00

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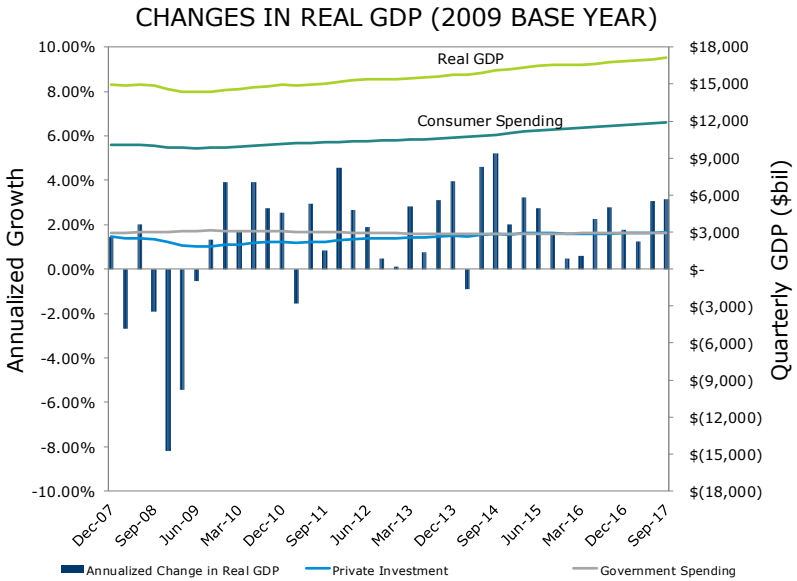
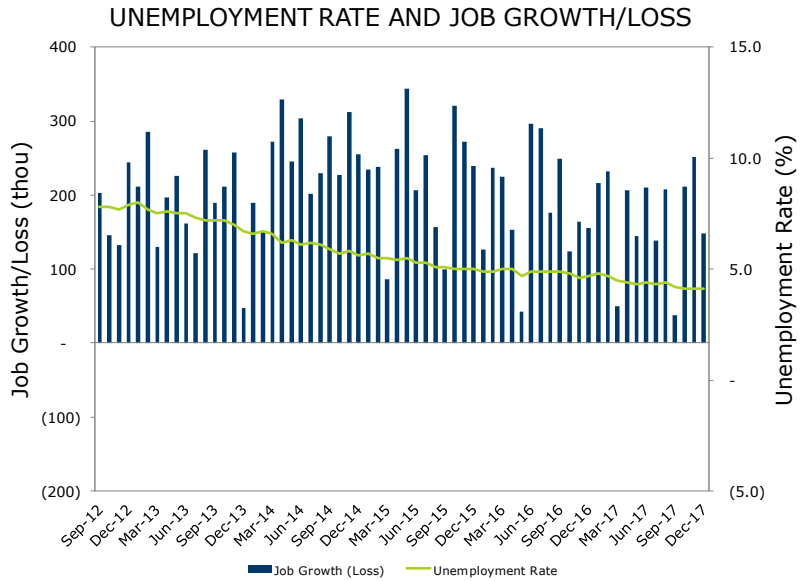
ECONOMIC REVIEW

AS OF DECEMBER 31, 2017	KEY ECONOMIC INDICATORS			
CPI (ALL ITEMS)	MONTHLY CHANGE		CUMULATIVE CHANGE	
SEASONALLY ADJUSTED	Dec-17	0.1	3-Mo.	0.6
	Nov-17	0.4	12-Mo.	2.1
	Oct-17	0.1	10-Yr. (Annual)	1.6
BREAKEVEN INFLATION	10-Yr.	2.0		
CONSUMER SENTIMENT	Dec-17	95.9		
U. OF MICHIGAN SURVEY	Nov-17	98.5		
	1-Yr. Ago	98.2	10-Yr. Avg	79.1
MANUFACTURING	Dec-17	59.7	CHANGE IN SECTOR	
INST. FOR SUPPLY MGMT	Nov-17	58.2	>50	Expansion
PURCHASING MNGRS' IDX	1-Yr. Avg.	57.6	<50	Contraction

Note: Seasonally adjusted CPI data is utilized to better reflect short-term pricing activity.





Data sources: Bureau of Labor Statistics, U.S. Treasury, University of Michigan, Institute for Supply Management, Bureau of Economic Analysis

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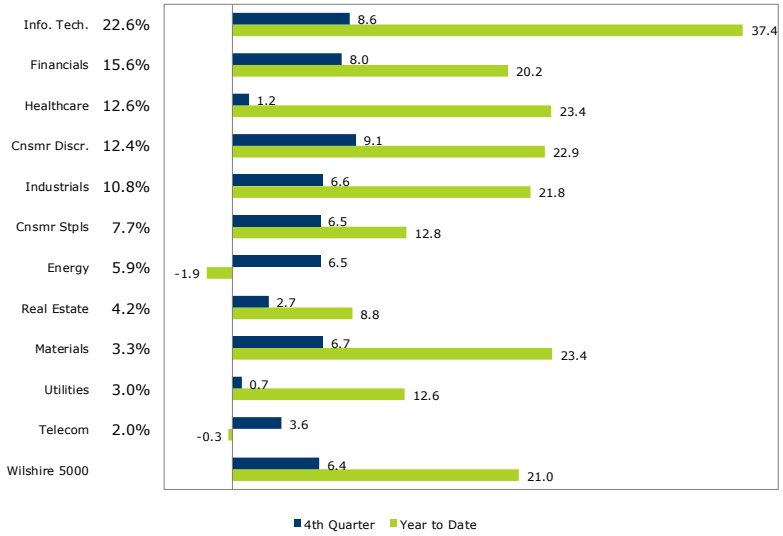
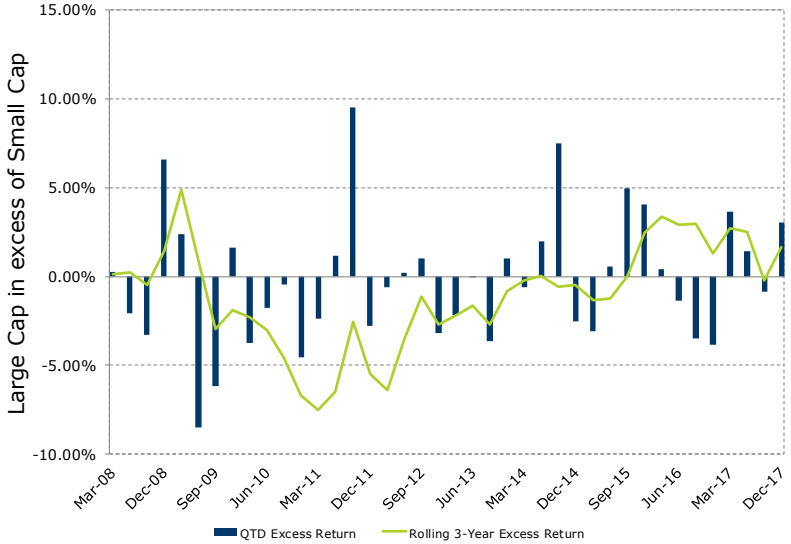
U.S. EQUITY MARKET

AS OF DECEMBER 31, 2017	QTR	YTD	1 YR	3 YR	5 YR	10 YR
WILSHIRE 5000 INDEX	6.4	21.0	21.0	11.4	15.7	8.6
WILSHIRE U.S. LARGE CAP	6.7	21.8	21.8	11.5	15.8	8.5
WILSHIRE U.S. SMALL CAP	3.6	13.5	13.5	9.7	14.4	9.9
WILSHIRE U.S. LARGE GROWTH	7.3	27.7	27.7	12.9	17.3	9.7
WILSHIRE U.S. LARGE VALUE	6.1	16.3	16.3	10.0	14.4	7.2
WILSHIRE U.S. SMALL GROWTH	4.2	19.6	19.6	9.8	14.9	9.9
WILSHIRE U.S. SMALL VALUE	3.0	7.4	7.4	9.5	13.9	9.8
WILSHIRE REIT INDEX	1.7	4.2	4.2	5.2	9.3	7.3
MSCI USA MIN. VOL. INDEX	5.2	18.4	18.4	10.9	14.5	8.8
FTSE RAFI U.S. 1000 INDEX	6.5	16.4	16.4	10.1	15.3	9.4

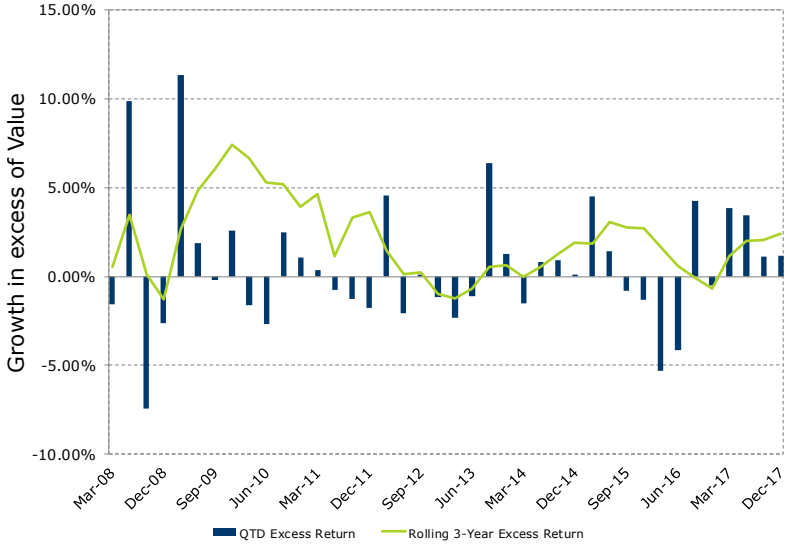
WILSHIRE 5000 SECTOR WEIGHT & RETURN (%)



LARGE CAP VS SMALL CAP



GROWTH VS VALUE



Data sources: Wilshire Compass, Wilshire Atlas

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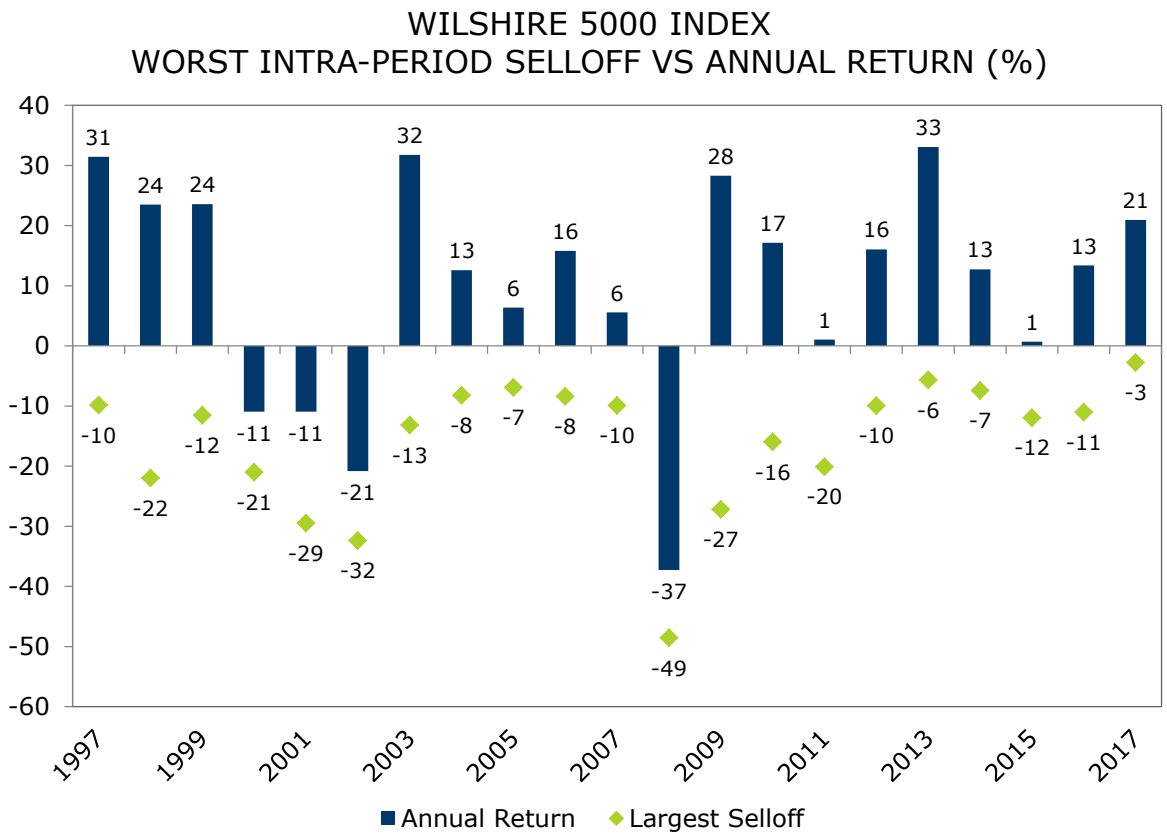
ANNUAL EQUITY RETURNS

- U.S. Equity has now produced 9 straight years of positive returns since 2008
- 2017 was one of the least volatile years in nearly four decades
  - Largest drawdown for the year was -2.75%
  - Only 4 trading days where the market was down 1% or more



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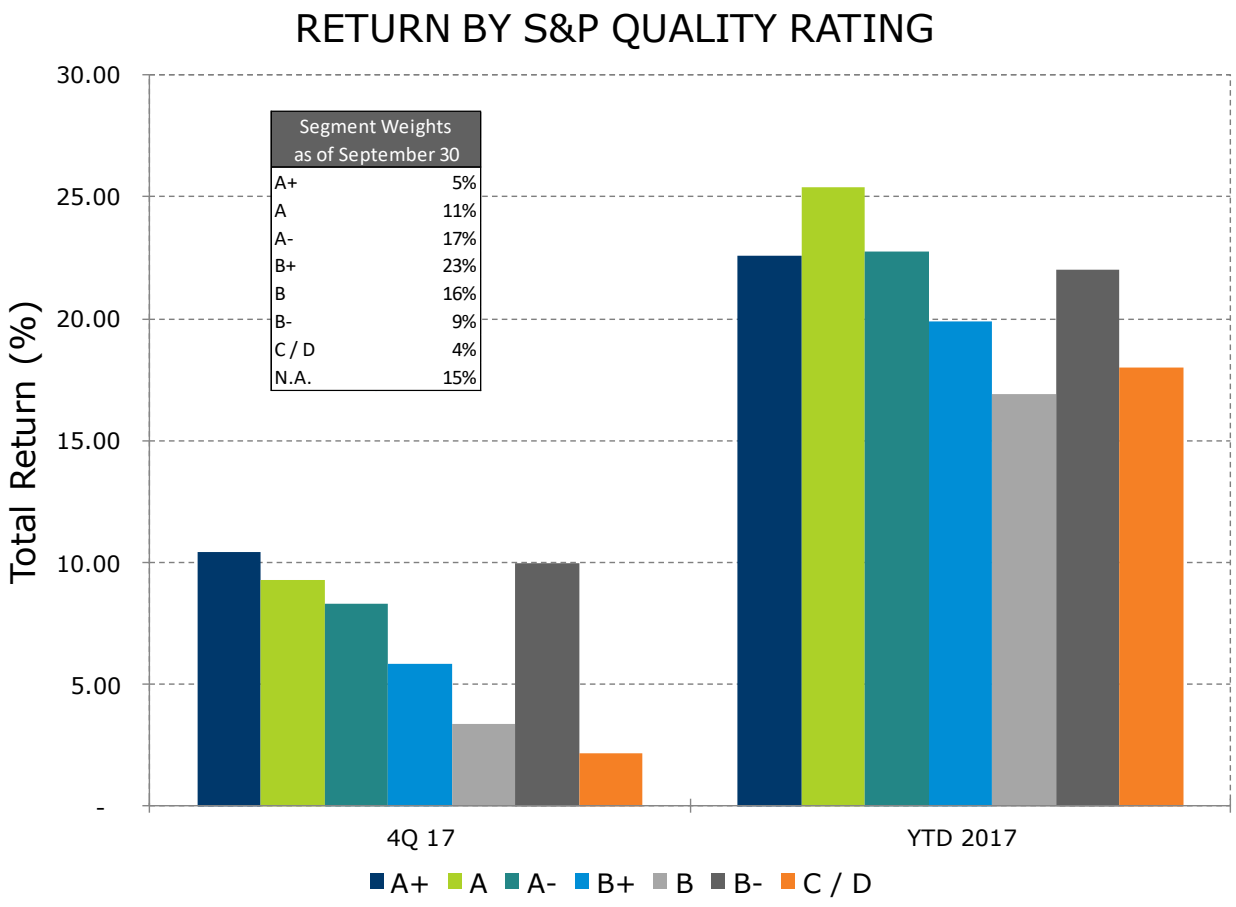
RETURNS BY QUALITY SEGMENT

Generally speaking, higher quality names led the market for both the fourth quarter and 2017



Data sources: Wilshire Atlas

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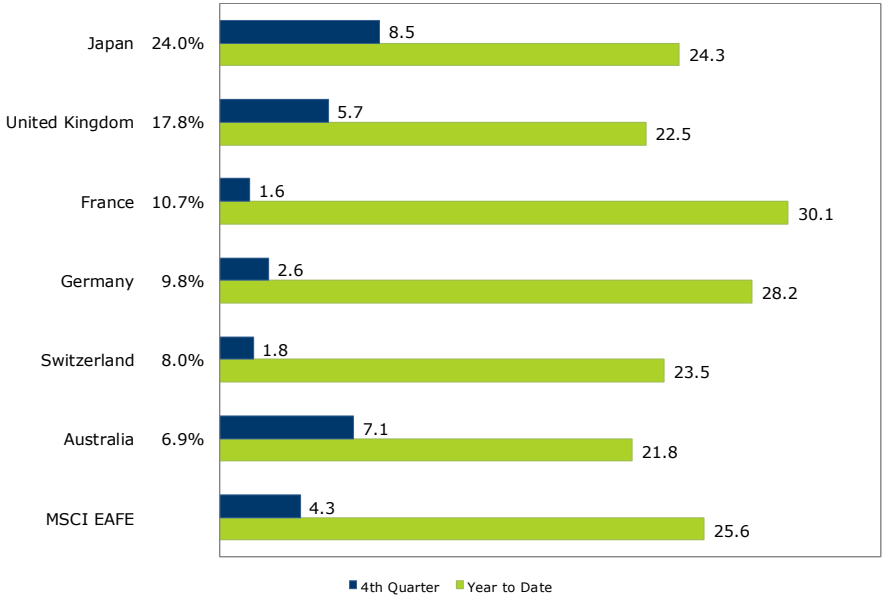
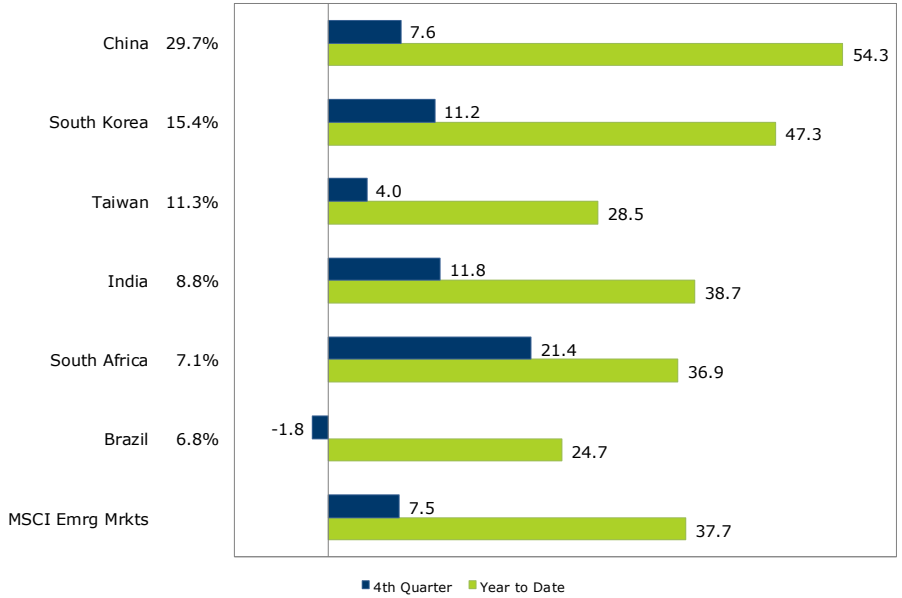
NON-U.S. EQUITY MARKET

AS OF DECEMBER 31, 2017	QTR	YTD	1 YR	3 YR	5 YR	10 YR
MSCI ACWI EX-US ($G)	5.1	27.8	27.8	8.3	7.3	2.3
MSCI EAFE ($G)	4.3	25.6	25.6	8.3	8.4	2.4
MSCI EMERGING MARKETS ($G)	7.5	37.7	37.7	9.5	4.7	2.0
MSCI FRONTIER MARKETS ($G)	5.6	32.3	32.3	5.5	9.7	-0.7
MSCI ACWI EX-US GROWTH ($G)	5.8	32.5	32.5	9.7	8.4	2.8
MSCI ACWI EX-US VALUE ($G)	4.3	23.4	23.4	6.9	6.2	1.8
MSCI ACWI EX-US SMALL ($G)	6.6	32.1	32.1	12.5	10.5	5.2
MSCI EAFE MINIMUM VOLATILITY	3.6	22.2	22.2	9.3	9.9	5.2
FTSE RAFI DEVELOPED EX-US	4.7	25.7	25.7	8.7	8.9	2.8
MSCI EAFE LC (G)	3.7	15.8	15.8	9.0	11.9	3.8
MSCI EMERGING MARKETS LC (G)	5.7	31.0	31.0	10.9	8.4	4.5

MSCI EAFE: LARGEST COUNTRIES & RETURN (USD)



MSCI EM: LARGEST COUNTRIES & RETURN (USD)



Data sources: Wilshire Compass

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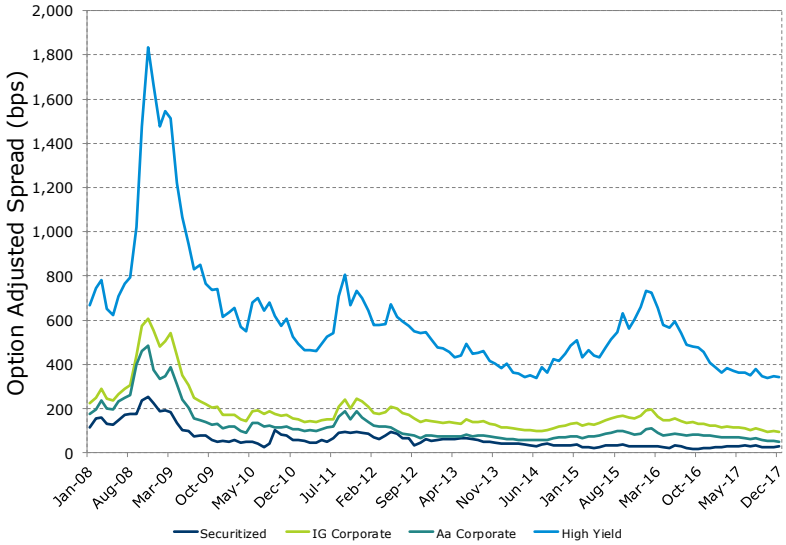
U.S. FIXED INCOME

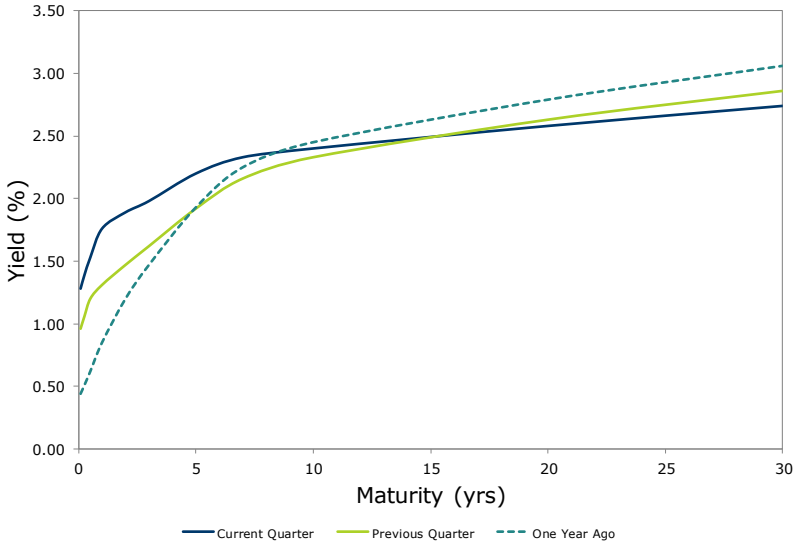
AS OF DECEMBER 31, 2017	YTM	DURATION	QTR	YTD	1 YR	3 YR	5 YR	10 YR
BLOOMBERG BARCLAYS AGGREGATE	2.7	6.0	0.4	3.6	3.6	2.2	2.1	4.0
BLOOMBERG BARCLAYS TREASURY	2.2	6.2	0.1	2.3	2.3	1.4	1.3	3.3
BLOOMBERG BARCLAYS GOV'T-REL.	2.7	5.5	0.3	4.2	4.2	2.2	1.9	3.7
BLOOMBERG BARCLAYS SECURITIZED	2.9	4.4	0.2	2.5	2.5	1.9	2.0	3.8
BLOOMBERG BARCLAYS CORPORATE	3.3	7.6	1.2	6.4	6.4	3.9	3.5	5.7
BLOOMBERG BARCLAYS LT G/C	3.5	15.4	2.8	10.7	10.7	4.5	4.4	7.3
BLOOMBERG BARCLAYS LT TREASURY	2.7	17.6	2.4	8.5	8.5	2.8	3.5	6.6
BLOOMBERG BARCLAYS LT GOV't-REL.	4.0	12.6	2.1	11.9	11.9	4.5	4.1	7.0
BLOOMBERG BARCLAYS LT CORP.	4.0	14.3	3.3	12.1	12.1	5.9	5.3	7.8
BLOOMBERG BARCLAYS U.S. TIPS *	2.4	7.7	1.3	3.0	3.0	2.0	0.1	3.5
BLOOMBERG BARCLAYS HIGH YIELD	6.2	3.9	0.5	7.5	7.5	6.3	5.8	8.0
TREASURY BILLS	1.4	0.25	0.3	0.8	0.8	0.4	0.3	0.4

* Yield and Duration statistics are for a proxy index based on similar maturity, the Bloomberg Barclays U.S. Treasury 7-10 Year Index

BLOOMBERG BARCLAYS FIXED INCOME INDEXES



TREASURY YIELD CURVE



Data sources: Wilshire Compass, Bloomberg Barclays, U.S. Treasury

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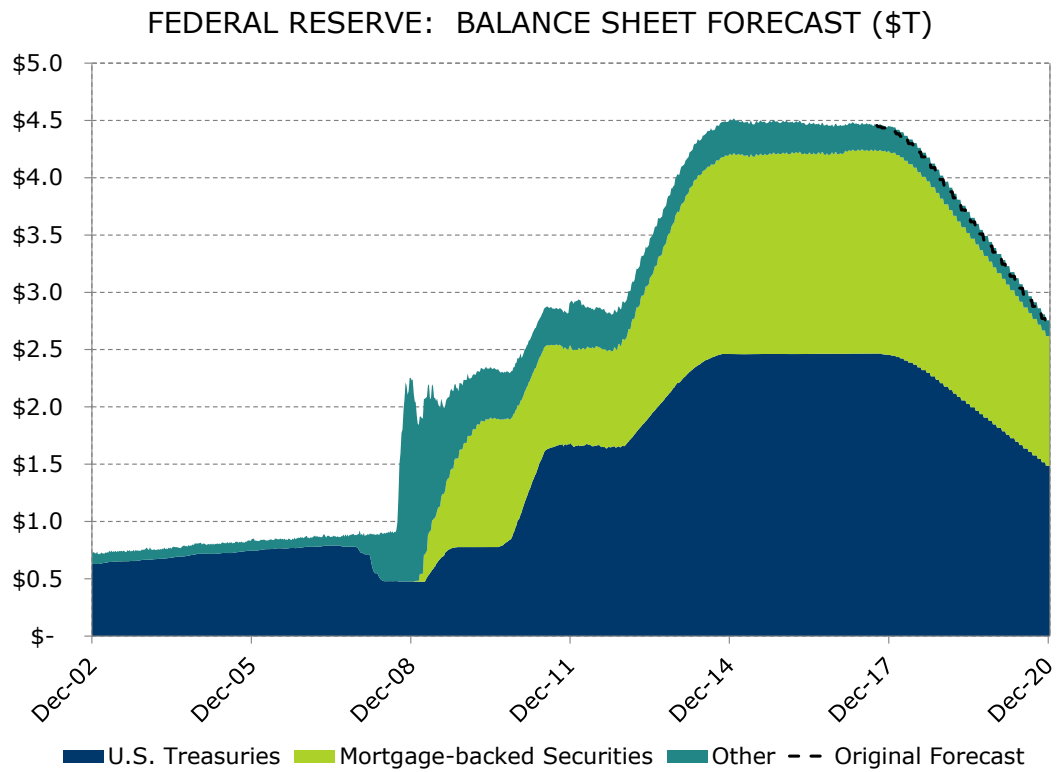
FEDERAL RESERVE

- Federal Reserve began their balance sheet normalization program during Q4; targeting $10B in reductions per month with the goal of reaching $50B per month in Q4 2018

- Total reductions have equaled only $17B through mid-January 2018



Data sources: Federal Reserve

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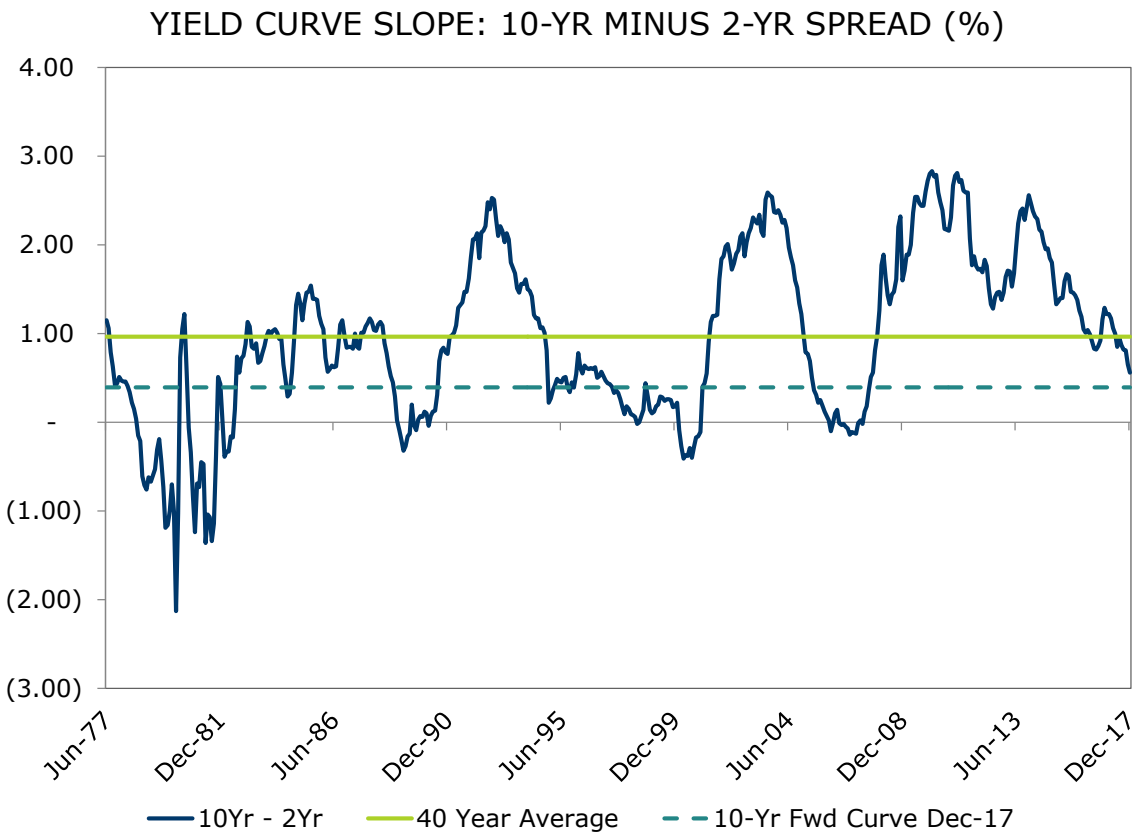
U.S. YIELD CURVE

- Shape of the curve had been steep since the global financial crisis; has recently flattened
- Current spread between 10-year and 2-year Treasury is well below average (0.56% vs. 0.96%)
- Tight spread present in 10-year forward curve as well (0.39%)
- Continued strong economic growth will put upward pressure on the long end of the curve



Data source: Federal Reserve

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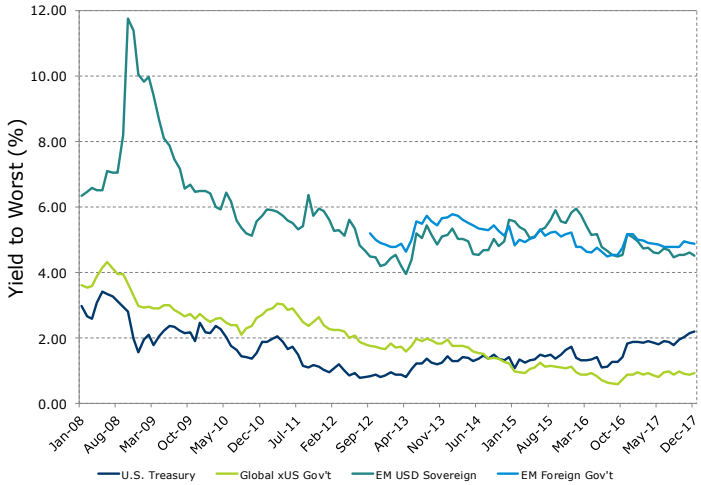
NON-U.S. FIXED INCOME

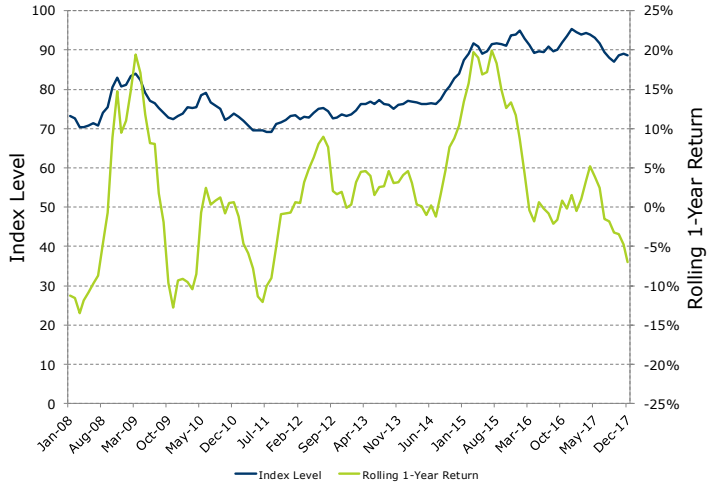
AS OF DECEMBER 31, 2017	QTR	YTD	1 YR	3 YR	5 YR	10 YR
DEVELOPED MARKETS						
BLMBRG BRCLYS GLBL AGGREGATE xUS	1.6	10.5	10.5	1.8	-0.2	2.4
BLMBRG BRCLYS GLBL AGGREGATE xUS *	1.1	2.5	2.5	2.9	3.7	4.2
BLMBRG BRCLYS GLOBAL INF LNKD xUS	3.9	12.8	12.8	2.6	2.4	3.3
BLMBRG BRCLYS GLOBAL INF LNKD xUS *	3.4	3.3	3.3	5.7	5.8	5.8
EMERGING MARKETS (HARD CURRENCY)						
BLMBRG BRCLYS EM USD AGGREGATE	0.6	8.2	8.2	6.4	3.9	7.0
EMERGING MARKETS (FOREIGN CURRENCY)						
BLMBRG BRCLYS EM LOCAL CURR. GOV'T	2.2	14.3	14.3	2.7	0.3	n.a.
BLMBRG BRCLYS EM LOCAL CURR. GOV'T *	0.0	3.6	3.6	2.3	1.8	n.a.
EURO vs. DOLLAR	1.6	13.8	13.8	-0.3	-1.9	-2.0
YEN vs. DOLLAR	-0.1	3.5	3.5	2.1	-5.2	-0.1
POUND vs. DOLLAR	0.8	9.5	9.5	-4.6	-3.6	-3.8

* Returns are reported in terms of local market investors, which removes currency effects.

BLOOMBERG BARCLAYS FIXED INCOME INDEXES



U.S. DOLLAR INDEX: MAJOR CURRENCIES



Data sources: Wilshire Compass, Bloomberg Barclays, Federal Reserve Bank of St. Louis

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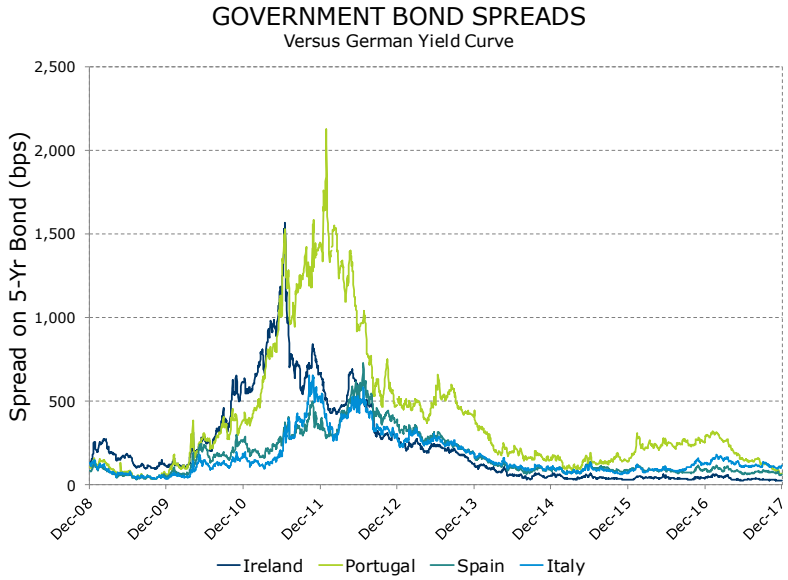
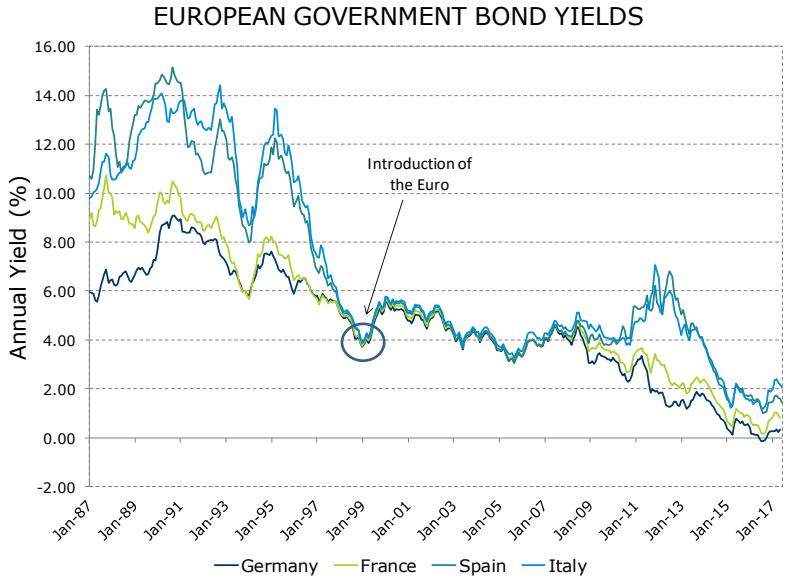
EUROPEAN DEBT

- Yields on Portugal's debt are down in the midst of a strong economic recovery and rating upgrades during the fourth quarter



- Yields on government bonds remain low globally



Data sources: Bloomberg Barclays, International Monetary Fund

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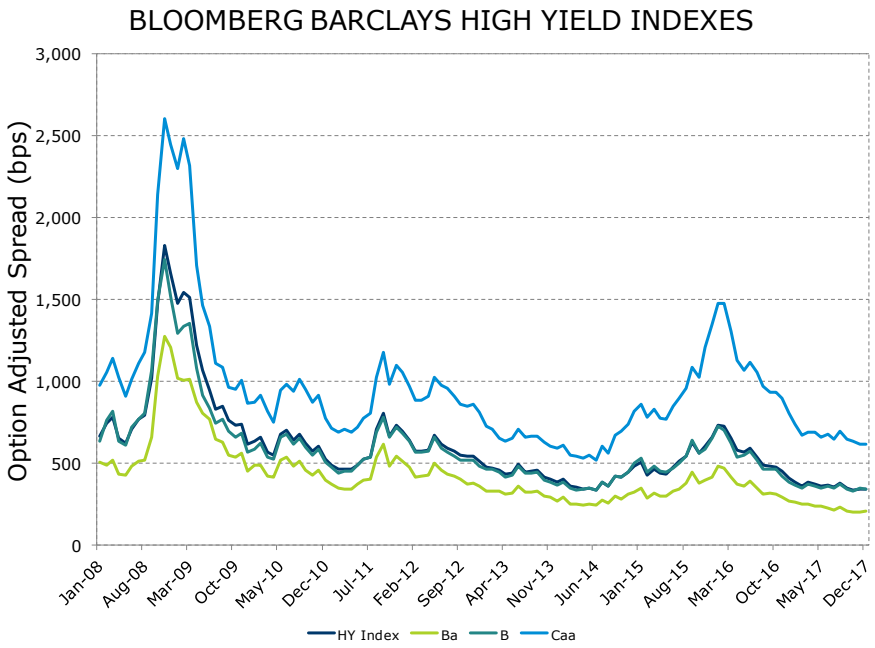
HIGH YIELD BOND MARKET

AS OF DECEMBER 31, 2017		QTR	YTD	1 YR	3 YR	5 YR	10 YR
BLOOMBERG BARCLAYS HIGH YIELD		0.5	7.5	7.5	6.3	5.8	8.0
CREDIT SUISSE LEVERAGED LOAN		1.2	4.2	4.2	4.5	4.3	4.6
HIGH YIELD QUALITY DISTRIBUTION	WEIGHT						
Ba U.S. HIGH YIELD	44.1%	0.4	7.3	7.3	6.2	5.8	8.4
B U.S. HIGH YIELD	40.3%	0.4	6.5	6.5	5.5	5.1	6.5
Caa U.S. HIGH YIELD	14.4%	1.0	10.4	10.4	8.4	7.5	7.8
Ca to D U.S. HIGH YIELD	1.1%	0.8	13.8	13.8	-3.0	-10.1	-0.4
Non-Rated U.S. HIGH YIELD	0.2%	-2.0	9.2	9.2	-2.5	0.9	1.3



Data sources: Wilshire Compass, Bloomberg Barclays

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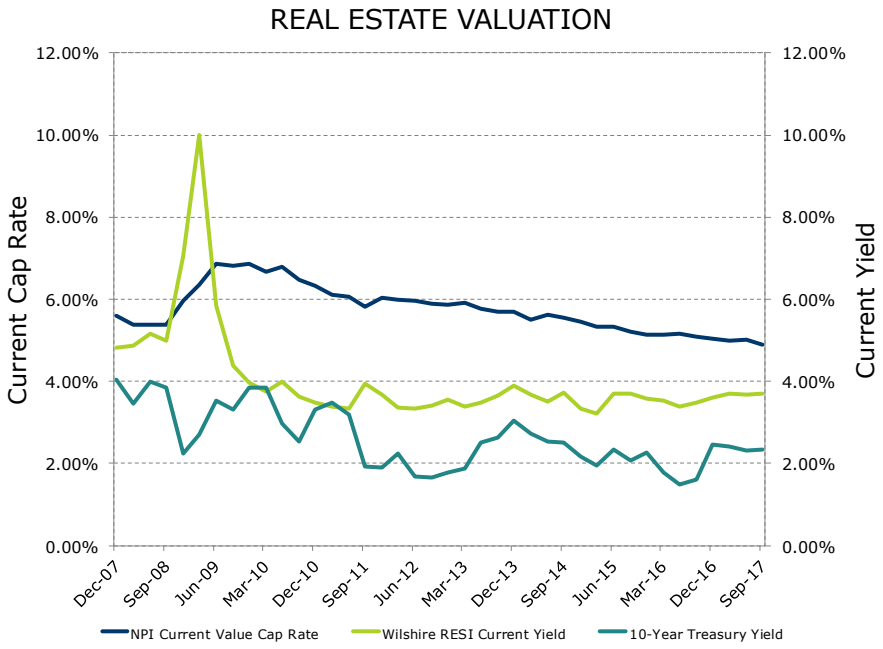
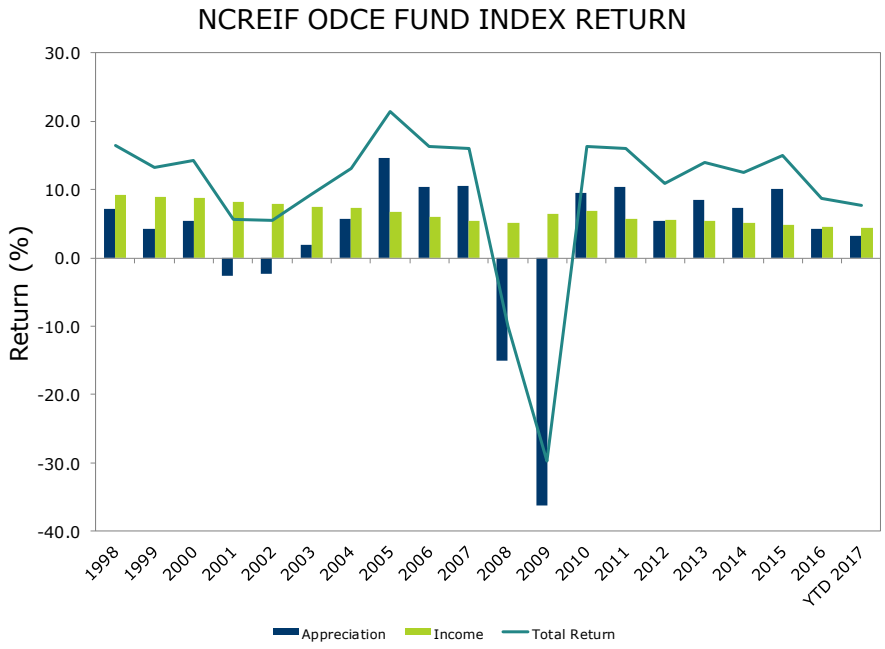
REAL ASSETS

AS OF DECEMBER 31, 2017	QTR	YTD	1 YR	3 YR	5 YR	10 YR
BLOOMBERG BARCLAYS U.S. TIPS	1.3	3.0	3.0	2.0	0.1	3.5
BLOOMBERG COMMODITY INDEX	4.7	1.7	1.7	-5.0	-8.5	-6.8
WILSHIRE GLOBAL RESI INDEX	3.2	10.0	10.0	5.8	8.0	5.4
NCREIF ODCE FUND INDEX	2.1	7.6	7.6	10.4	11.5	5.0
NCREIF TIMBERLAND INDEX	1.5	3.6	3.6	3.7	6.2	4.4
ALERIAN MLP INDEX (OIL & GAS)	-1.0	-6.5	-6.5	-9.3	-0.1	6.0





Data sources: Wilshire Compass, National Council of Real Estate Investment Fiduciaries

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TOTAL FUND

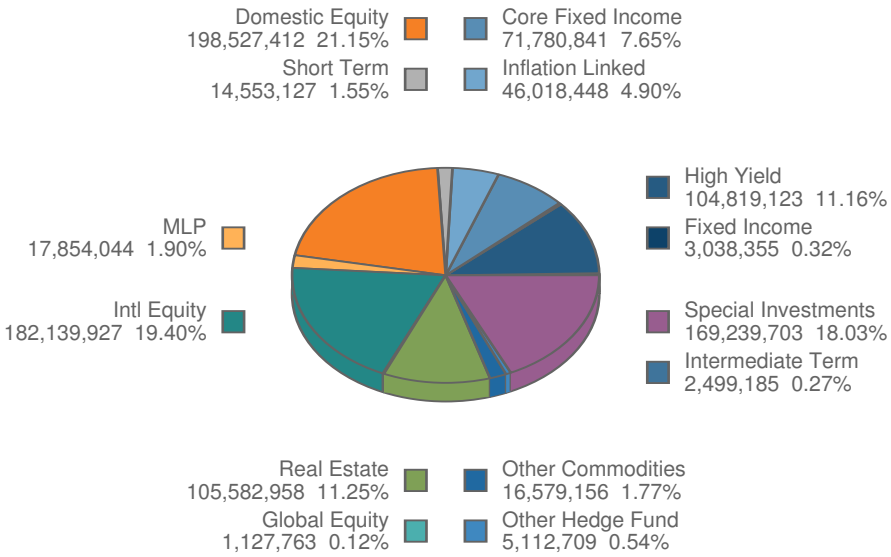
Wilshire Consulting

ACTUAL ALLOCATION VS POLICY ALLOCATION

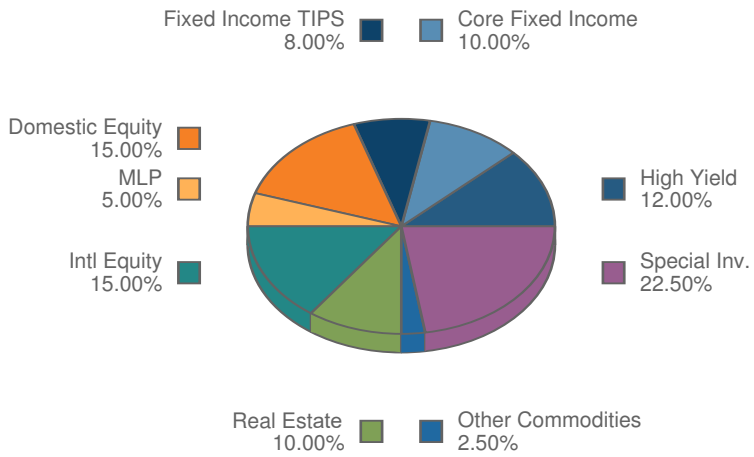
Total Fund Composite

As of December 31, 2017

Total Fund



Policy Index



$938,872,750

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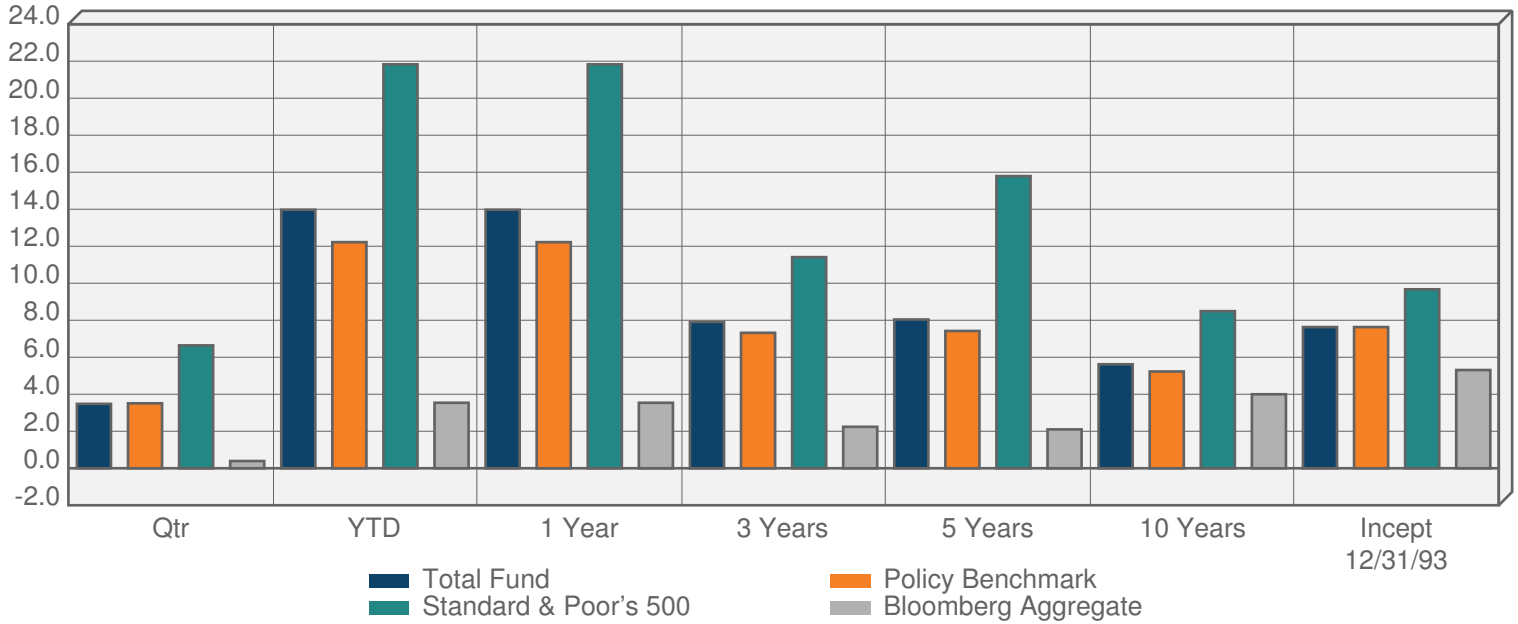
INVESTMENT PERFORMANCE

Total Fund Composite

Periods Ended December 31, 2017



Total Returns	Qtr	YTD	1 Year	3 Years	5 Years	10 Years	Incept 12/31/93
Total Fund	3.48	13.97	13.97	7.91	8.04	5.62	7.63
Policy Benchmark	3.51	12.22	12.22	7.32	7.42	5.23	7.63
Standard & Poor's 500	6.64	21.83	21.83	11.41	15.79	8.49	9.67
Bloomberg Aggregate	0.39	3.54	3.54	2.24	2.10	4.01	5.31

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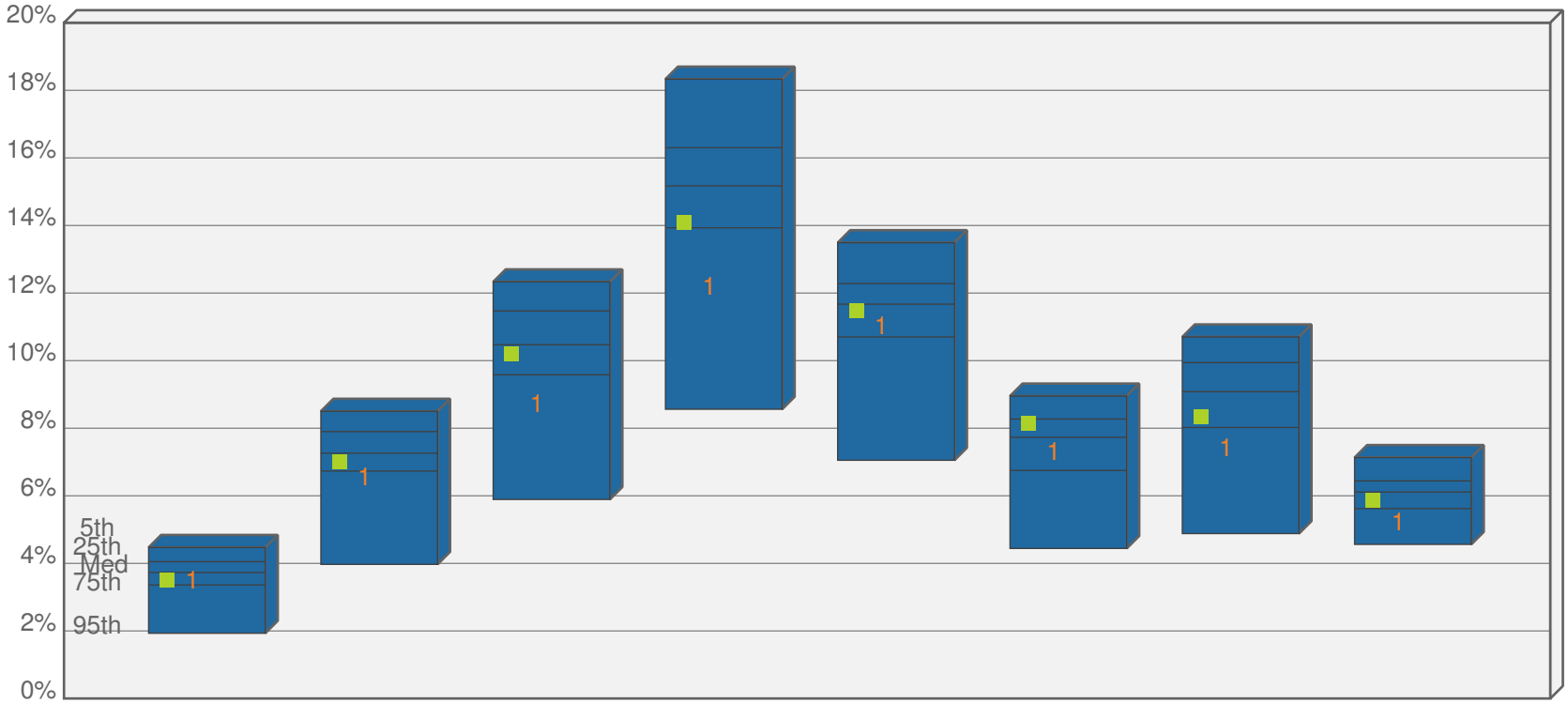
PERFORMANCE COMPARISON

Total Fund Composite

Periods Ended December 31, 2017



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
Total Fund	3.53 (66)	7.04 (60)	10.23 (58)	14.13 (71)	11.52 (56)	8.19 (27)	8.37 (70)	5.91 (62)
1 Policy Benchmark	3.51 (67)	6.57 (78)	8.75 (86)	12.22 (86)	11.03 (68)	7.32 (62)	7.42 (84)	5.23 (86)
5th %tile	4.47	8.50	12.33	18.33	13.49	8.95	10.70	7.13
25th %tile	4.05	7.90	11.47	16.30	12.28	8.27	9.94	6.44
Median	3.73	7.26	10.47	15.17	11.67	7.73	9.08	6.11
75th %tile	3.36	6.73	9.58	13.93	10.70	6.75	8.02	5.62
95th %tile	1.93	3.97	5.89	8.56	7.05	4.44	4.88	4.56
Number of Funds	154	154	154	154	149	145	144	119

*TUCS Total Ret of Master Trusts - Public Universe - Gross of Fees

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PERFORMANCE COMPARISON

Trailing Returns

Periods Ended December 31, 2017

	Quarter	2 Quarters	3 Quarters	1 Year	3 Years	5 Years	10 Years	Incept Date	Incept Ret
US Equity Composite									
Net of Fee Return	**6.56**	**12.00**	**15.51**	**22.08**	**11.13**	**15.50**	**8.33**	**12/31/93**	**9.00**
Wilshire 5000	6.39	11.28	14.56	20.99	11.35	15.67	8.64	12/31/93	9.67
Value Added	0.16	0.73	0.95	1.09	-0.23	-0.17	-0.30	12/31/93	-0.67
Non US Equity Composite									
Net of Fee Return	**4.62**	**11.75**	**20.35**	**30.72**	**10.59**	**8.46**	**2.50**	**12/31/00**	**5.65**
Policy Index	5.23	11.82	18.36	27.81	8.38	7.13	1.90	12/31/00	4.51
Value Added	-0.60	-0.07	1.99	2.91	2.22	1.33	0.60	12/31/00	1.14
Global Equity									
Net of Fee Return	**3.09**	**7.82**	**10.79**	**17.91**	**6.44**			**12/31/14**	**6.44**
MSCI ACWI (N)	5.73	11.21	15.96	23.97	9.29			12/31/14	9.29
Value Added	-2.64	-3.39	-5.16	-6.05	-2.85			12/31/14	-2.85
Core Fixed Composite									
Net of Fee Return	**0.34**	**1.12**	**2.39**	**3.30**	**2.30**	**2.02**	**4.07**	**9/30/82**	**7.84**
Bloomberg Aggregate	0.39	1.24	2.70	3.54	2.24	2.10	4.01	9/30/82	7.42
Value Added	-0.05	-0.12	-0.32	-0.24	0.06	-0.08	0.07	9/30/82	0.42
High Yield Fixed Composite									
Net of Fee Return	**0.20**	**1.81**	**3.87**	**6.10**	**4.51**	**4.15**		**3/31/08**	**7.55**
Citi High Yield Market Capped	0.58	2.50	4.49	6.97	5.91	5.35		3/31/08	7.95
Value Added	-0.38	-0.69	-0.62	-0.87	-1.40	-1.20		3/31/08	-0.40
TIPS Fixed Composite									
Net of Fee Return	**1.26**	**2.22**	**1.80**	**3.10**	**2.01**	**0.01**		**3/31/08**	**3.14**
Bloomberg U.S. TIPS	1.26	2.14	1.72	3.01	2.05	0.13		3/31/08	3.09
Value Added	-0.00	0.08	0.07	0.09	-0.04	-0.13		3/31/08	0.06

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PERFORMANCE COMPARISON

Trailing Returns

Periods Ended December 31, 2017

	Quarter	2 Quarters	3 Quarters	1 Year	3 Years	5 Years	10 Years	Incept Date	Incept Ret
MLP Composite									
Net of Fee Return								**12/31/17**	
Alerian MLP Index								12/31/17	
Value Added								12/31/17	
Commodities Composite									
Net of Fee Return	**6.15**	**10.32**	**6.82**	**4.58**	**-4.75**	**-7.84**	**-5.51**	**3/31/07**	**-3.95**
Bloomberg Commodity Index	4.71	7.35	4.13	1.70	-5.03	-8.45	-6.83	3/31/07	-5.44
Value Added	1.44	2.97	2.70	2.88	0.29	0.61	1.32	3/31/07	1.49
ERECT Composite									
Net of Fee Return	**1.33**	**7.19**	**4.91**	**6.30**	**7.18**	**6.76**		**9/30/10**	**6.78**
Real Estate Composite									
Net of Fee Return	**3.48**	**6.28**	**8.17**	**10.04**	**9.72**	**11.26**	**5.46**	**3/31/03**	**8.87**
NCREIF ODCE NOF	1.85	3.52	5.04	6.66	9.42	10.51	4.07	3/31/03	7.31
Value Added	1.63	2.76	3.13	3.38	0.30	0.75	1.39	3/31/03	1.57
Hedge Fund Composite									
Net of Fee Return	**1.05**	**-0.55**	**-10.69**	**-13.66**	**-1.70**	**0.07**		**9/30/11**	**0.97**
91 Day T-Bill Index + 3%	1.02	2.03	2.99	3.85	3.41	3.27		9/30/11	3.23
Value Added	0.03	-2.58	-13.68	-17.51	-5.11	-3.20		9/30/11	-2.26
Life Settlement Composite									
Net of Fee Return	**-2.66**	**-4.00**	**0.44**	**-6.64**	**-6.61**	**-2.76**		**9/30/09**	**10.07**
Israel Bonds and Cash									
Net of Fee Return	**0.81**	**0.39**	**0.85**	**1.16**	**1.15**	**1.72**	**2.56**	**3/31/99**	**2.96**

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PERFORMANCE COMPARISON

Trailing Returns

Periods Ended December 31, 2017

	Quarter	2 Quarters	3 Quarters	1 Year	3 Years	5 Years	10 Years	Incept Date	Incept Ret
Private Equity Composite									
Net of Fee Return	**4.03**	**5.77**	**6.95**	**9.19**	**11.45**	**11.70**	**9.18**	**3/31/03**	**6.39**
RBAC Custom Private Equity Bench	4.03	5.76	6.95	9.19	11.45	11.70	9.18	3/31/03	6.39
Value Added	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3/31/03	0.00
Total Fund									
Net of Fee Return	**3.48**	**6.94**	**10.12**	**13.97**	**7.91**	**8.04**	**5.62**	**12/31/93**	**7.63**
Policy Benchmark	3.51	6.57	8.75	12.22	7.32	7.42	5.23	12/31/93	7.63
Value Added	-0.03	0.38	1.37	1.75	0.59	0.62	0.39	12/31/93	0.01

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CUSTOM BENCHMARK SPECIFICATION

Total Fund

December 31, 2017

	Quarter Start	Quarter End	Percent	Description
Policy Benchmark	12/93	12/06	65.00	Russell 3000
			35.00	Bloomberg Aggregate
	3/07	6/08	5.00	RBAC Custom Private Equity Benchmark
			45.00	Wilshire 5000
			25.00	Bloomberg Aggregate
			10.00	MSCI EAFE Index (N)
			5.00	Bloomberg Commodity Index
			5.00	91-Day T-Bill + 3.0% Ann (Monthly)
			5.00	NCREIF ODCE NOF
	9/08	9/08	5.00	RBAC Custom Private Equity Benchmark
			5.00	NCREIF ODCE NOF
			5.00	91-Day T-Bill + 3.0% Ann (Monthly)
			5.00	Bloomberg Commodity Index
			10.00	MSCI ACWI ex US (N)
			25.00	Bloomberg Aggregate
			45.00	Wilshire 5000
	12/08	6/09	5.00	RBAC Custom Private Equity Benchmark
			2.50	91-Day T-Bill + 3.0% Ann (Monthly)
			5.00	Citi High Yield Market Capped
			5.00	Bloomberg U.S. TIPS
			5.00	Bloomberg Commodity Index
			7.50	NCREIF ODCE NOF
			15.00	MSCI ACWI ex US (N)
			20.00	Bloomberg Aggregate
			35.00	Wilshire 5000
	9/09	3/10	5.00	RBAC Custom Private Equity Benchmark
			30.00	Wilshire 5000
			20.00	MSCI ACWI ex US (N)
			15.00	Bloomberg Aggregate

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CUSTOM BENCHMARK SPECIFICATION

Total Fund

December 31, 2017

	Quarter Start	Quarter End	Percent	Description
Policy Benchmark (cont.)			10.00	Citi High Yield Market Capped
			10.00	NCREIF ODCE NOF
			7.50	Bloomberg U.S. TIPS
			2.50	Bloomberg Commodity Index
	6/10	12/12	10.00	RBAC Custom Private Equity Benchmark
			5.00	Bloomberg Commodity Index
			6.00	Bloomberg U.S. TIPS
			10.00	NCREIF ODCE NOF
			10.00	Citi High Yield Market Capped
			14.00	Bloomberg Aggregate
			20.00	Wilshire 5000
			25.00	MSCI ACWI ex US (N)
	3/13	12/17	5.00	Bloomberg U.S. TIPS
			8.00	Bloomberg Commodity Index
			10.00	NCREIF ODCE NOF
			10.00	Bloomberg Aggregate
			12.00	Citi High Yield Market Capped
			16.10	Wilshire 5000
			18.90	MSCI ACWI ex US (N)
			20.00	RBAC Custom Private Equity Benchmark

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US EQUITY

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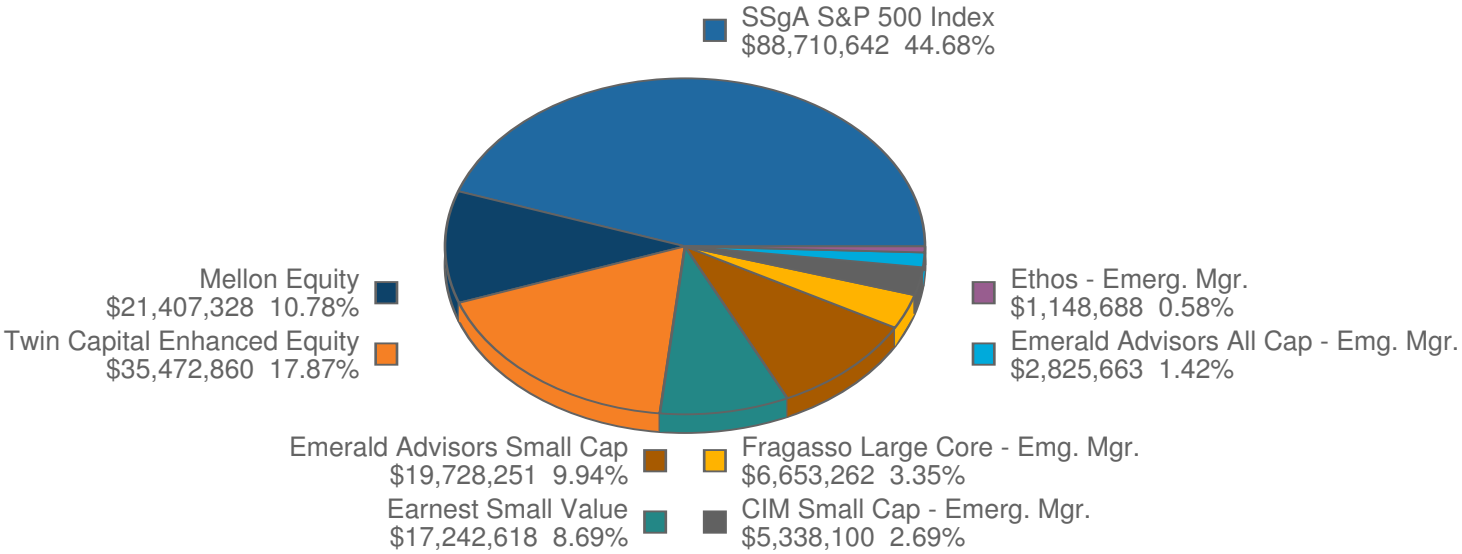
MANAGER ALLOCATION

US Equity Composite

As of December 31, 2017



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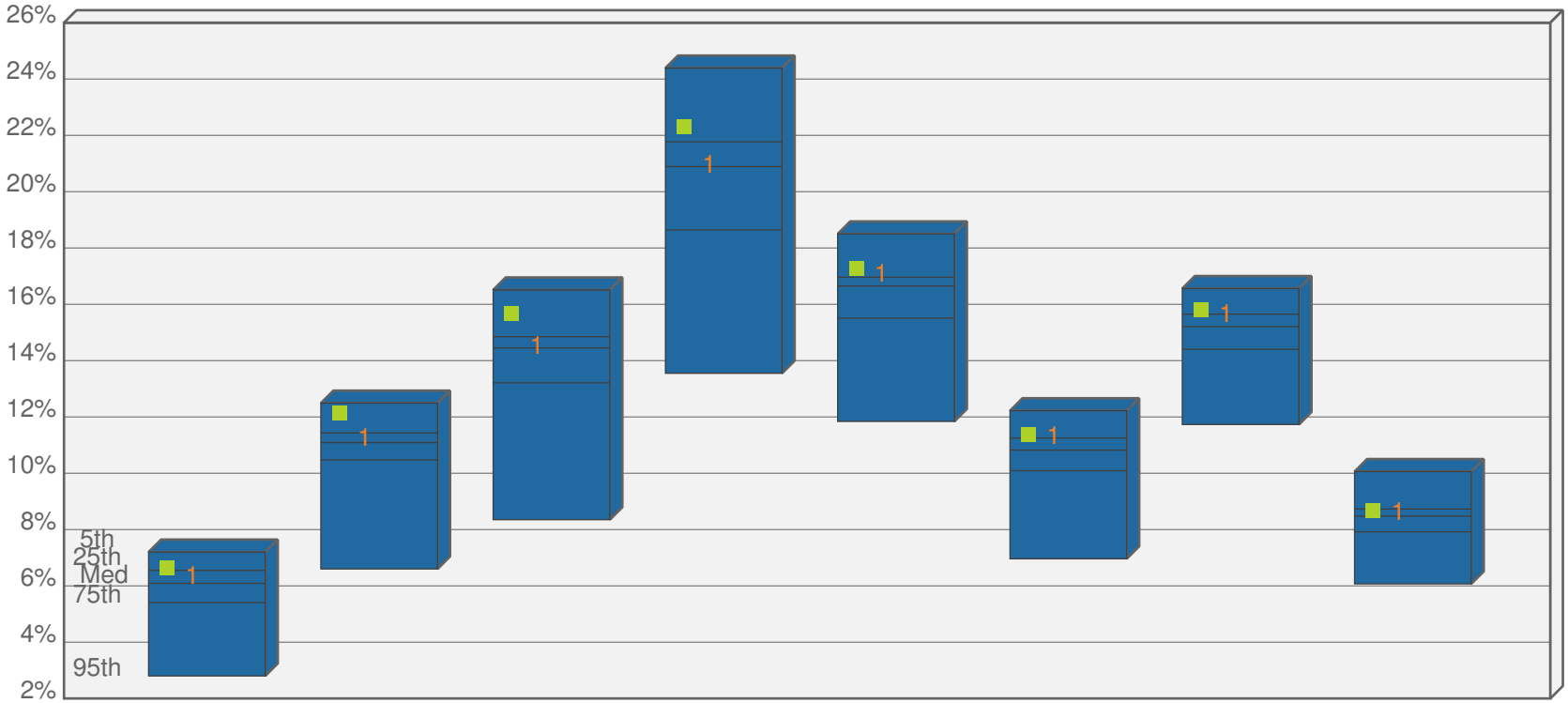
PERFORMANCE COMPARISON

US Equity Composite

Periods Ended December 31, 2017



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
US Equity Composite	6.68 (12)	12.20 (9)	15.72 (15)	22.36 (16)	17.31 (15)	11.43 (14)	15.85 (9)	8.71 (28)
1 Wilshire 5000	6.39 (32)	11.28 (34)	14.56 (43)	20.99 (48)	17.12 (22)	11.35 (19)	15.67 (22)	8.64 (35)
5th %tile	7.20	12.49	16.51	24.39	18.50	12.22	16.56	10.06
25th %tile	6.55	11.43	14.85	21.77	16.96	11.25	15.65	8.73
Median	6.09	11.09	14.45	20.89	16.65	10.82	15.21	8.48
75th %tile	5.41	10.47	13.21	18.64	15.51	10.09	14.40	7.92
95th %tile	2.80	6.60	8.35	13.55	11.84	6.96	11.73	6.07
Number of Funds	128	125	122	117	115	107	103	83

*TUCS Total Ret of US Equity Investment Pools Universe - Gross of Fees

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PERFORMANCE COMPARISON

Trailing Returns

Periods Ended December 31, 2017

	Quarter	2 Quarters	3 Quarters	1 Year	3 Years	5 Years	10 Years	Incept Date	Incept Ret
SSgA S&P 500 Index									
Net of Fee Return	**6.65**	**11.44**	**14.88**	**21.85**	**11.45**	**15.80**	**8.54**	**12/31/07**	**8.54**
Standard & Poor's 500	6.64	11.42	14.86	21.83	11.41	15.79	8.49	12/31/07	8.49
Value Added	0.00	0.02	0.01	0.01	0.04	0.01	0.05	12/31/07	0.05
Mellon Equity									
Net of Fee Return	**5.61**	**11.79**	**14.19**	**22.48**	**9.18**	**14.63**	**8.47**	**3/31/94**	**9.86**
Standard & Poor's 500	6.64	11.42	14.86	21.83	11.41	15.79	8.49	3/31/94	9.96
Value Added	-1.04	0.37	-0.68	0.64	-2.23	-1.16	-0.02	3/31/94	-0.10
Twin Capital Enhanced Equity									
Net of Fee Return	**6.95**	**11.81**	**14.66**	**20.67**	**11.31**	**15.75**	**8.51**	**12/31/05**	**8.96**
Standard & Poor's 500	6.64	11.42	14.86	21.83	11.41	15.79	8.49	12/31/05	8.83
Value Added	0.31	0.39	-0.21	-1.16	-0.10	-0.05	0.01	12/31/05	0.13
Earnest Small Value									
Net of Fee Return	**6.13**	**13.43**	**15.73**	**21.78**	**13.15**	**16.26**		**6/30/09**	**16.42**
Russell 2000 Value	2.05	7.26	7.98	7.84	9.55	13.00		6/30/09	14.89
Value Added	4.08	6.17	7.75	13.94	3.61	3.25		6/30/09	1.53
Emerald Advisors Small Cap									
Net of Fee Return	**7.46**	**14.78**	**22.60**	**28.31**	**13.34**	**18.58**	**11.54**	**9/30/04**	**11.42**
Russell 2000 Growth	4.59	11.09	15.96	22.17	10.28	15.21	9.19	9/30/04	9.92
Value Added	2.88	3.70	6.63	6.14	3.06	3.38	2.36	9/30/04	1.50
Fragasso Large Core - Emg. Mgr.									
Net of Fee Return	**7.17**	**12.18**	**15.30**	**19.69**	**8.74**	**13.89**		**9/30/12**	**13.47**
Standard & Poor's 500	6.64	11.42	14.86	21.83	11.41	15.79		9/30/12	14.90
Value Added	0.52	0.76	0.43	-2.14	-2.67	-1.91		9/30/12	-1.44

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PERFORMANCE COMPARISON

Trailing Returns

Periods Ended December 31, 2017

	Quarter	2 Quarters	3 Quarters	1 Year	3 Years	5 Years	10 Years	Incept Date	Incept Ret
Ethos - Emerg. Mgr.									
Net of Fee Return	**6.33**	**11.33**	**15.89**	**23.74**				**9/30/16**	**21.69**
Standard & Poor's 500	6.64	11.42	14.86	21.83				9/30/16	20.68
Value Added	-0.31	-0.09	1.03	1.91				9/30/16	1.01
CIM Small Cap - Emerg. Mgr.									
Net of Fee Return	**3.29**	**6.68**	**8.19**	**11.60**	**7.26**			**12/31/13**	**6.95**
Russell 2000	3.34	9.20	11.89	14.65	9.96			12/31/13	8.67
Value Added	-0.06	-2.52	-3.69	-3.05	-2.69			12/31/13	-1.71
Emerald Advisors All Cap - Emg. Mgr.									
Net of Fee Return	**9.92**	**19.18**	**24.90**	**35.81**				**9/30/15**	**16.09**
Russell 3000 Growth	7.61	13.98	19.29	29.59				9/30/15	19.40
Value Added	2.31	5.20	5.62	6.23				9/30/15	-3.31
US Equity Composite									
Net of Fee Return	**6.56**	**12.00**	**15.51**	**22.08**	**11.13**	**15.50**	**8.33**	**12/31/93**	**9.00**
Wilshire 5000	6.39	11.28	14.56	20.99	11.35	15.67	8.64	12/31/93	9.67
Value Added	0.16	0.73	0.95	1.09	-0.23	-0.17	-0.30	12/31/93	-0.67

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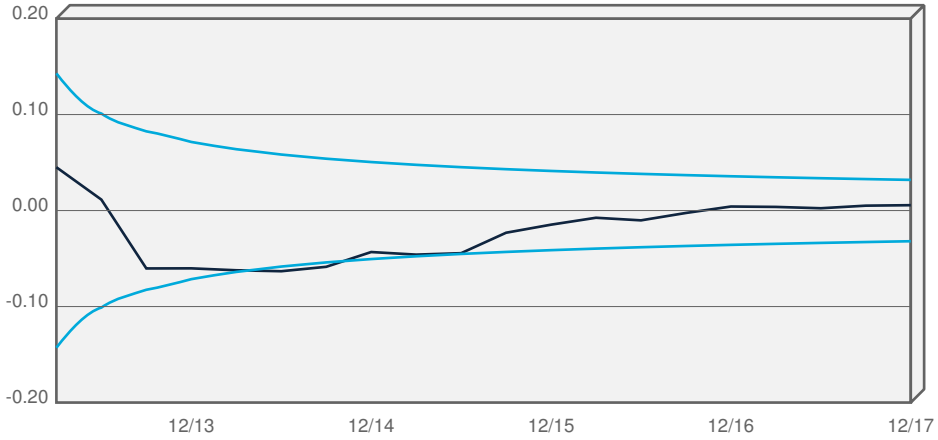
INVESTMENT MANAGER ANALYSIS

SSgA S&P 500 Index

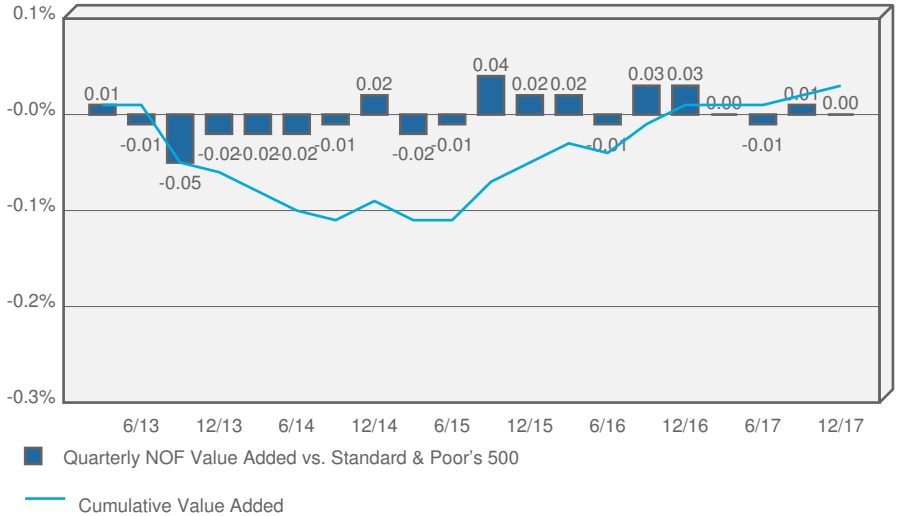
December 31, 2017

Cumulative Skill Analysis vs Benchmark

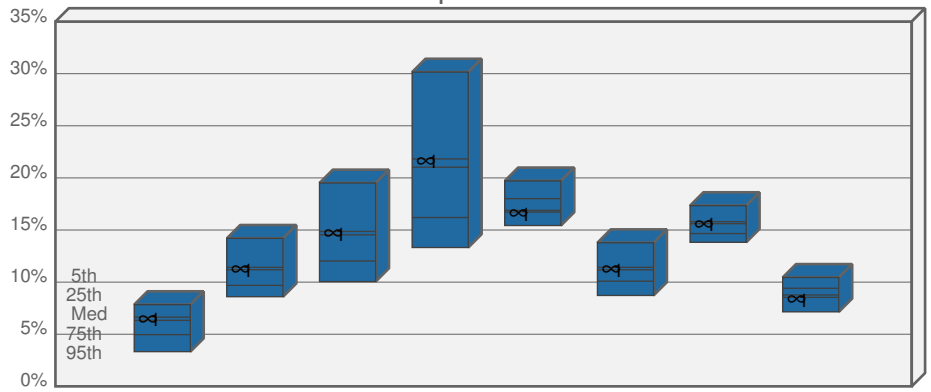


Excess Return:	0.01	Information Ratio:	0.13
Excess Risk:	0.04	T-Stat:	0.29

Value-Added Analysis vs Benchmark



Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
∞ SSgA S&P 500 I	6.65 (22)	11.45 (21)	14.89 (20)	21.86 (21)	16.84 (52)	11.47 (20)	15.82 (23)	8.56 (74)
1 Standard & Poo	6.64 (26)	11.42 (28)	14.86 (26)	21.83 (24)	16.79 (63)	11.41 (31)	15.79 (28)	8.49 (82)
Median	6.33	11.19	14.54	21.03	16.88	11.18	15.61	8.77
Number of Funds	128	128	128	128	127	122	116	100

*Compass Total Returns of Passive U.S. Equity Portfolios Universe - Gross of Fees

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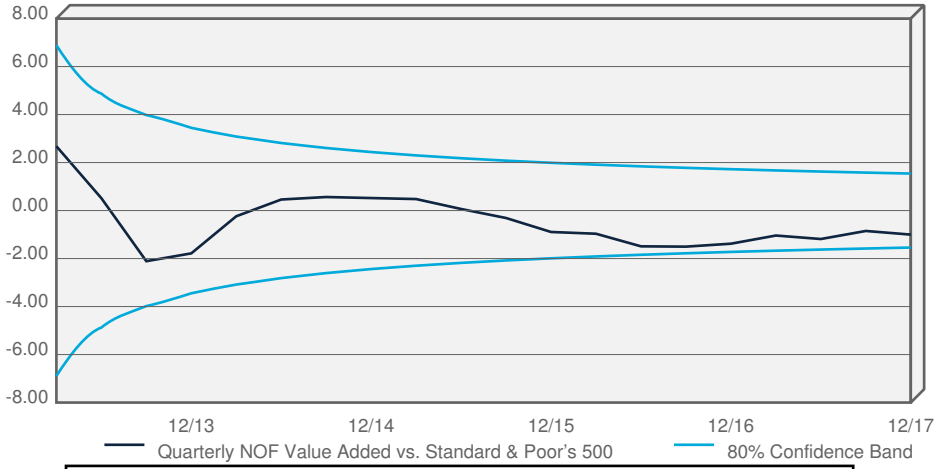
INVESTMENT MANAGER ANALYSIS

Mellon Equity

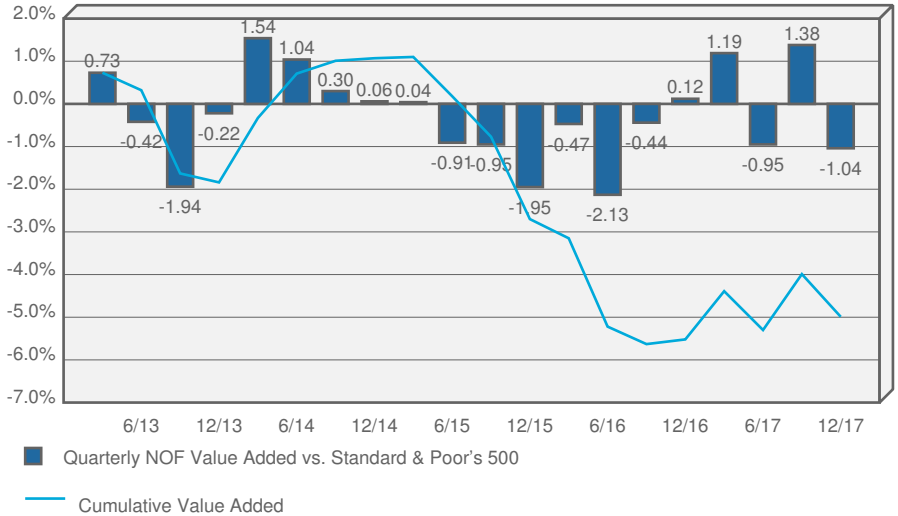
December 31, 2017

Cumulative Skill Analysis vs Benchmark

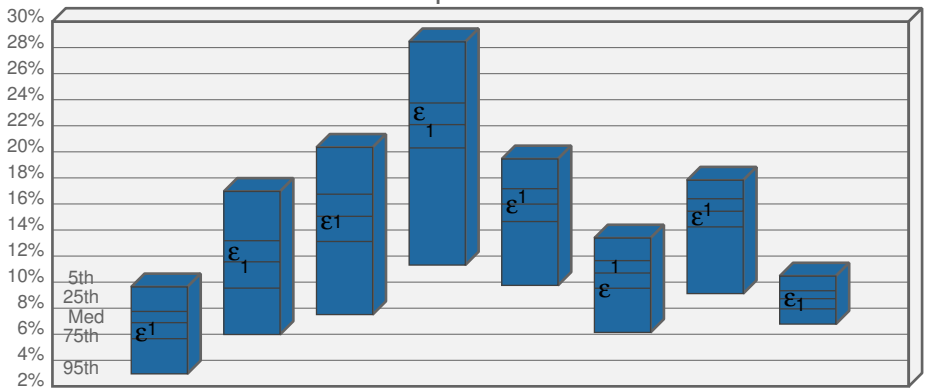


Excess Return:	-1.00	Information Ratio:	-0.48
Excess Risk:	2.10	T-Stat:	-1.07

Value-Added Analysis vs Benchmark



Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
ε Mellon Equity	6.18 (67)	12.40 (37)	14.80 (52)	23.14 (29)	15.99 (50)	9.61 (73)	15.10 (56)	8.92 (45)
1 Standard & Poo	6.64 (56)	11.42 (52)	14.86 (52)	21.83 (51)	16.79 (30)	11.41 (31)	15.79 (41)	8.49 (57)
Median	6.89	11.56	15.05	22.09	15.99	10.70	15.44	8.73
Number of Funds	179	178	178	177	177	173	167	141

*Compass Total Returns of Active Large Core Equity Portfolios Universe - Gross of Fees

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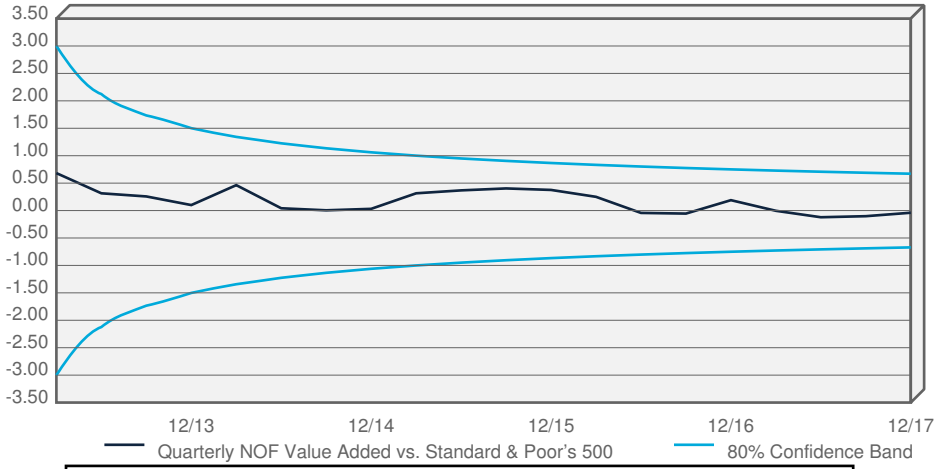
INVESTMENT MANAGER ANALYSIS

Twin Capital Enhanced Equity

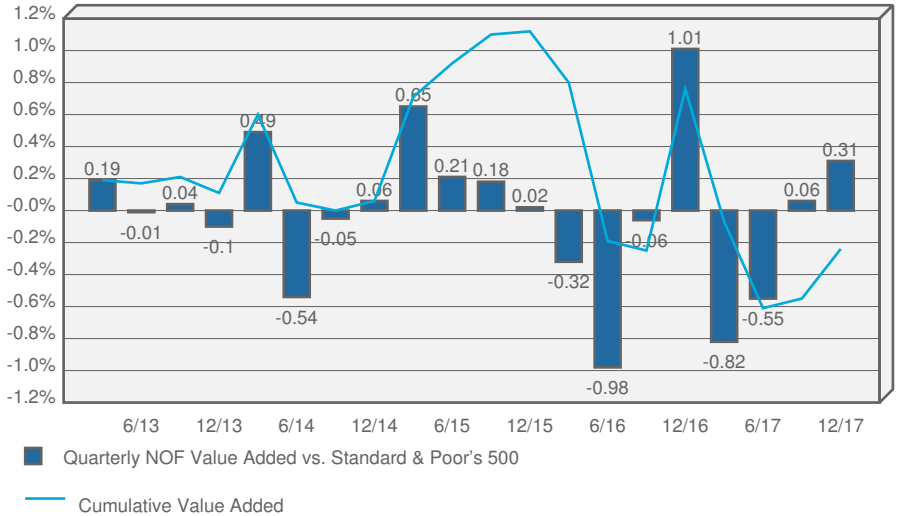
December 31, 2017

Cumulative Skill Analysis vs Benchmark

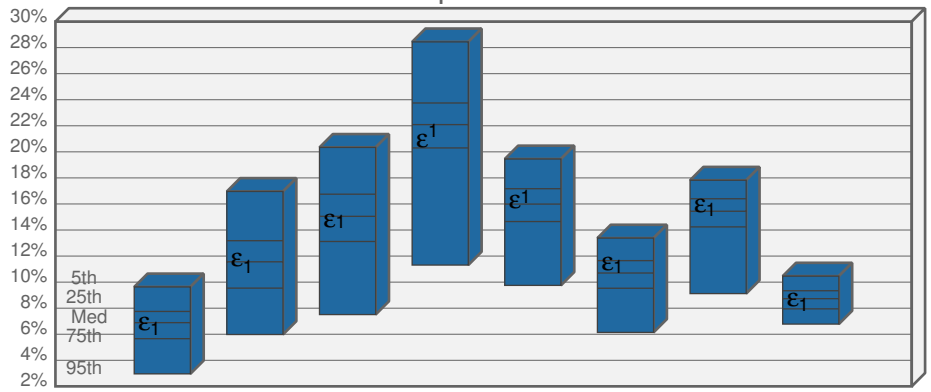


Excess Return:	-0.04	Information Ratio:	-0.04
Excess Risk:	0.91	T-Stat:	-0.10

Value-Added Analysis vs Benchmark



Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
ε Twin Capital E	7.04 (46)	11.98 (43)	14.93 (51)	21.06 (62)	16.41 (41)	11.66 (24)	16.12 (31)	8.86 (46)
1 Standard & Poo	6.64 (56)	11.42 (52)	14.86 (52)	21.83 (51)	16.79 (30)	11.41 (31)	15.79 (41)	8.49 (57)
Median	6.89	11.56	15.05	22.09	15.99	10.70	15.44	8.73
Number of Funds	179	178	178	177	177	173	167	141

*Compass Total Returns of Active Large Core Equity Portfolios Universe - Gross of Fees

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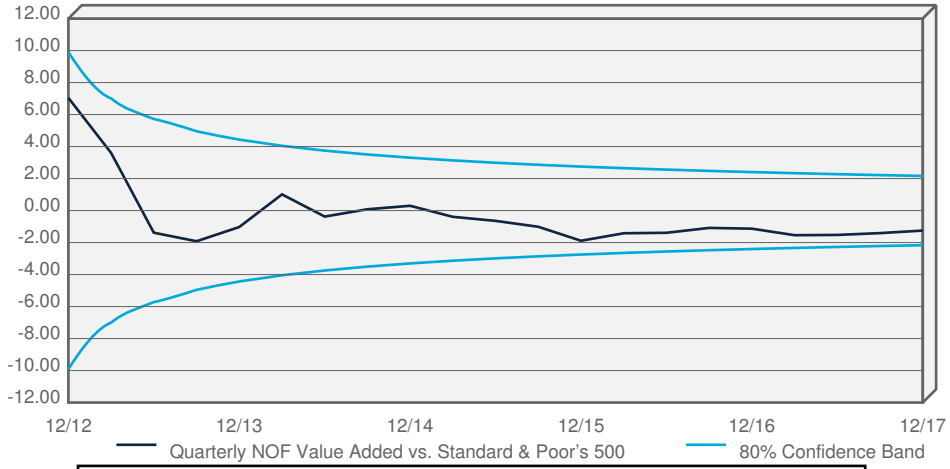
INVESTMENT MANAGER ANALYSIS

Fragasso Large Core - Emg. Mgr.

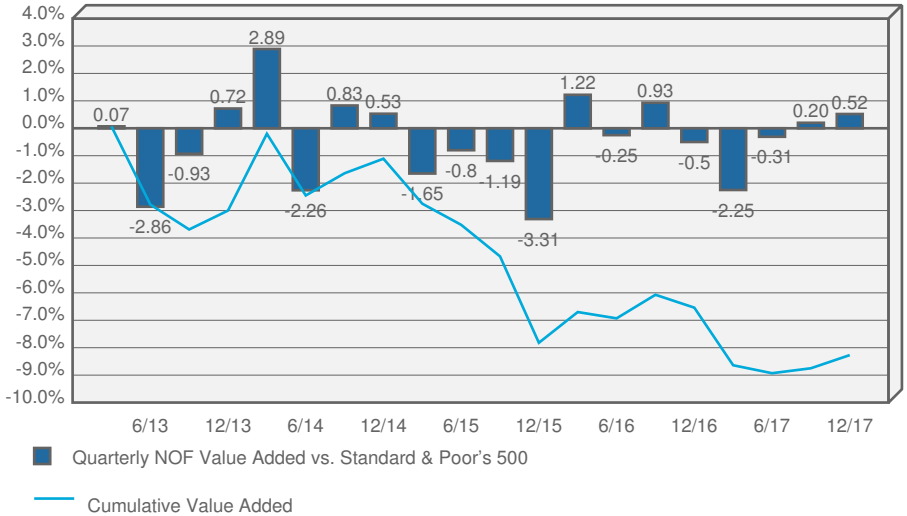
December 31, 2017

Cumulative Skill Analysis vs Benchmark

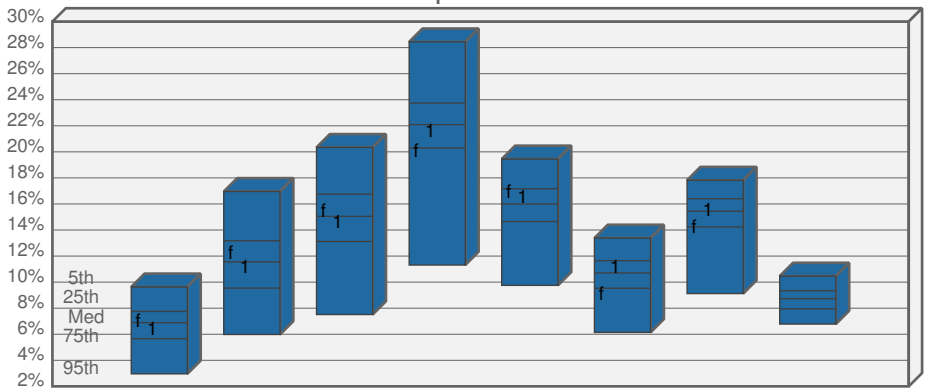


Excess Return:	-1.25	Information Ratio:	-0.42
Excess Risk:	3.01	T-Stat:	-0.93

Value-Added Analysis vs Benchmark



Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
f Fragasso Large	7.30 (37)	12.47 (36)	15.74 (35)	20.32 (74)	17.17 (25)	9.32 (79)	14.51 (71)	
1 Standard & Poo	6.64 (56)	11.42 (52)	14.86 (52)	21.83 (51)	16.79 (30)	11.41 (31)	15.79 (41)	
Median	6.89	11.56	15.05	22.09	15.99	10.70	15.44	8.73
Number of Funds	179	178	178	177	177	173	167	141

*Compass Total Returns of Active Large Core Equity Portfolios Universe - Gross of Fees

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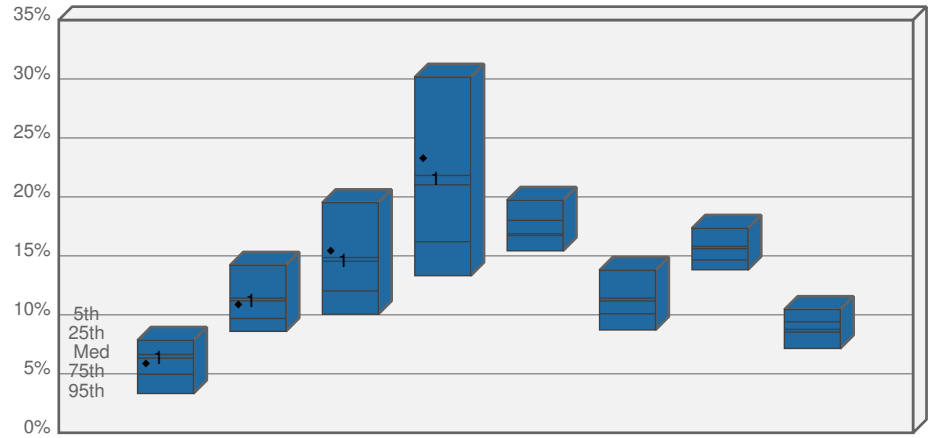
INVESTMENT MANAGER ANALYSIS

Ethos - Emerg. Mgr.

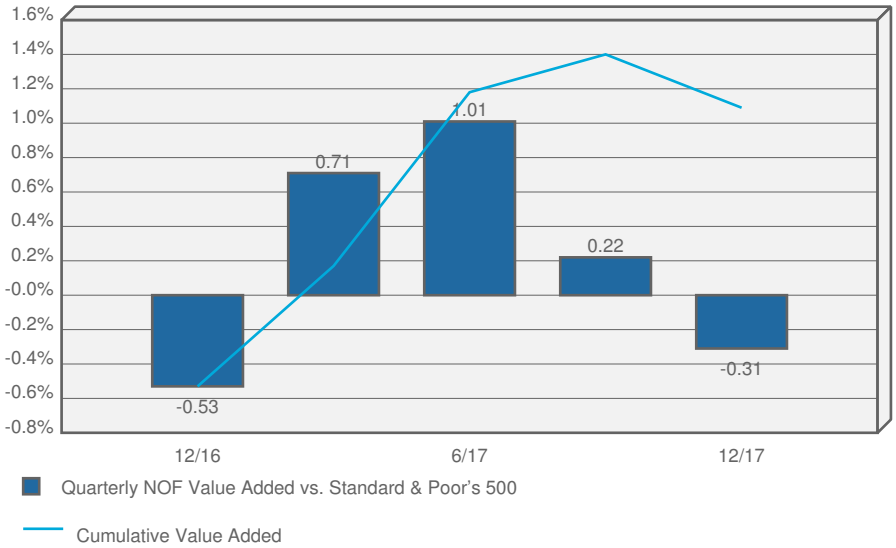
December 31, 2017

Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
◆ Ethos - Emerg.	6.33 (52)	11.33 (39)	15.89 (14)	23.74 (10)				
1 Standard & Poo	6.64 (26)	11.42 (28)	14.86 (26)	21.83 (24)				
Median	6.33	11.19	14.54	21.03	16.88	11.18	15.61	8.77
Number of Funds	128	128	128	128	127	122	116	100

Value-Added Analysis vs Benchmark



*Compass Total Returns of Passive U.S. Equity Portfolios Universe - Gross of Fees

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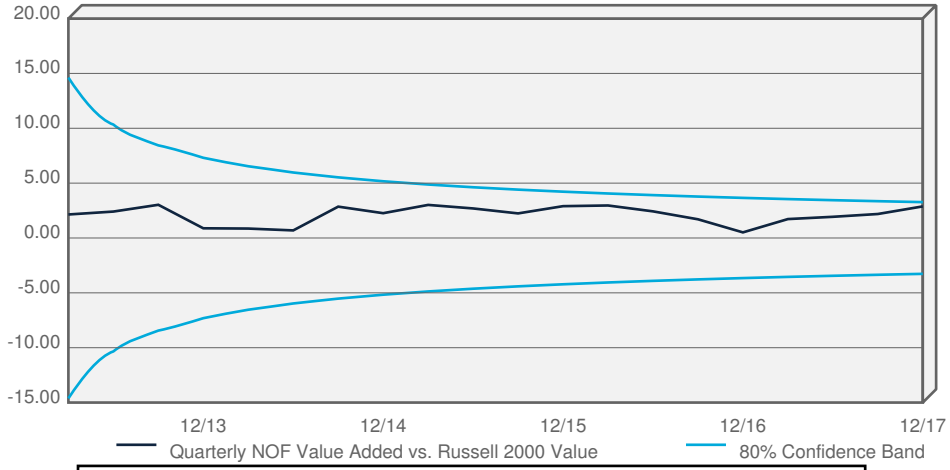
INVESTMENT MANAGER ANALYSIS

Earnest Small Value

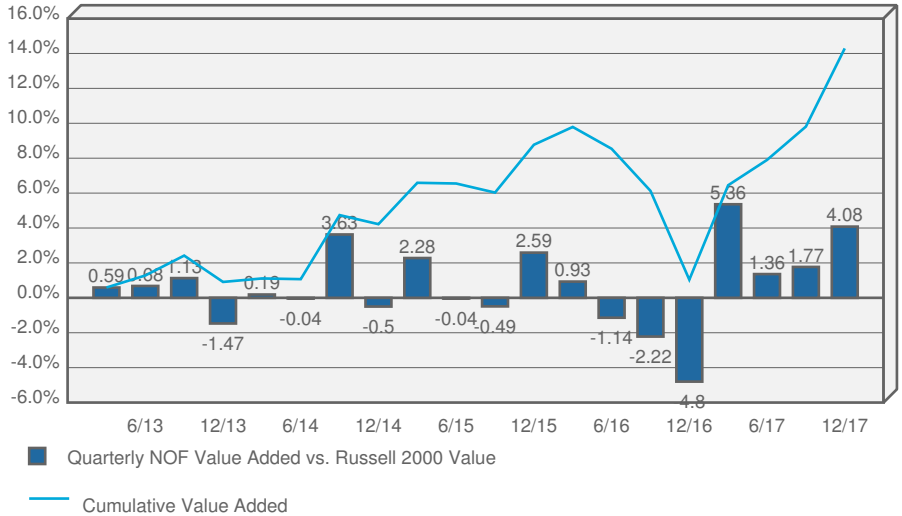
December 31, 2017

Cumulative Skill Analysis vs Benchmark

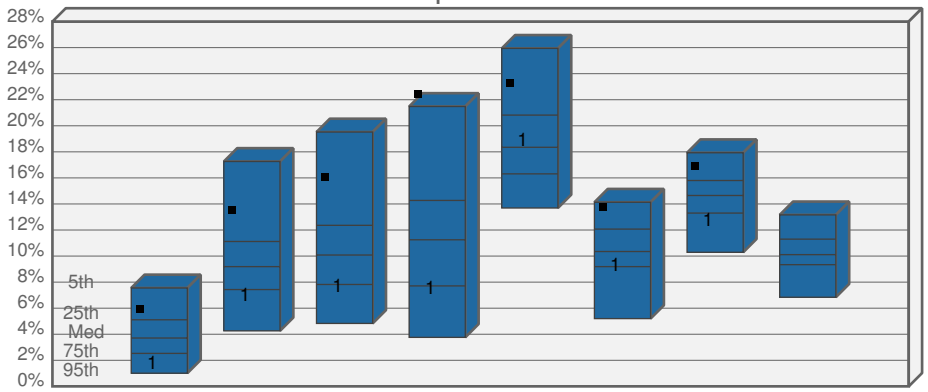


Excess Return:	2.88	Information Ratio:	0.65
Excess Risk:	4.44	T-Stat:	1.45

Value-Added Analysis vs Benchmark



Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
■ Earnest Small	6.35 (8)	13.91 (10)	16.48 (10)	22.83 (4)	23.69 (7)	14.19 (4)	17.34 (8)	
1 Russell 2000 V	2.05 (81)	7.26 (77)	7.98 (73)	7.84 (73)	19.19 (44)	9.55 (68)	13.00 (79)	
Median	3.71	9.19	10.08	11.25	18.35	10.35	14.65	10.11
Number of Funds	182	179	178	178	177	174	168	149

*Compass Total Returns of Active Small Cap Value Equity Portfolios Universe - Gross of Fees

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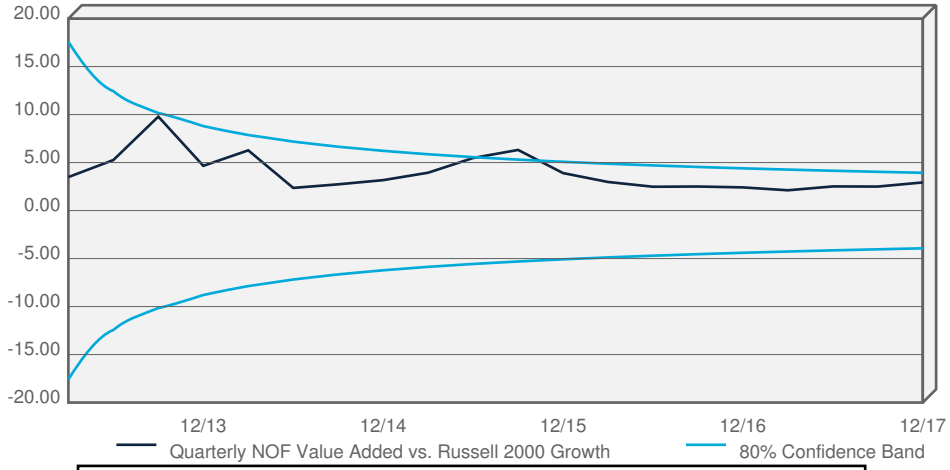
INVESTMENT MANAGER ANALYSIS

Emerald Advisors Small Cap

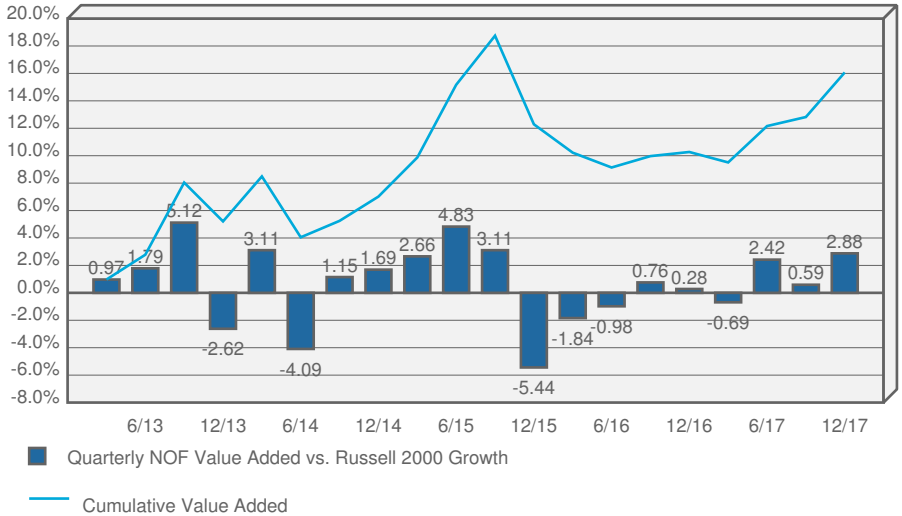
December 31, 2017

Cumulative Skill Analysis vs Benchmark

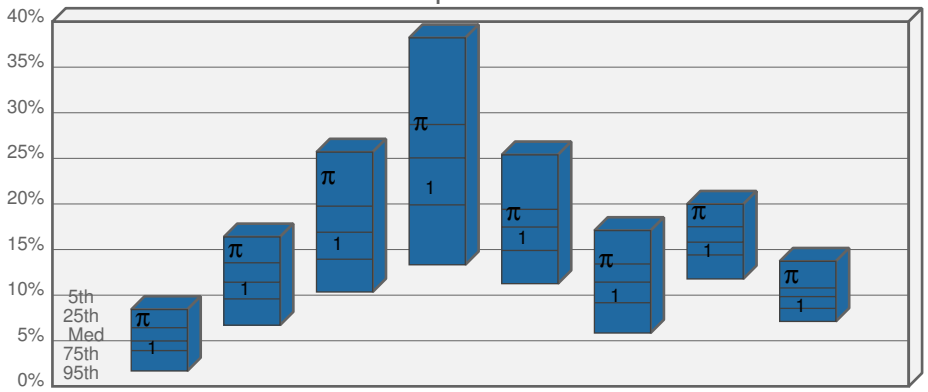


Excess Return:	2.93	Information Ratio:	0.55
Excess Risk:	5.35	T-Stat:	1.23

Value-Added Analysis vs Benchmark



Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
π Emerald Adviso	7.65 (11)	15.18 (11)	23.25 (9)	29.16 (20)	19.30 (25)	14.15 (14)	19.41 (6)	12.36 (10)
1 Russell 2000 G	4.59 (62)	11.09 (55)	15.96 (58)	22.17 (62)	16.62 (59)	10.28 (62)	15.21 (63)	9.19 (61)
Median	4.98	11.42	16.90	25.05	17.47	11.43	15.81	9.84
Number of Funds	145	143	143	143	143	141	138	124

*Compass Total Returns of Active Small Cap Growth Equity Portfolios Universe - Gross of Fees

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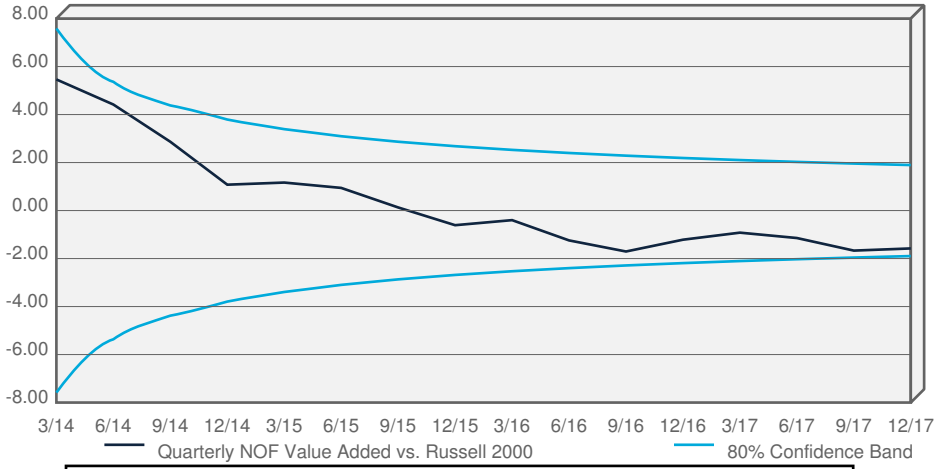
INVESTMENT MANAGER ANALYSIS

CIM Small Cap - Emerg. Mgr.

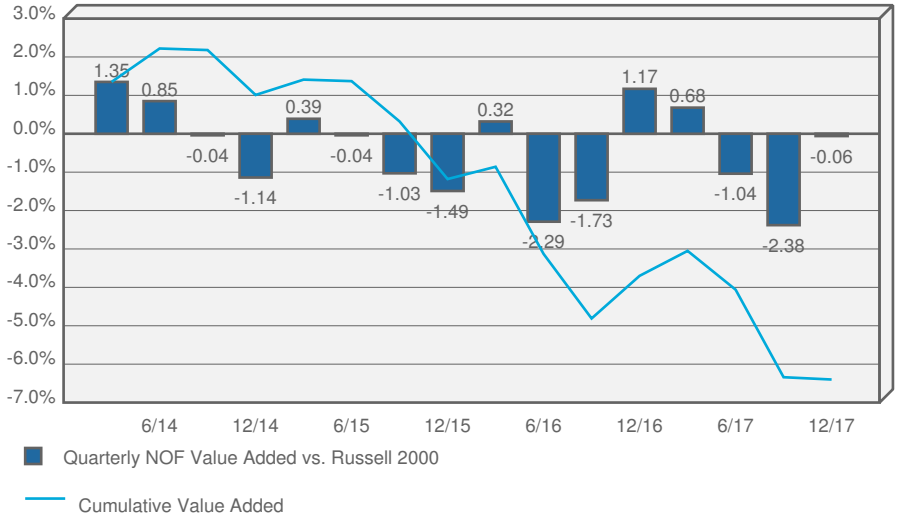
December 31, 2017

Cumulative Skill Analysis vs Benchmark

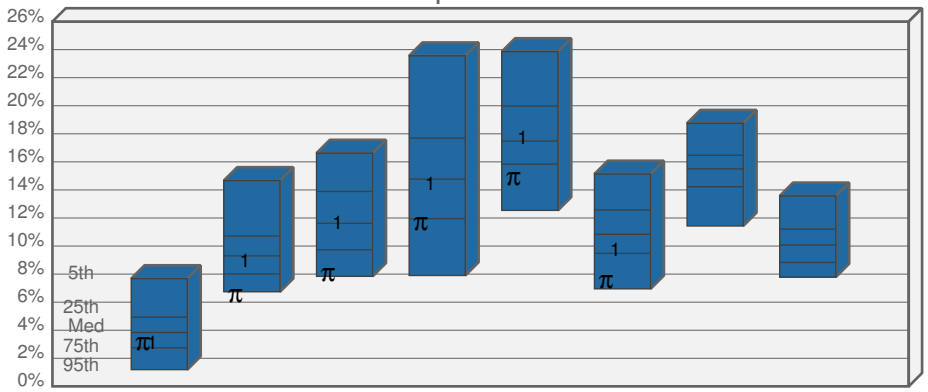


Excess Return:	-1.58	Information Ratio:	-0.68
Excess Risk:	2.31	T-Stat:	-1.37

Value-Added Analysis vs Benchmark



Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
π CIM Small Cap	3.29 (62)	6.68 (95)	8.19 (92)	11.78 (76)	15.03 (80)	7.64 (89)		
1 Russell 2000	3.34 (62)	9.20 (51)	11.89 (45)	14.65 (51)	17.93 (46)	9.96 (68)		
Median	3.84	9.30	11.62	14.77	17.48	10.84	15.50	10.07
Number of Funds	132	131	131	131	131	129	127	104

*Compass Total Returns of Active Small Cap Core Equity Portfolios Universe - Gross of Fees

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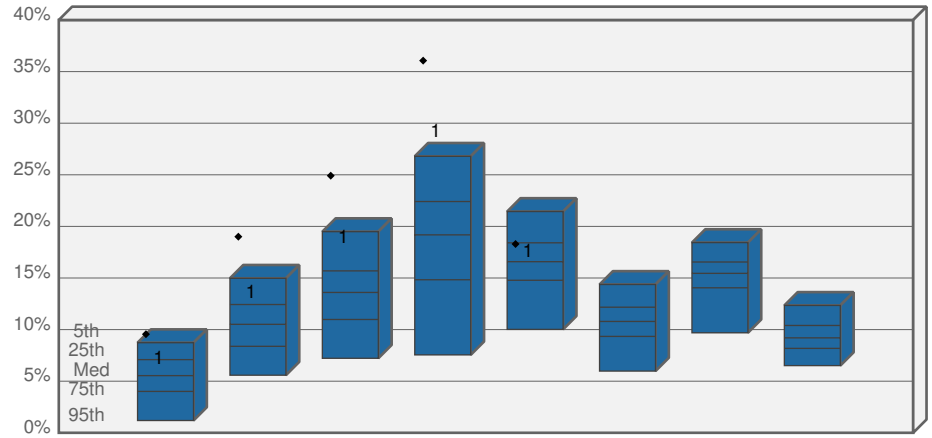
INVESTMENT MANAGER ANALYSIS

Emerald Advisors All Cap - Emg. Mgr.

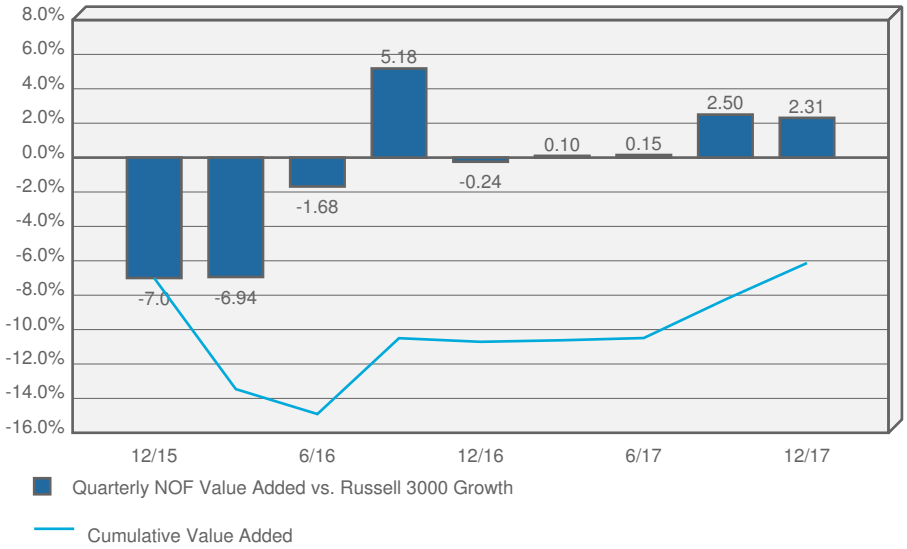
December 31, 2017

Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
◆ Emerald Adviso	10.07 (1)	19.52 (1)	25.43 (1)	36.58 (1)	18.81 (20)			
1 Russell 3000 G	7.61 (15)	13.98 (12)	19.29 (5)	29.59 (2)	17.97 (30)			
Median	5.54	10.51	13.60	19.18	16.58	10.79	15.45	9.20
Number of Funds	489	487	486	484	483	474	456	371

Value-Added Analysis vs Benchmark



*Compass Total Returns of Active Core Equity Portfolios Universe - Gross of Fees

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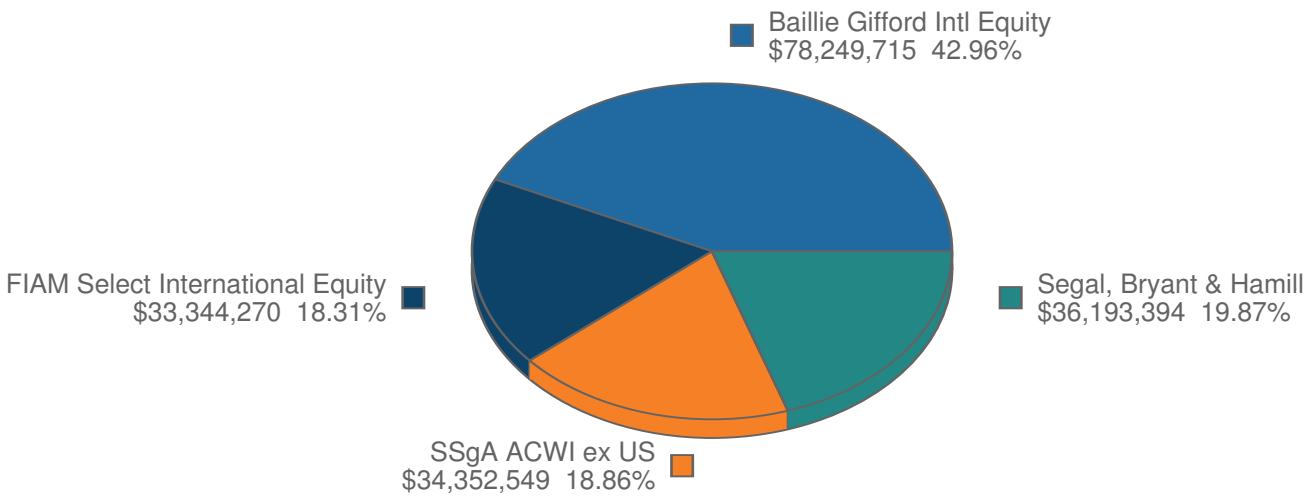
NON US EQUITY

Wilshire Consulting

MANAGER ALLOCATION

Non US Equity Composite

As of December 31, 2017



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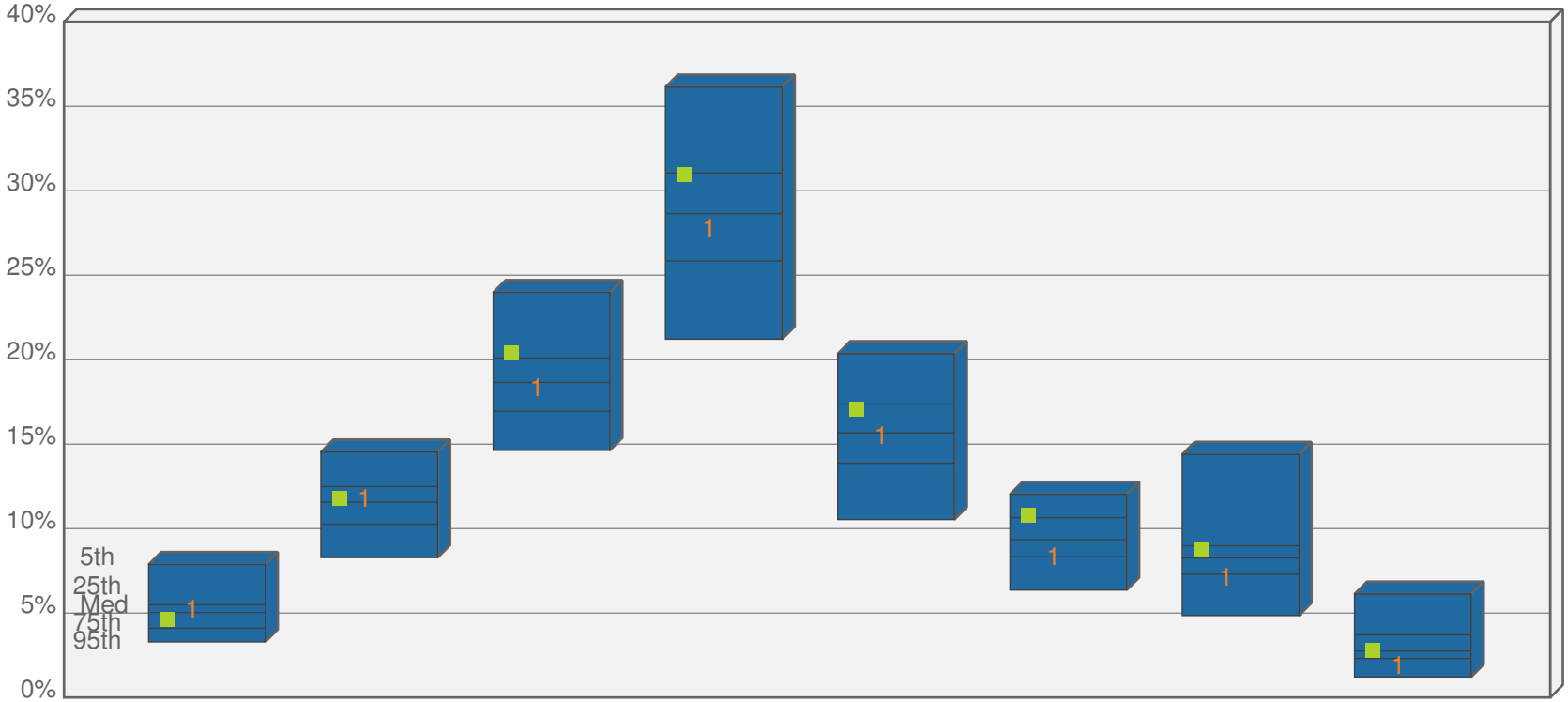
PERFORMANCE COMPARISON

Non US Equity Composite

Periods Ended December 31, 2017



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
Non US Equity Composite	4.67 (63)	11.84 (41)	20.48 (19)	31.01 (25)	17.12 (26)	10.88 (18)	8.81 (29)	2.88 (41)
1 Policy Index	5.23 (35)	11.82 (41)	18.36 (53)	27.81 (56)	15.52 (57)	8.38 (73)	7.13 (77)	1.90 (87)
5th %tile	7.87	14.53	23.97	36.13	20.35	12.03	14.39	6.12
25th %tile	5.49	12.49	20.10	31.05	17.37	10.64	8.98	3.71
Median	5.03	11.56	18.65	28.64	15.66	9.35	8.26	2.75
75th %tile	4.10	10.26	16.94	25.84	13.87	8.33	7.30	2.31
95th %tile	3.29	8.28	14.63	21.21	10.53	6.36	4.85	1.22
Number of Funds	115	114	112	111	109	100	95	74

*TUCS Total Ret of Non-US Equity Investment Pools Universe - Gross of Fees

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PERFORMANCE COMPARISON

Trailing Returns

Periods Ended December 31, 2017

	Quarter	2 Quarters	3 Quarters	1 Year	3 Years	5 Years	10 Years	Incept Date	Incept Ret
SSgA ACWI ex US									
Net of Fee Return	**4.19**	**10.11**	**16.52**	**24.56**				**6/30/15**	**7.29**
MSCI World X-US (N)	4.23	10.09	16.29	24.20				6/30/15	7.06
Value Added	-0.04	0.02	0.23	0.36				6/30/15	0.23
Baillie Gifford Intl Equity									
Net of Fee Return	**5.55**	**12.36**	**22.96**	**34.83**	**12.14**	**10.10**		**9/30/09**	**9.62**
MSCI ACWI X US (N)	5.00	11.47	17.92	27.19	7.83	6.80		9/30/09	5.99
Value Added	0.54	0.89	5.04	7.64	4.31	3.30		9/30/09	3.64
FIAM Select International Equity									
Net of Fee Return	**3.82**	**10.28**	**17.09**	**26.92**	**7.20**	**6.41**	**1.27**	**12/31/00**	**4.90**
Policy Benchmark	5.00	11.47	17.92	27.19	7.83	6.80	1.75	12/31/00	4.42
Value Added	-1.18	-1.19	-0.83	-0.26	-0.63	-0.39	-0.48	12/31/00	0.48
Segal, Bryant & Hamill									
Net of Fee Return	**3.93**	**13.31**	**21.48**	**31.71**				**6/30/15**	**13.69**
MSCI EAFE Small Cap (N)	6.05	13.96	23.19	33.01				6/30/15	12.83
Value Added	-2.12	-0.64	-1.71	-1.30				6/30/15	0.86
Non US Equity Composite									
Net of Fee Return	**4.62**	**11.75**	**20.35**	**30.72**	**10.59**	**8.46**	**2.50**	**12/31/00**	**5.65**
Policy Index	5.23	11.82	18.36	27.81	8.38	7.13	1.90	12/31/00	4.51
Value Added	-0.60	-0.07	1.99	2.91	2.22	1.33	0.60	12/31/00	1.14

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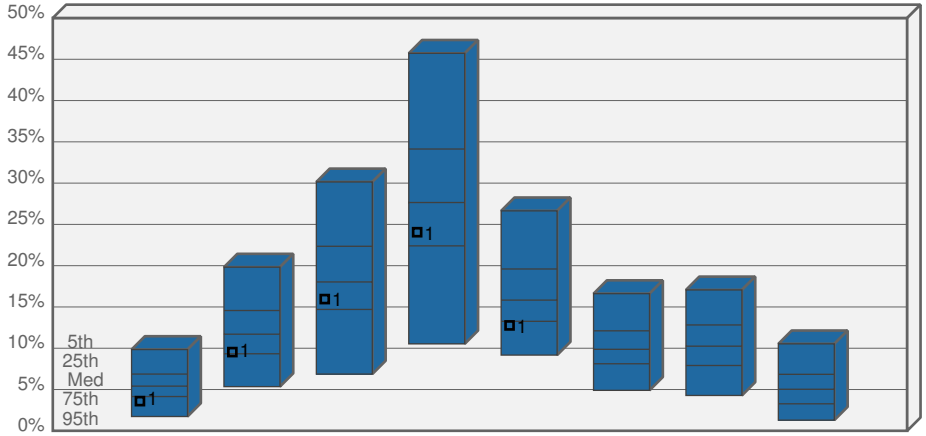
INVESTMENT MANAGER ANALYSIS

SSgA ACWI ex US

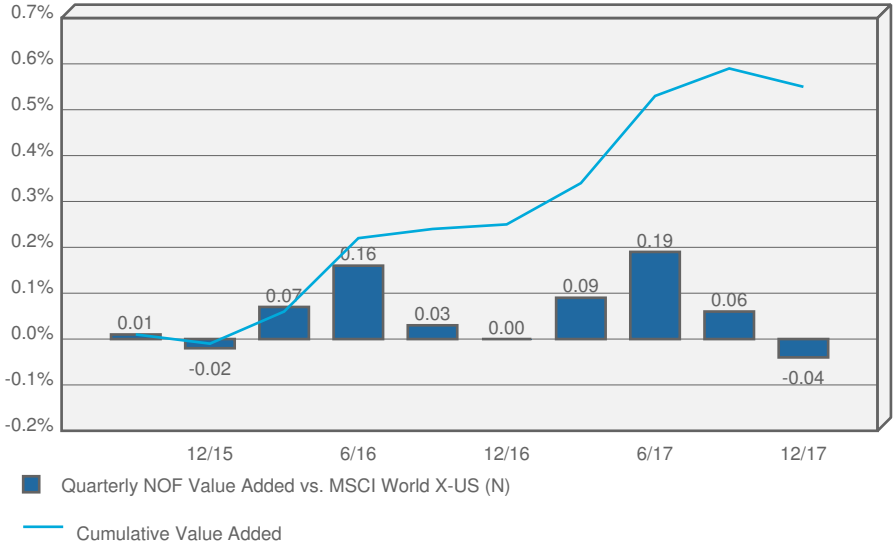
December 31, 2017

Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
SSgA ACWI ex U	4.24 (73)	10.18 (66)	16.60 (62)	24.70 (65)	13.41 (73)			
1 MSCI World X-U	4.23 (73)	10.09 (67)	16.29 (64)	24.20 (67)	12.97 (77)			
Median	5.41	11.70	18.03	27.65	15.83	9.87	10.25	5.03
Number of Funds	1612	1599	1595	1591	1567	1502	1330	871

Value-Added Analysis vs Benchmark



*Compass Total Returns of International Equity Portfolios Universe - Gross of Fees

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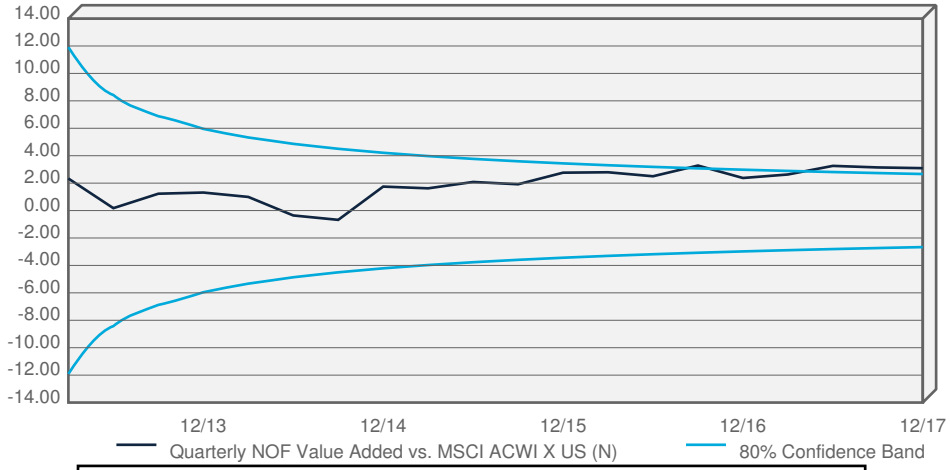
INVESTMENT MANAGER ANALYSIS

Baillie Gifford Intl Equity

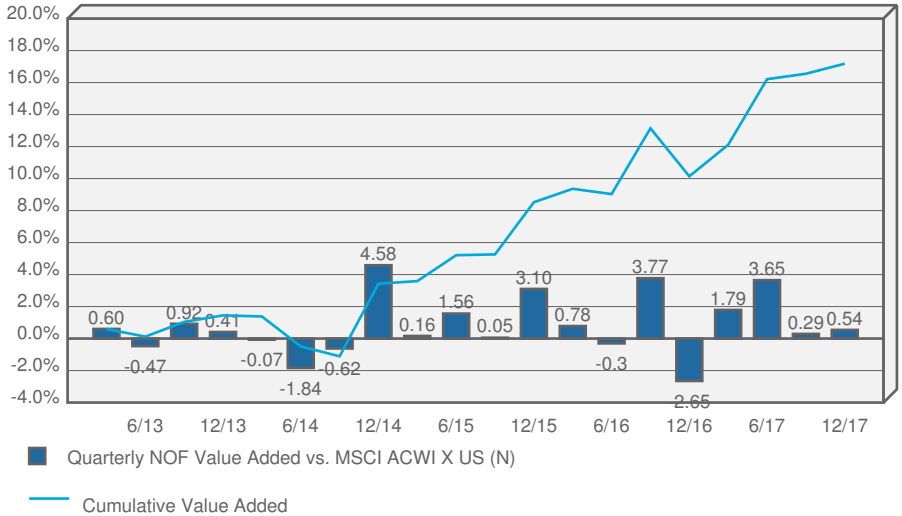
December 31, 2017

Cumulative Skill Analysis vs Benchmark

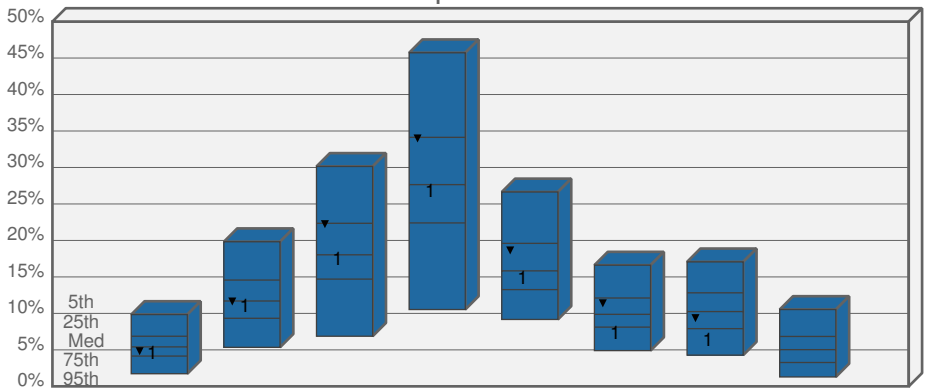


Excess Return:	3.09	Information Ratio:	0.85
Excess Risk:	3.62	T-Stat:	1.91

Value-Added Analysis vs Benchmark



Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
▼ Baillie Giffor	5.55 (47)	12.36 (42)	22.96 (22)	34.71 (23)	19.36 (26)	12.11 (25)	10.08 (51)	
1 MSCI ACWI X US	5.00 (58)	11.47 (52)	17.92 (50)	27.19 (52)	15.29 (55)	7.83 (78)	6.80 (83)	
Median	5.41	11.70	18.03	27.65	15.83	9.87	10.25	5.03
Number of Funds	1612	1599	1595	1591	1567	1502	1330	871

*Compass Total Returns of International Equity Portfolios Universe - Gross of Fees

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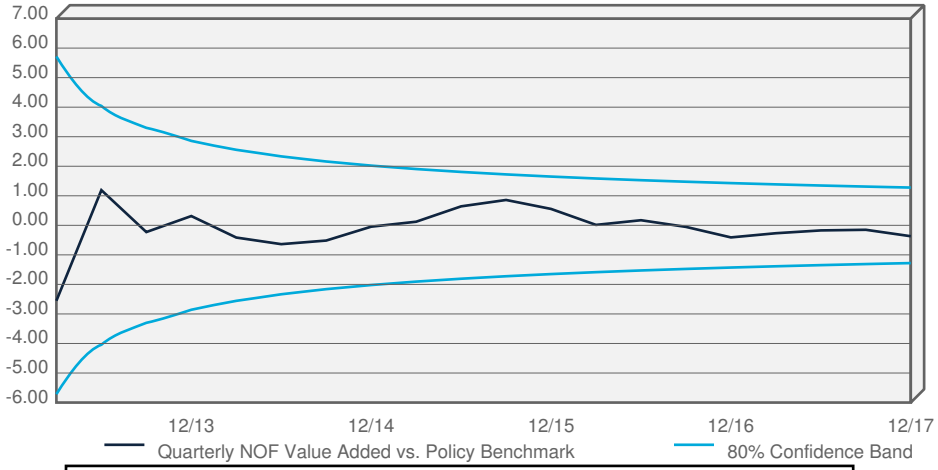
INVESTMENT MANAGER ANALYSIS

FIAM Select International Equity

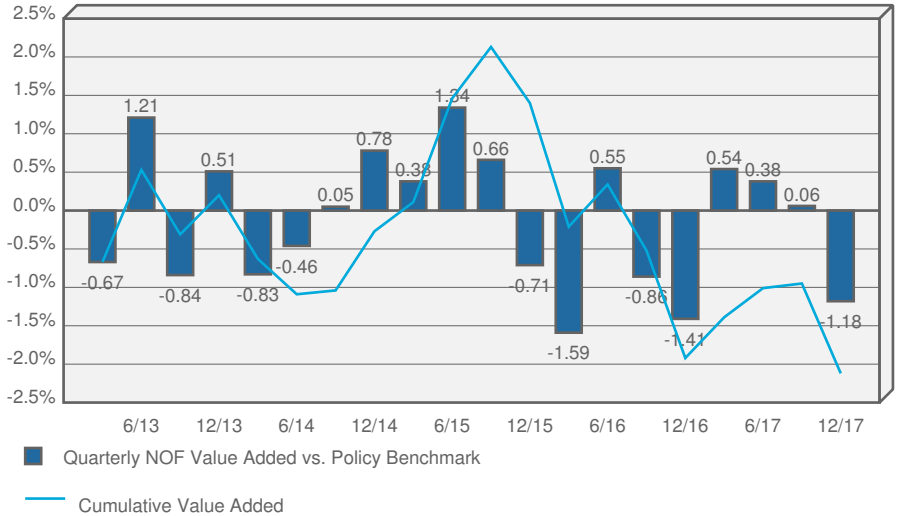
December 31, 2017

Cumulative Skill Analysis vs Benchmark

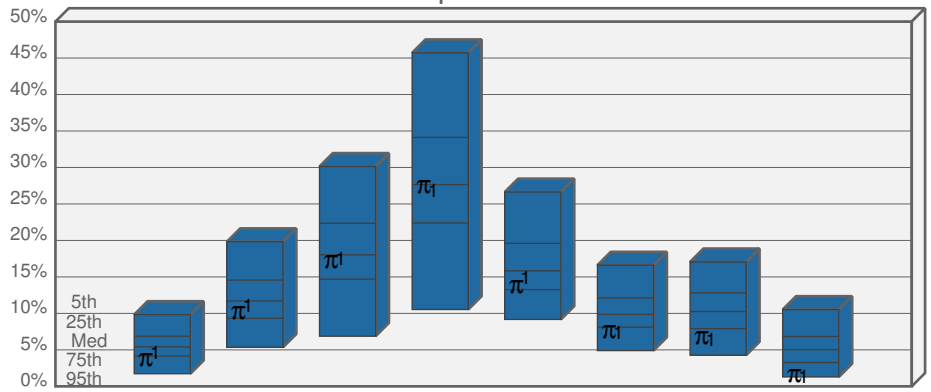


Excess Return:	-0.37	Information Ratio:	-0.21
Excess Risk:	1.74	T-Stat:	-0.47

Value-Added Analysis vs Benchmark



Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
π FIAM Select In	4.02 (77)	10.50 (63)	17.50 (54)	27.80 (49)	14.08 (67)	7.94 (77)	7.06 (82)	1.89 (91)
1 Policy Benchma	5.00 (58)	11.47 (52)	17.92 (50)	27.19 (52)	15.29 (55)	7.83 (78)	6.80 (83)	1.75 (92)
Median	5.41	11.70	18.03	27.65	15.83	9.87	10.25	5.03
Number of Funds	1612	1599	1595	1591	1567	1502	1330	871

*Compass Total Returns of International Equity Portfolios Universe - Gross of Fees

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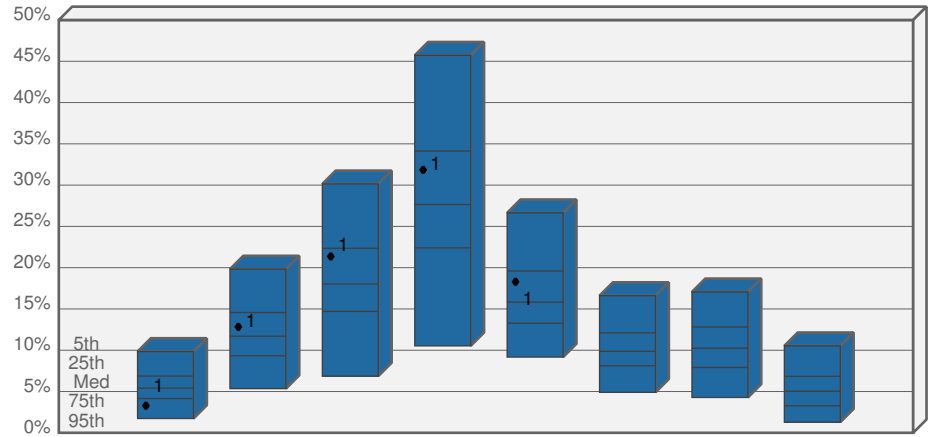
INVESTMENT MANAGER ANALYSIS

Segal, Bryant & Hamill

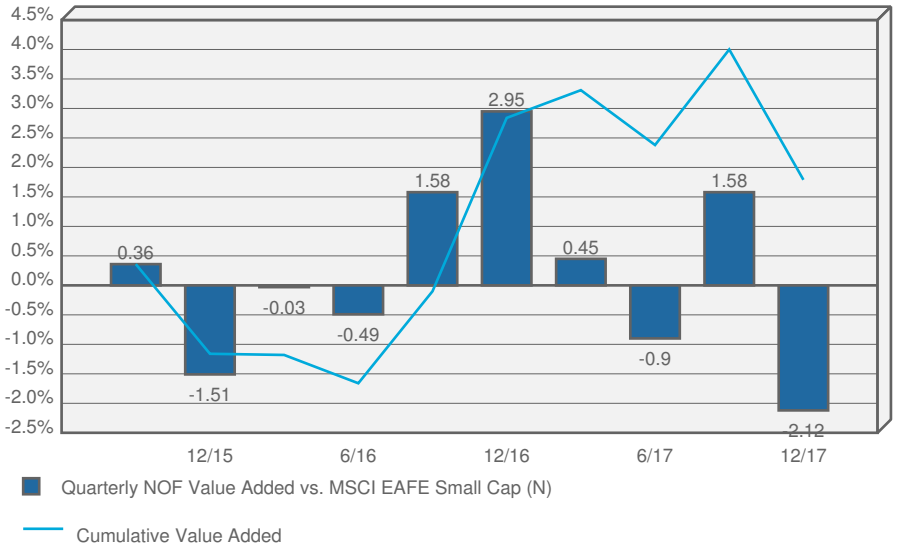
December 31, 2017

Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
♦ Segal, Bryant	3.93 (79)	13.48 (32)	22.01 (26)	32.49 (30)	18.94 (28)			
1 MSCI EAFE Smal	6.05 (38)	13.96 (29)	23.19 (21)	33.01 (28)	16.58 (43)			
Median	5.41	11.70	18.03	27.65	15.83	9.87	10.25	5.03
Number of Funds	1612	1599	1595	1591	1567	1502	1330	871

Value-Added Analysis vs Benchmark



*Compass Total Returns of International Equity Portfolios Universe - Gross of Fees

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CUSTOM BENCHMARK SPECIFICATION

Non US Equity Composite

December 31, 2017

	Quarter Start	Quarter End	Percent	Description
Policy Index	12/00	6/08	100.00	MSCI EAFE Index (N)
	9/08	12/14	100.00	MSCI ACWI ex US (N)
	3/15	12/17	100.00	MSCI ACWI X US IMI Index (N)

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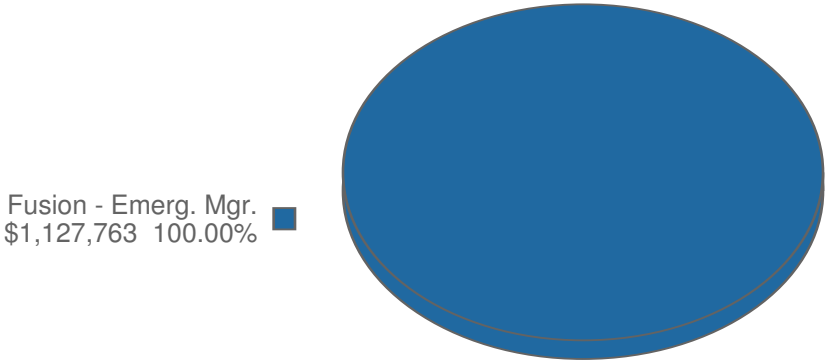
GLOBAL EQUITY

Wilshire Consulting

MANAGER ALLOCATION

Global Equity Composite

As of December 31, 2017



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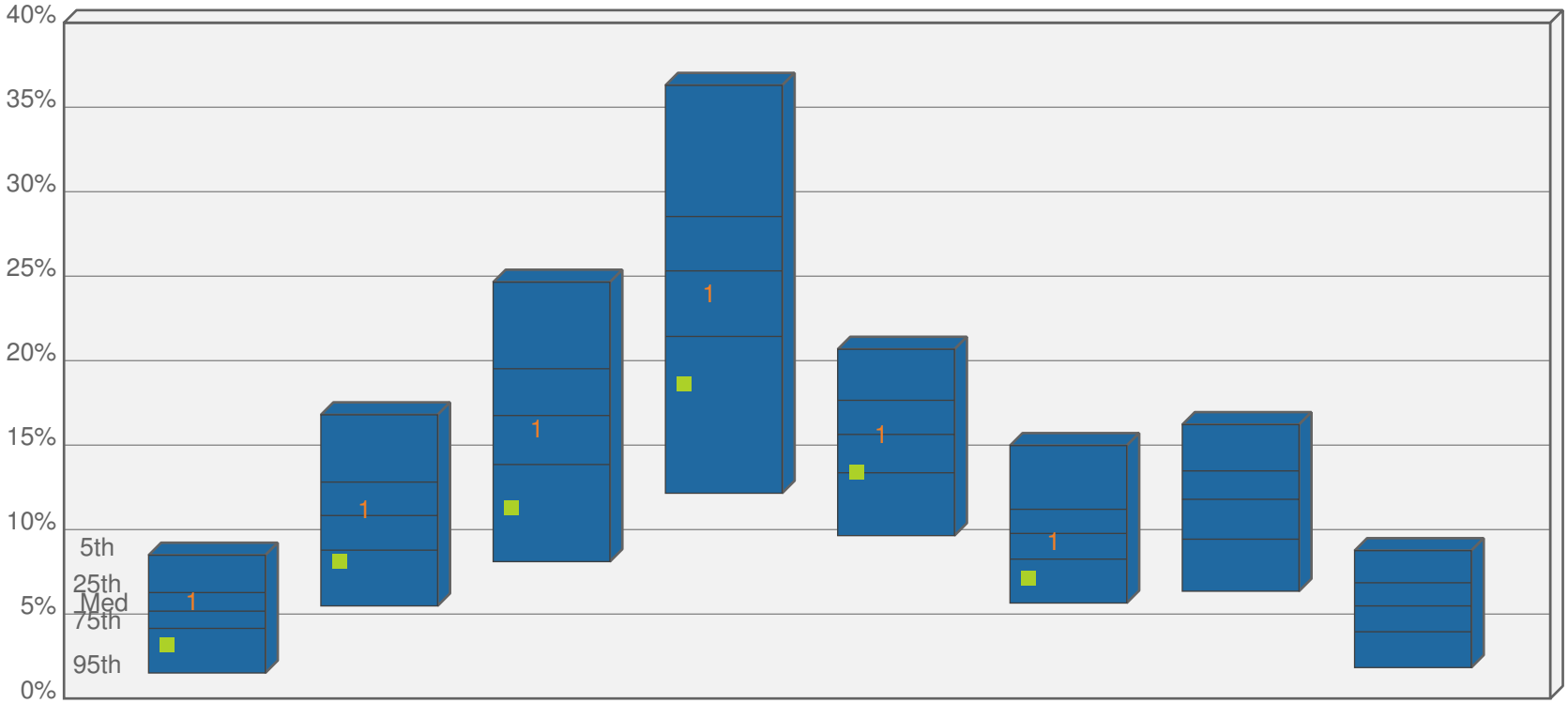
PERFORMANCE COMPARISON

Global Equity Composite

Periods Ended December 31, 2017



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
Global Equity	3.26 (87)	8.18 (81)	11.36 (85)	18.71 (82)	13.47 (73)	7.20 (83)		
1 MSCI ACWI (N)	5.73 (37)	11.21 (44)	15.96 (59)	23.97 (58)	15.63 (50)	9.29 (60)		
5th %tile	8.48	16.79	24.64	36.29	20.67	14.97	16.21	8.75
25th %tile	6.27	12.81	19.52	28.53	17.65	11.20	13.47	6.85
Median	5.17	10.83	16.75	25.31	15.63	9.77	11.79	5.48
75th %tile	4.15	8.78	13.85	21.43	13.36	8.25	9.43	3.95
95th %tile	1.51	5.48	8.10	12.15	9.64	5.65	6.35	1.83
Number of Funds	298	289	288	284	283	271	238	135

*TUCS Total Ret of Global Equity Portfolios Universe - Gross of Fees

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PERFORMANCE COMPARISON

Trailing Returns

Periods Ended December 31, 2017

	Quarter	2 Quarters	3 Quarters	1 Year	3 Years	5 Years	10 Years	Incept Date	Incept Ret
Fusion - Emerg. Mgr.									
Net of Fee Return	**3.09**	**7.82**	**10.80**	**17.92**	**6.44**			**12/31/14**	**6.44**
MSCI ACWI (N)	5.73	11.21	15.96	23.97	9.29			12/31/14	9.29
Value Added	-2.64	-3.39	-5.16	-6.05	-2.85			12/31/14	-2.85
Global Equity									
Net of Fee Return	**3.09**	**7.82**	**10.79**	**17.91**	**6.44**			**12/31/14**	**6.44**
MSCI ACWI (N)	5.73	11.21	15.96	23.97	9.29			12/31/14	9.29
Value Added	-2.64	-3.39	-5.16	-6.05	-2.85			12/31/14	-2.85

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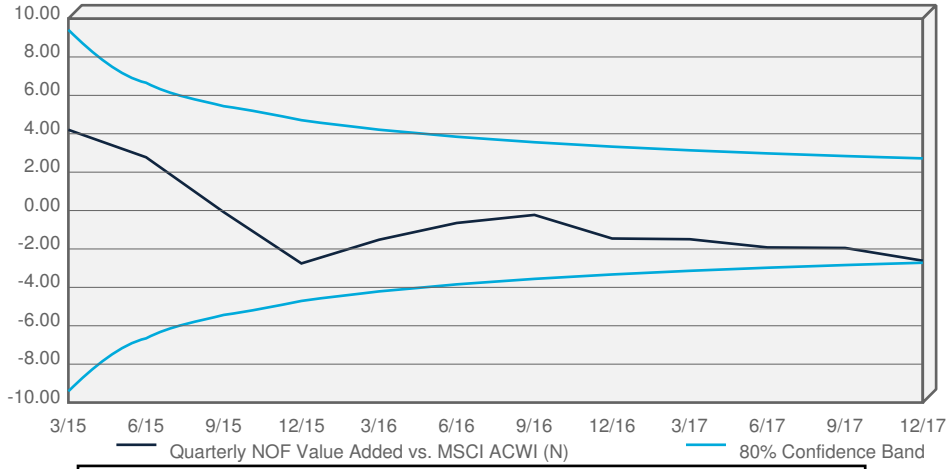
INVESTMENT MANAGER ANALYSIS

Fusion - Emerg. Mgr.

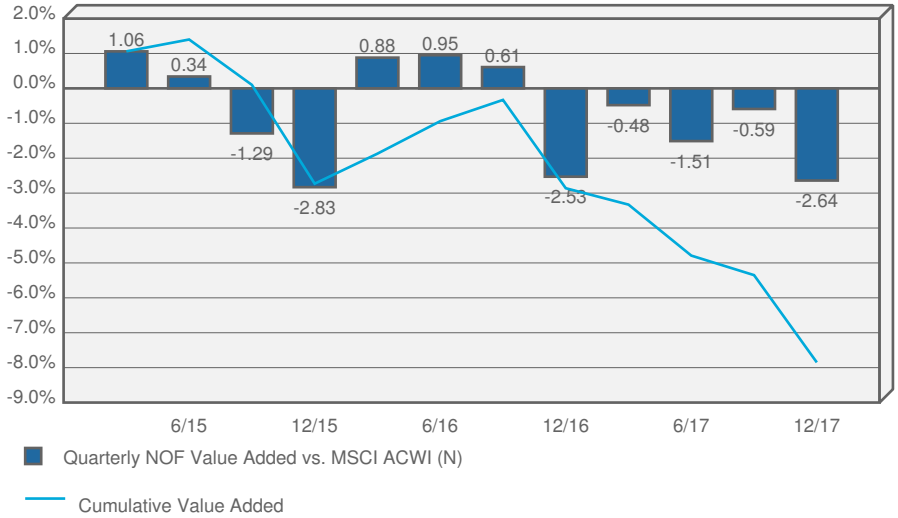
December 31, 2017

Cumulative Skill Analysis vs Benchmark

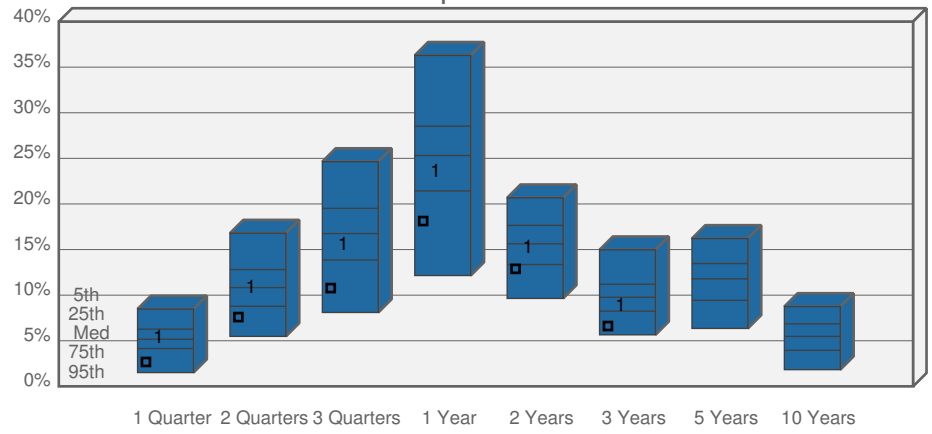


Excess Return:	-2.61	Information Ratio:	-0.91
Excess Risk:	2.86	T-Stat:	-1.58

Value-Added Analysis vs Benchmark

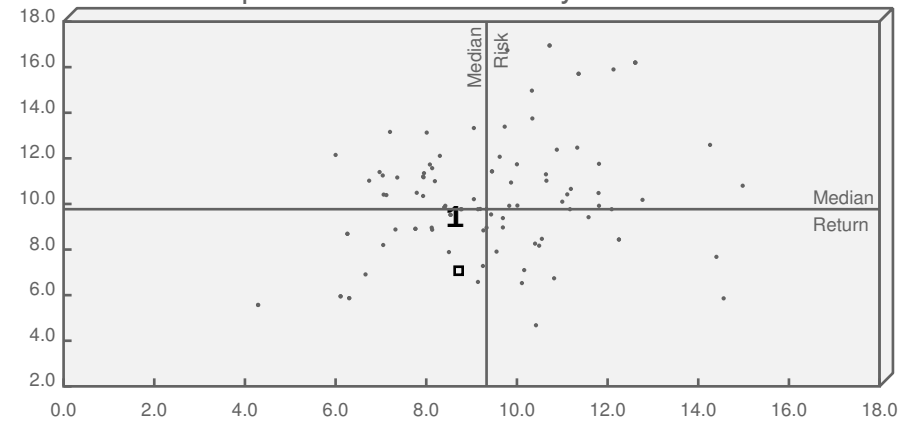


Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
◘ Fusion - Emerg	3.26 (87)	8.18 (81)	11.36 (85)	18.71 (82)	13.47 (73)	7.20 (83)		
1 MSCI ACWI (N)	5.73 (37)	11.21 (44)	15.96 (59)	23.97 (58)	15.63 (50)	9.29 (60)		
Median	5.17	10.83	16.75	25.31	15.63	9.77	11.79	5.48
Number of Funds	298	289	288	284	283	271	238	135

Since Inception Risk/Return Analysis vs Peer Universe*



Description	Legend	Gross Fee Ret Value	Gross Fee Ret Rank	Standard Deviation Value	Standard Deviation Rank
Fusion - Emerg. Mgr.	◘	7.20	83	8.95	56
MSCI ACWI (N)	1	9.29	60	8.75	58
Median		9.77		9.33	

*TUCS Total Returns of Global Equity Portfolios Universe - Gross of Fees

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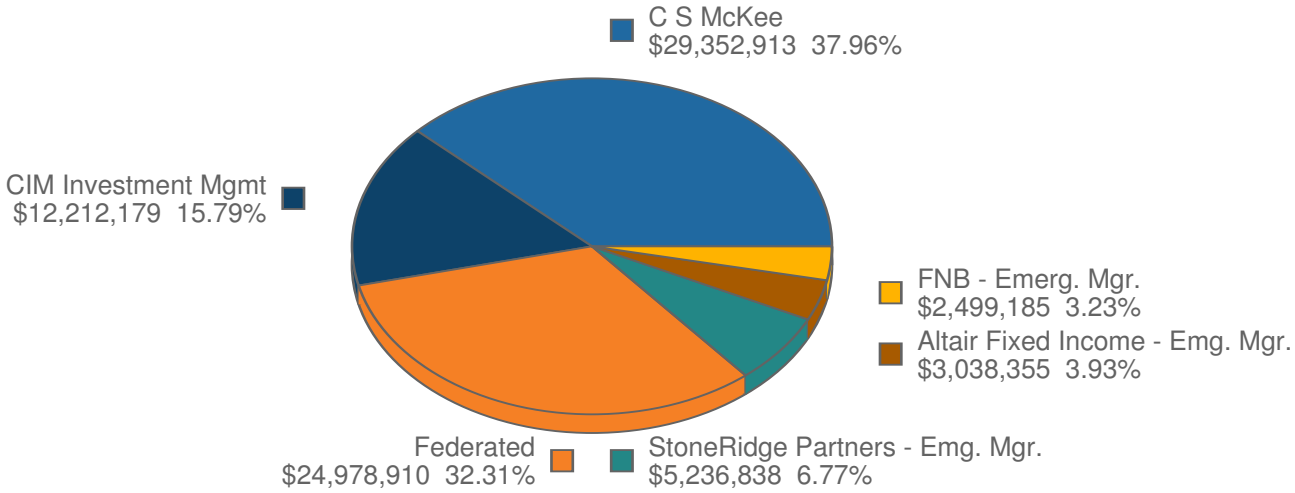
CORE FIXED INCOME

Wilshire Consulting

MANAGER ALLOCATION

Core Fixed Composite

As of December 31, 2017



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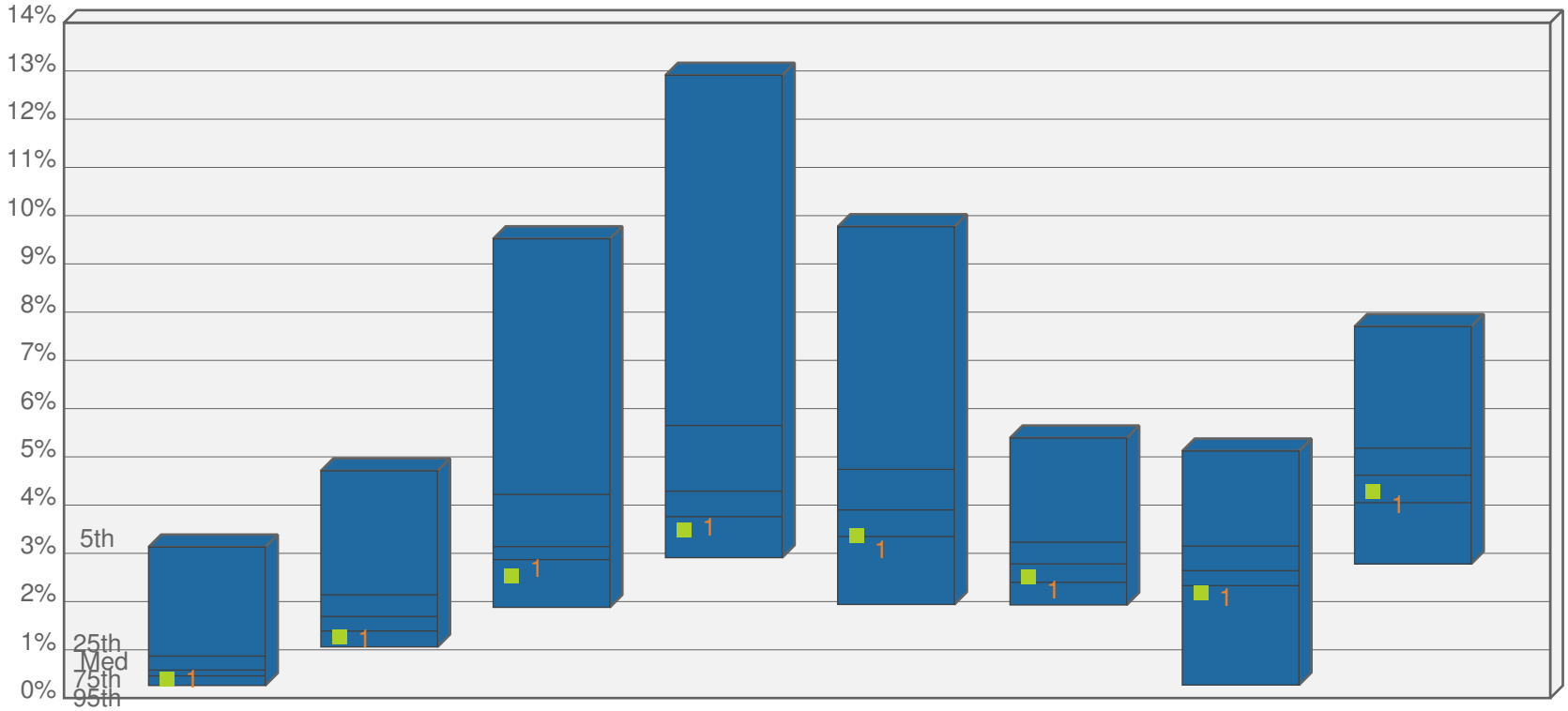
PERFORMANCE COMPARISON

Core Fixed Composite

Periods Ended December 31, 2017



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
Core Fixed Composite	0.42 (77)	1.30 (81)	2.56 (90)	3.51 (90)	3.40 (70)	2.53 (61)	2.21 (85)	4.30 (68)
1 Bloomberg Aggreg	0.39 (87)	1.24 (85)	2.70 (85)	3.54 (90)	3.09 (83)	2.24 (87)	2.10 (85)	4.01 (77)
5th %tile	3.13	4.71	9.52	12.91	9.77	5.39	5.12	7.70
25th %tile	0.87	2.14	4.22	5.65	4.74	3.23	3.15	5.18
Median	0.58	1.69	3.14	4.29	3.90	2.78	2.64	4.62
75th %tile	0.46	1.39	2.87	3.76	3.35	2.40	2.33	4.05
95th %tile	0.26	1.06	1.88	2.91	1.94	1.93	0.27	2.78
Number of Funds	51	50	47	47	46	45	39	22

*TUCS Total Ret of Fixed Income Portfolios - Core Universe - Gross of Fees

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PERFORMANCE COMPARISON

Trailing Returns

Periods Ended December 31, 2017

	Quarter	2 Quarters	3 Quarters	1 Year	3 Years	5 Years	10 Years	Incept Date	Incept Ret
C S McKee									
Net of Fee Return	**0.41**	**1.33**	**2.67**	**3.52**	**2.56**	**2.36**	**4.62**	**12/31/82**	**7.58**
Bloomberg Aggregate	0.39	1.24	2.70	3.54	2.24	2.10	4.01	12/31/82	7.22
Value Added	0.02	0.09	-0.03	-0.02	0.32	0.26	0.62	12/31/82	0.36
CIM Investment Mgmt									
Net of Fee Return	**-0.16**	**0.33**	**0.92**	**1.49**	**1.01**	**0.89**	**2.99**	**12/31/05**	**3.29**
Bloomberg Int Govt/Credit Index	-0.20	0.40	1.35	2.14	1.76	1.50	3.32	12/31/05	3.72
Value Added	0.05	-0.07	-0.42	-0.65	-0.75	-0.61	-0.34	12/31/05	-0.43
Federated									
Net of Fee Return	**0.65**	**1.65**	**3.10**	**4.33**	**2.79**	**2.39**	**4.76**	**9/30/06**	**4.94**
Bloomberg Aggregate	0.39	1.24	2.70	3.54	2.24	2.10	4.01	9/30/06	4.29
Value Added	0.26	0.41	0.39	0.79	0.55	0.29	0.75	9/30/06	0.65
StoneRidge Partners - Emg. Mgr.									
Net of Fee Return	**0.27**	**1.07**	**1.93**	**2.68**				**9/30/15**	**2.17**
Policy Index	-0.10	0.64	1.73	2.65				9/30/15	2.06
Value Added	0.37	0.43	0.20	0.03				9/30/15	0.10
Altair Fixed Income - Emg. Mgr.									
Net of Fee Return	**-0.34**	**0.15**	**1.20**					**3/31/17**	**1.20**
Bloomberg Aggregate	0.39	1.24	2.70					3/31/17	2.70
Value Added	-0.73	-1.09	-1.50					3/31/17	-1.50
Core Fixed Composite									
Net of Fee Return	**0.34**	**1.12**	**2.39**	**3.30**	**2.30**	**2.02**	**4.07**	**9/30/82**	**7.84**
Bloomberg Aggregate	0.39	1.24	2.70	3.54	2.24	2.10	4.01	9/30/82	7.42
Value Added	-0.05	-0.12	-0.32	-0.24	0.06	-0.08	0.07	9/30/82	0.42

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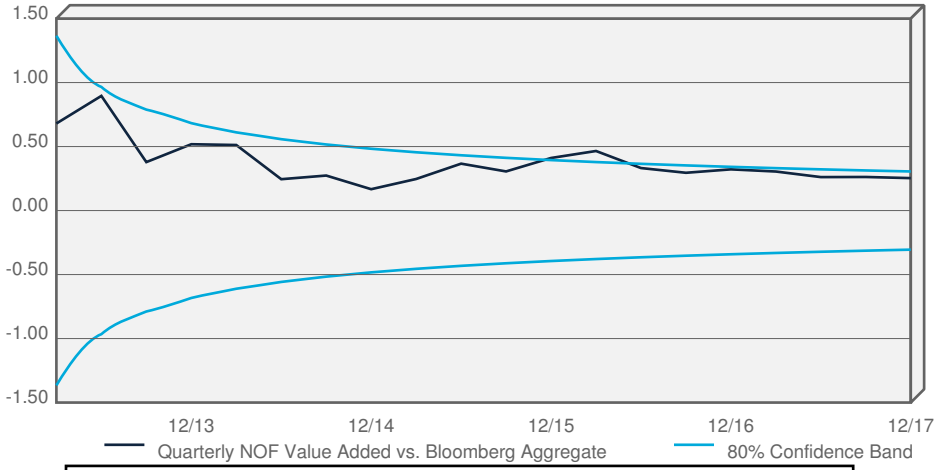
INVESTMENT MANAGER ANALYSIS

C S McKee

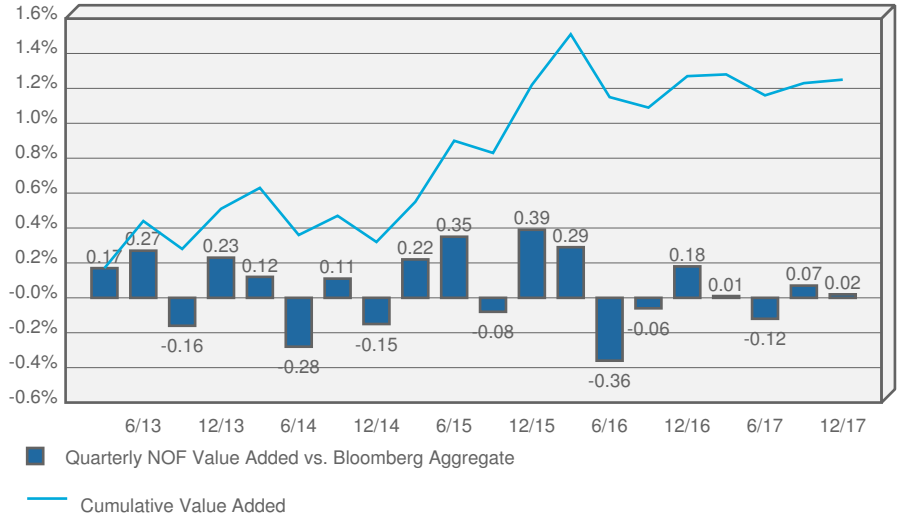
December 31, 2017

Cumulative Skill Analysis vs Benchmark

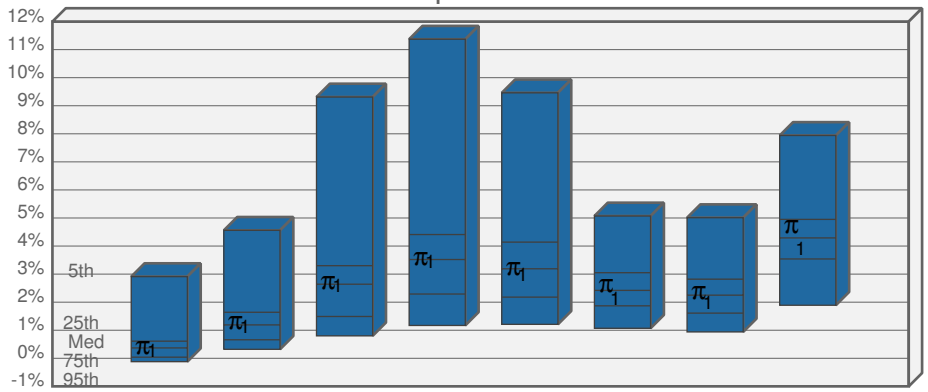


Excess Return:	0.25	Information Ratio:	0.61
Excess Risk:	0.42	T-Stat:	1.36

Value-Added Analysis vs Benchmark



Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
π C S McKee	0.47 (41)	1.39 (40)	2.79 (45)	3.64 (46)	3.29 (45)	2.70 (36)	2.46 (39)	4.79 (30)
1 Bloomberg Aggr	0.39 (48)	1.24 (48)	2.70 (48)	3.54 (49)	3.09 (53)	2.24 (58)	2.10 (56)	4.01 (60)
Median	0.37	1.19	2.64	3.52	3.19	2.42	2.25	4.29
Number of Funds	446	442	440	439	435	426	408	356

*Compass Total Returns of Active Core Fixed Income Portfolios Universe - Gross of Fees

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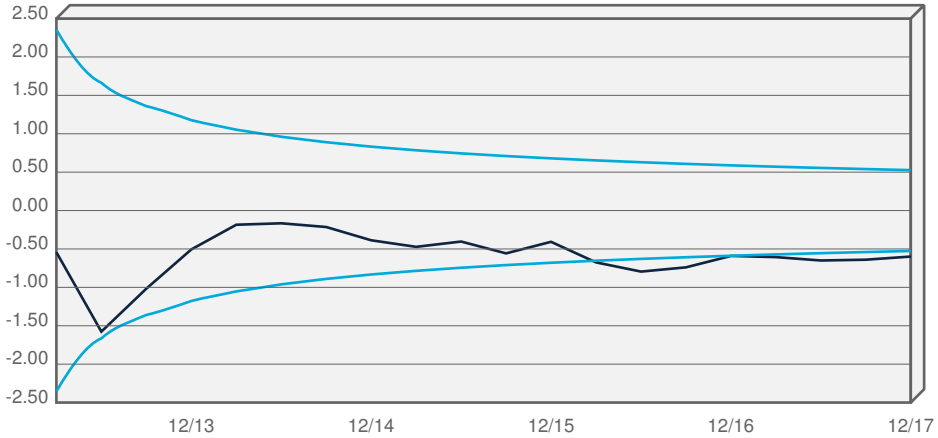
INVESTMENT MANAGER ANALYSIS

CIM Investment Mgmt

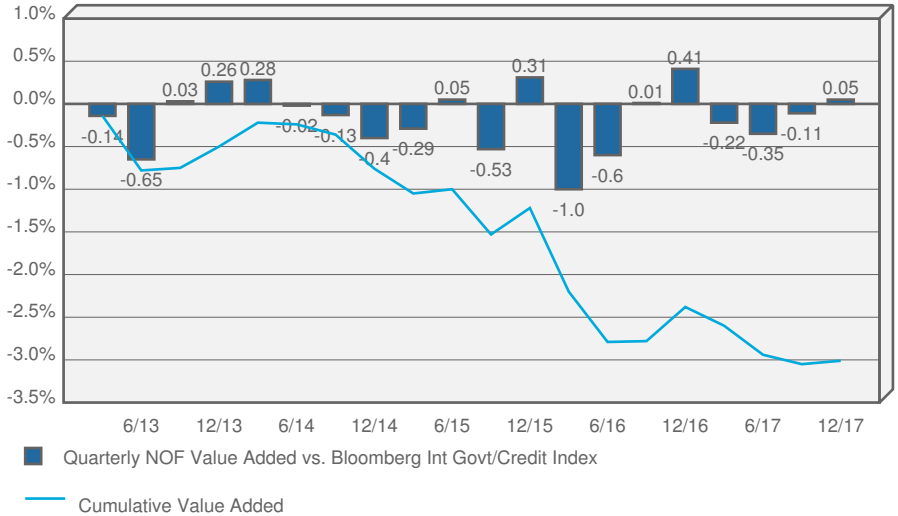
December 31, 2017

Cumulative Skill Analysis vs Benchmark

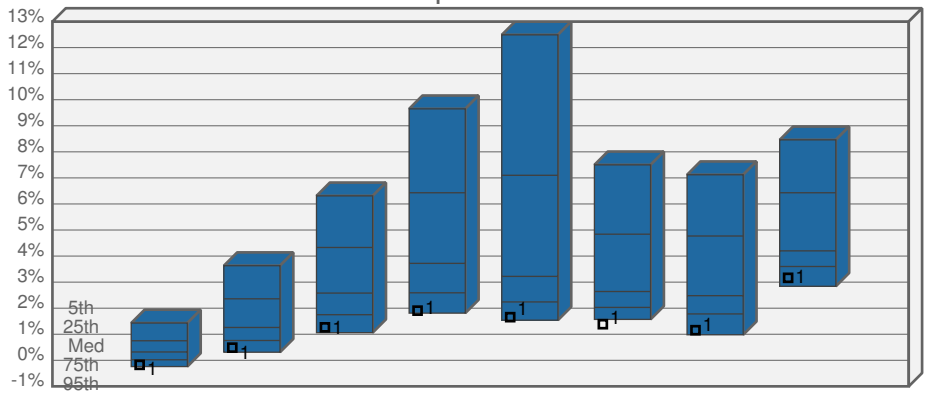


Excess Return:	-0.60	Information Ratio:	-0.84
Excess Risk:	0.72	T-Stat:	-1.87

Value-Added Analysis vs Benchmark



Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
CIM Investment	0.03 (73)	0.69 (77)	1.47 (87)	2.11 (89)	1.86 (87)	1.59 (94)	1.36 (91)	3.37 (83)
1 Bloomberg Int	-0.20 (92)	0.40 (92)	1.35 (89)	2.14 (88)	2.11 (80)	1.76 (89)	1.50 (86)	3.32 (85)
Median	0.32	1.26	2.58	3.72	3.22	2.64	2.48	4.20
Number of Funds	465	461	460	460	455	444	423	354

*Compass Total Returns of Active Intermediate Fixed Income Portfolios Universe - Gross of Fees

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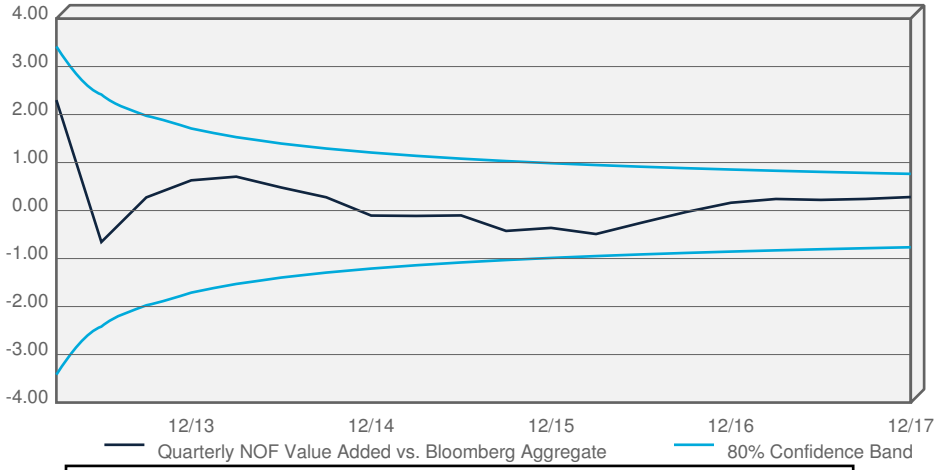
INVESTMENT MANAGER ANALYSIS

Federated

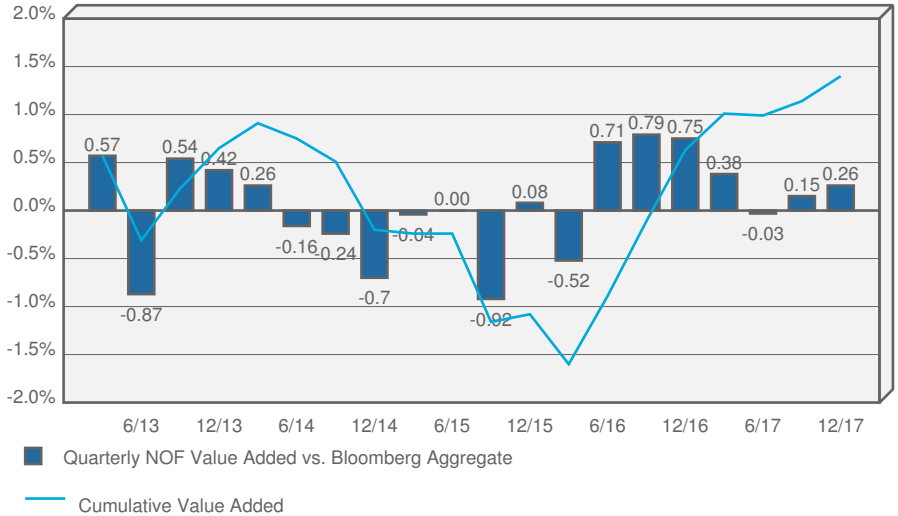
December 31, 2017

Cumulative Skill Analysis vs Benchmark

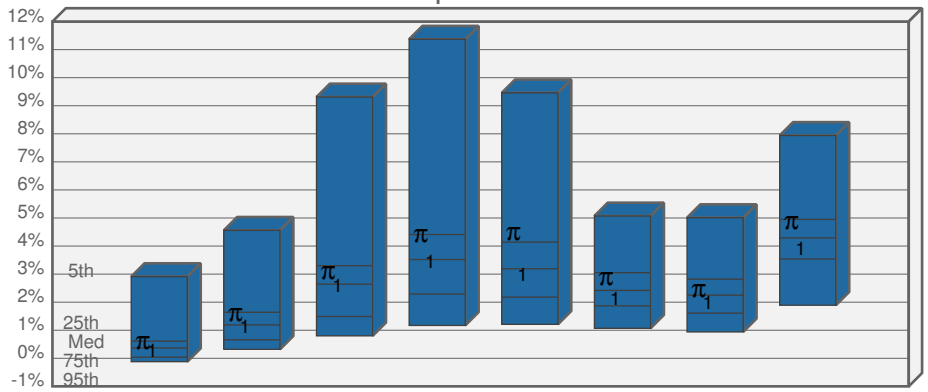


Excess Return:	0.28	Information Ratio:	0.27
Excess Risk:	1.04	T-Stat:	0.61

Value-Added Analysis vs Benchmark



Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
π Federated	0.65 (22)	1.65 (24)	3.17 (30)	4.47 (23)	4.56 (18)	2.95 (27)	2.52 (37)	4.95 (25)
1 Bloomberg Aggr	0.39 (48)	1.24 (48)	2.70 (48)	3.54 (49)	3.09 (53)	2.24 (58)	2.10 (56)	4.01 (60)
Median	0.37	1.19	2.64	3.52	3.19	2.42	2.25	4.29
Number of Funds	446	442	440	439	435	426	408	356

*Compass Total Returns of Active Core Fixed Income Portfolios Universe - Gross of Fees

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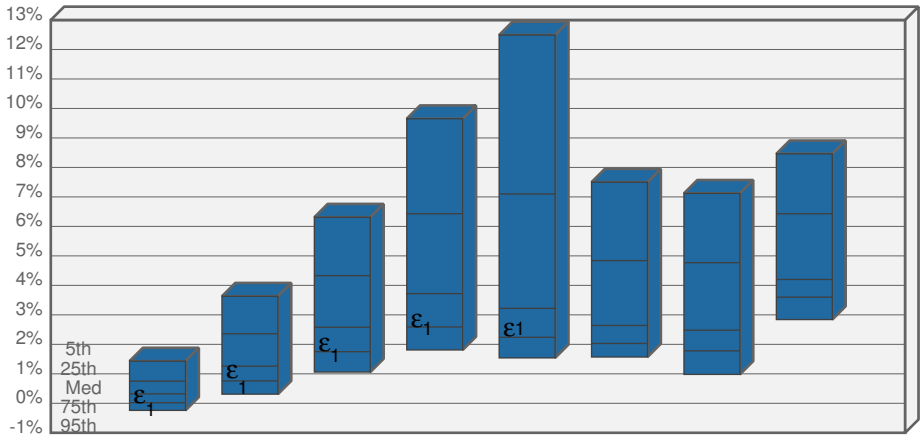
INVESTMENT MANAGER ANALYSIS

StoneRidge Partners - Emg. Mgr.

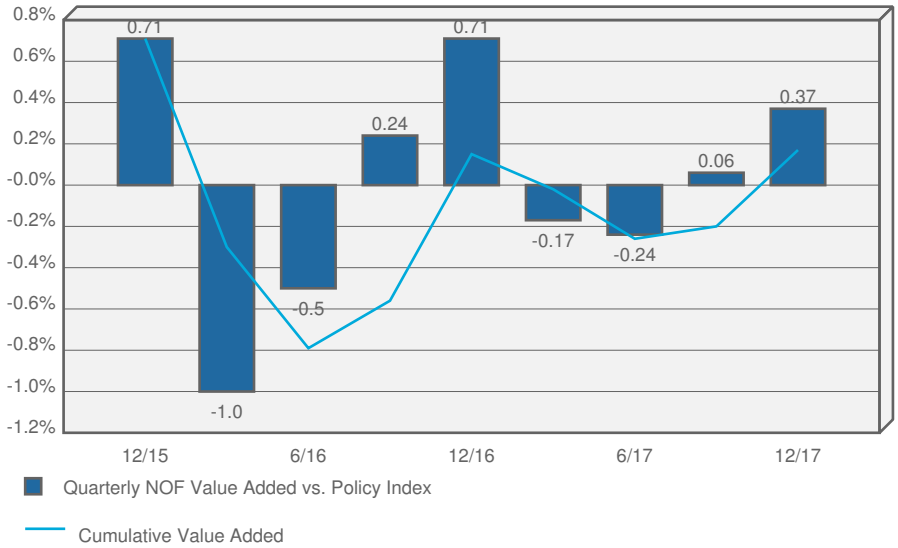
December 31, 2017

Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
ε StoneRidge Par	0.32 (50)	1.17 (52)	2.09 (61)	2.89 (66)	2.59 (63)			
1 Policy Index	-0.10 (87)	0.64 (82)	1.73 (76)	2.65 (72)	2.64 (61)			
Median	0.32	1.26	2.58	3.72	3.22	2.64	2.48	4.20
Number of Funds	465	461	460	460	455	444	423	354

Value-Added Analysis vs Benchmark



*Compass Total Returns of Active Intermediate Fixed Income Portfolios Universe - Gross of Fees

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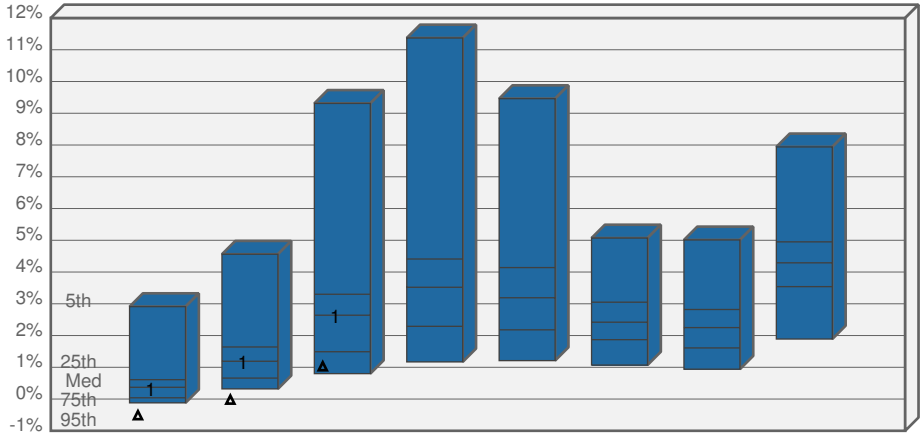
INVESTMENT MANAGER ANALYSIS

Altair Fixed Income - Emg. Mgr.

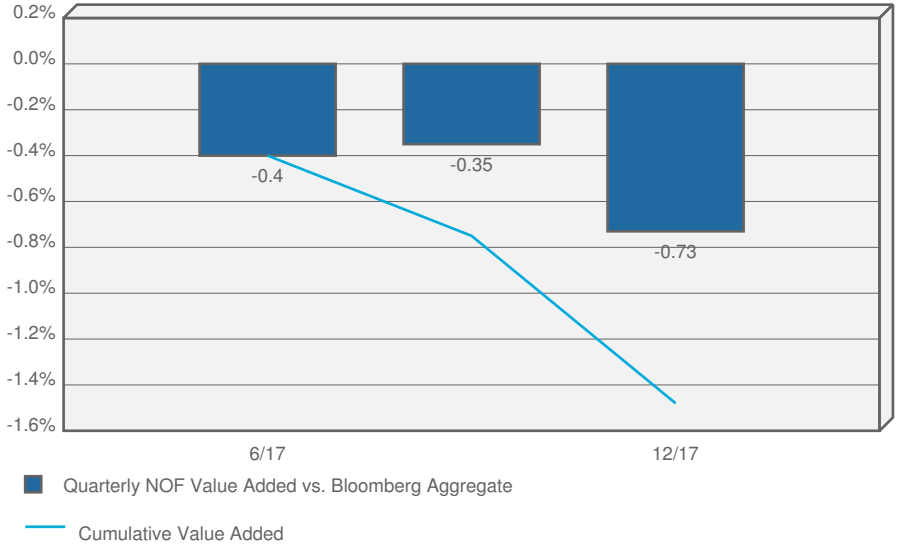
December 31, 2017

Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
▲ Altair Fixed I	-0.34 (99)	0.15 (99)	1.20 (81)					
1 Bloomberg Aggr	0.39 (48)	1.24 (48)	2.70 (48)					
Median	0.37	1.19	2.64	3.52	3.19	2.42	2.25	4.29
Number of Funds	446	442	440	439	435	426	408	356

Value-Added Analysis vs Benchmark



*Compass Total Returns of Active Core Fixed Income Portfolios Universe - Gross of Fees

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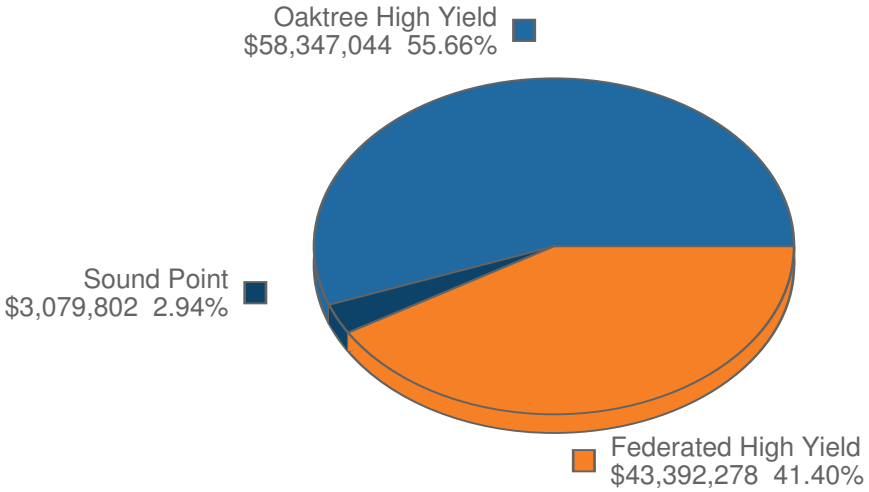
HIGH YIELD

Wilshire Consulting

MANAGER ALLOCATION

High Yield Fixed Composite

As of December 31, 2017



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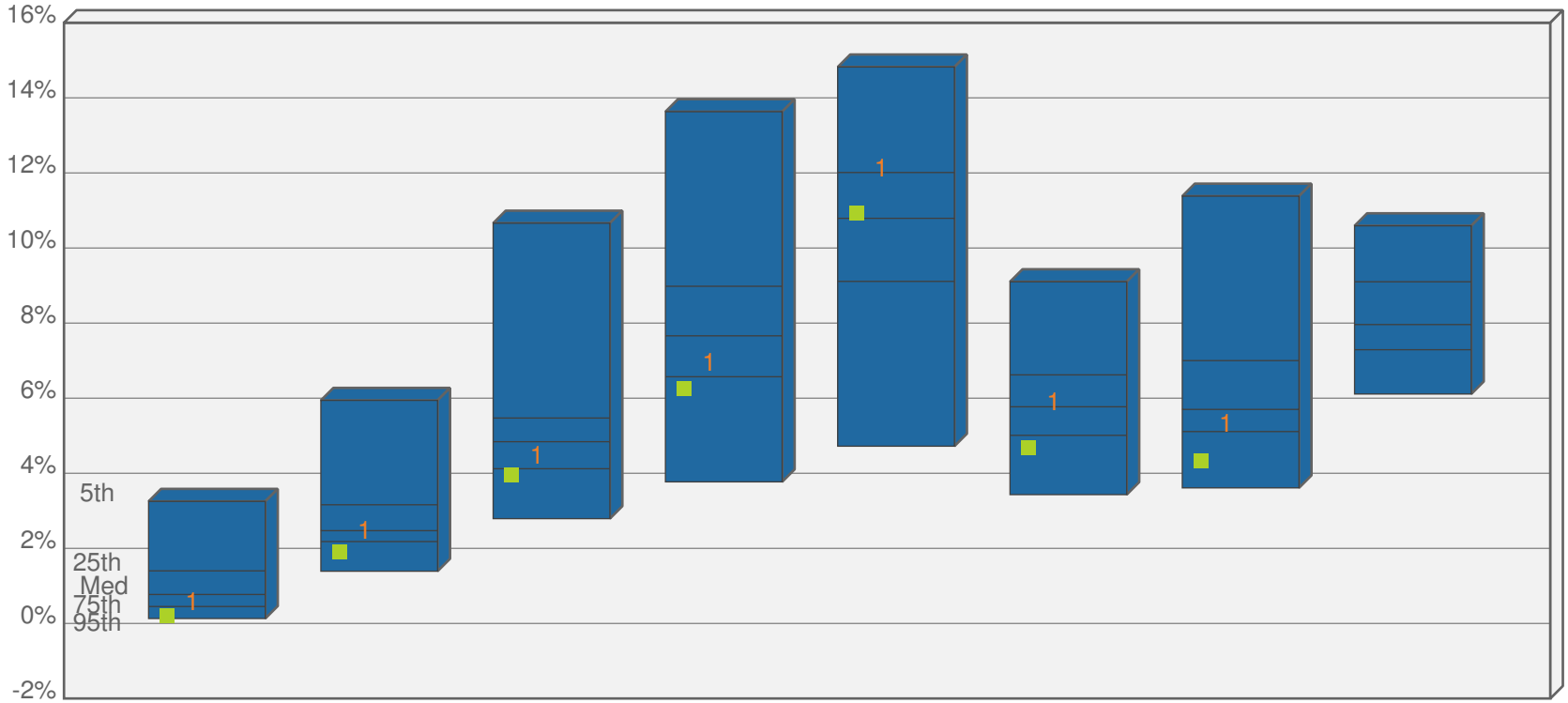
PERFORMANCE COMPARISON

High Yield Fixed Composite

Periods Ended December 31, 2017



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
High Yield Fixed Composi	0.25 (89)	1.94 (87)	4.00 (76)	6.29 (76)	10.96 (45)	4.71 (83)	4.37 (91)	
1 Citi High Yield	0.58 (66)	2.50 (47)	4.49 (67)	6.97 (66)	12.14 (22)	5.91 (43)	5.35 (64)	
5th %tile	3.25	5.94	10.66	13.63	14.82	9.10	11.38	10.59
25th %tile	1.40	3.16	5.47	8.98	12.01	6.62	7.00	9.10
Median	0.77	2.47	4.84	7.66	10.79	5.77	5.70	7.96
75th %tile	0.45	2.18	4.12	6.57	9.11	5.01	5.11	7.29
95th %tile	0.13	1.39	2.79	3.77	4.72	3.43	3.61	6.11
Number of Funds	70	70	70	70	67	62	50	24

*TUCS Total Ret of Fixed Income Portfolios - High Yield Universe - Gross of Fees

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PERFORMANCE COMPARISON

Trailing Returns

Periods Ended December 31, 2017

	Quarter	2 Quarters	3 Quarters	1 Year	3 Years	5 Years	10 Years	Incept Date	Incept Ret
Oaktree High Yield									
Net of Fee Return	**0.13**	**1.56**	**3.96**	**5.69**	**4.82**	**4.38**		**3/31/08**	**7.67**
Citigroup HY Cash Pay Capped	0.55	2.48	4.48	6.93	5.87	5.30		3/31/08	7.88
Value Added	-0.42	-0.91	-0.52	-1.25	-1.05	-0.93		3/31/08	-0.21
Sound Point									
Net of Fee Return	**0.80**	**2.24**	**3.71**	**5.31**	**5.01**			**9/30/13**	**4.88**
CSFB Leveraged Loan	1.17	2.24	3.01	4.25	4.50			9/30/13	4.09
Value Added	-0.37	0.00	0.70	1.06	0.51			9/30/13	0.79
Federated High Yield									
Net of Fee Return	**0.24**	**2.25**						**6/30/17**	**2.25**
Bloomberg US HY 2% Capped Index	0.47	2.46						6/30/17	2.46
Value Added	-0.23	-0.20						6/30/17	-0.20
High Yield Fixed Composite									
Net of Fee Return	**0.20**	**1.81**	**3.87**	**6.10**	**4.51**	**4.15**		**3/31/08**	**7.55**
Citi High Yield Market Capped	0.58	2.50	4.49	6.97	5.91	5.35		3/31/08	7.95
Value Added	-0.38	-0.69	-0.62	-0.87	-1.40	-1.20		3/31/08	-0.40

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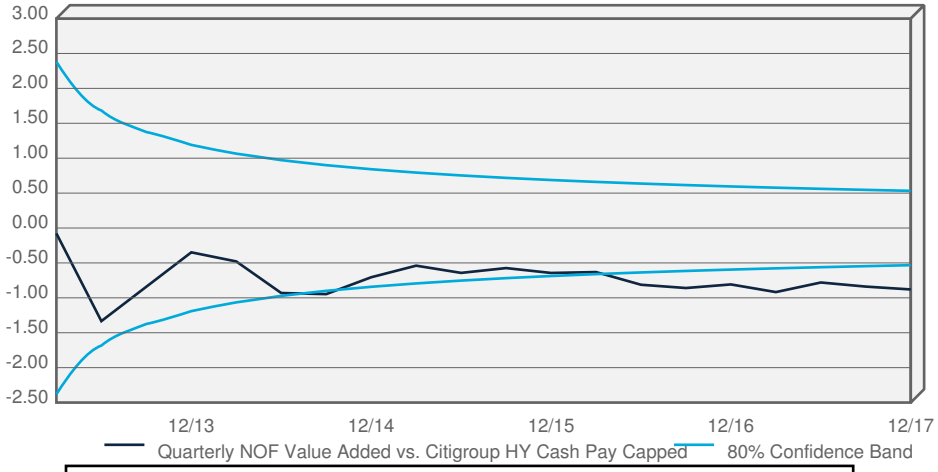
INVESTMENT MANAGER ANALYSIS

Oaktree High Yield

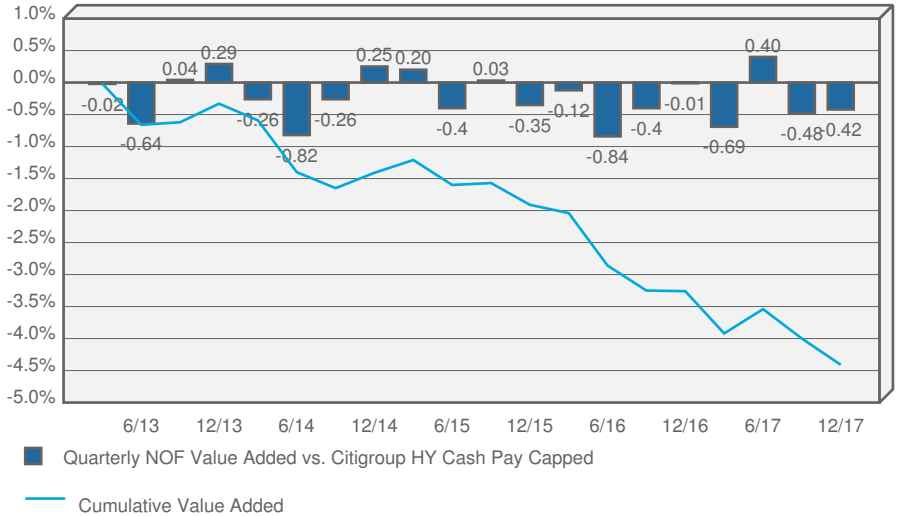
December 31, 2017

Cumulative Skill Analysis vs Benchmark

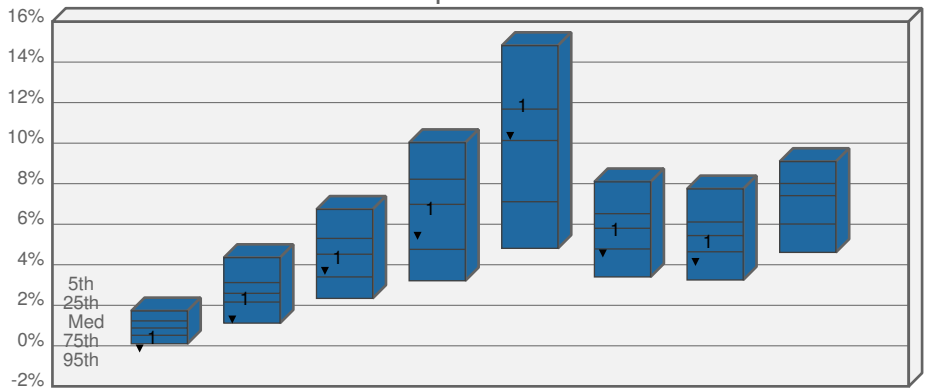


Excess Return:	-0.88	Information Ratio:	-1.22
Excess Risk:	0.72	T-Stat:	-2.72

Value-Added Analysis vs Benchmark



Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
▼ Oaktree High Y	0.13 (94)	1.56 (91)	3.96 (63)	5.69 (64)	10.62 (41)	4.82 (72)	4.40 (81)	
1 Citigroup HY C	0.55 (71)	2.48 (54)	4.48 (51)	6.93 (50)	12.00 (21)	5.87 (47)	5.30 (55)	
Median	0.88	2.59	4.52	6.98	10.13	5.80	5.44	7.41
Number of Funds	235	235	233	233	230	224	204	131

*Compass Total Returns of Active High Yield Fixed Income Portfolios Universe - Gross of Fees

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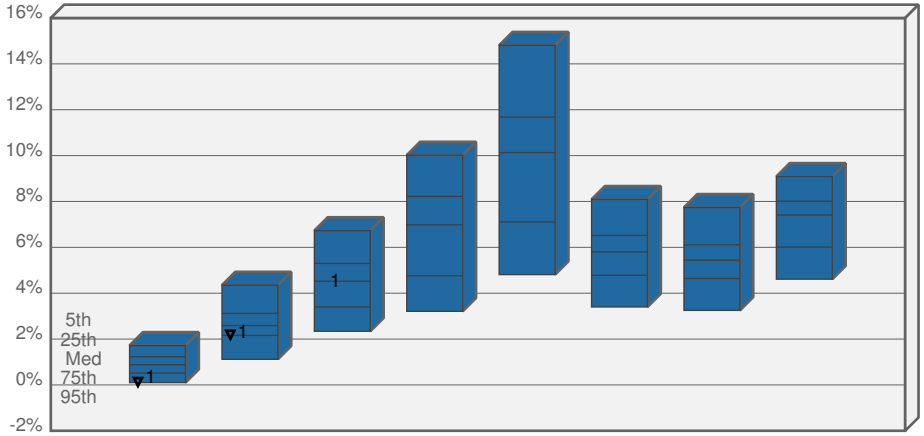
INVESTMENT MANAGER ANALYSIS

Federated High Yield

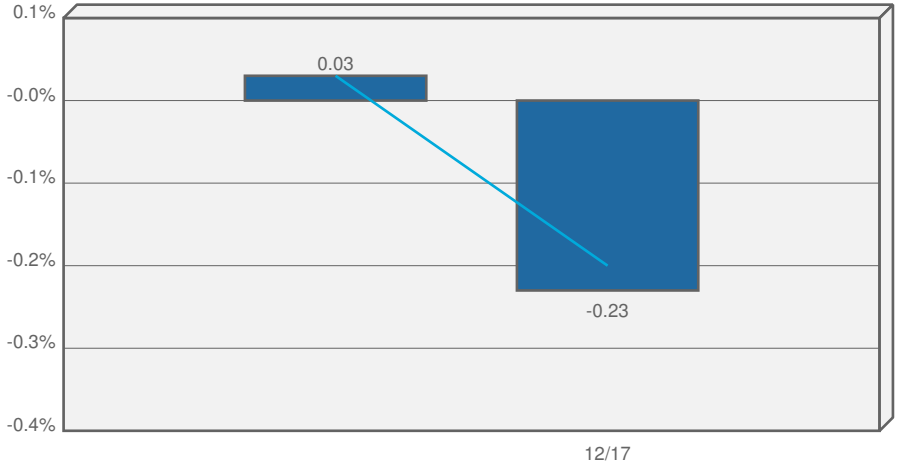
December 31, 2017

Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
▼ Federated High	0.36 (82)	2.42 (58)						
1 Bloomberg US H	0.47 (78)	2.46 (56)	4.68 (45)					
Median	0.88	2.59	4.52	6.98	10.13	5.80	5.44	7.41
Number of Funds	235	235	233	233	230	224	204	131

Value-Added Analysis vs Benchmark



*Compass Total Returns of Active High Yield Fixed Income Portfolios Universe - Gross of Fees

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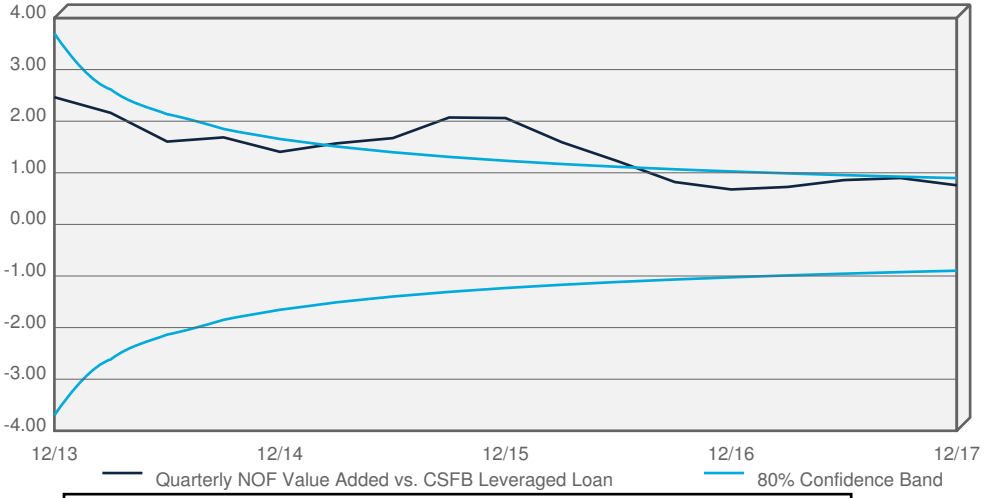
INVESTMENT MANAGER ANALYSIS

Sound Point

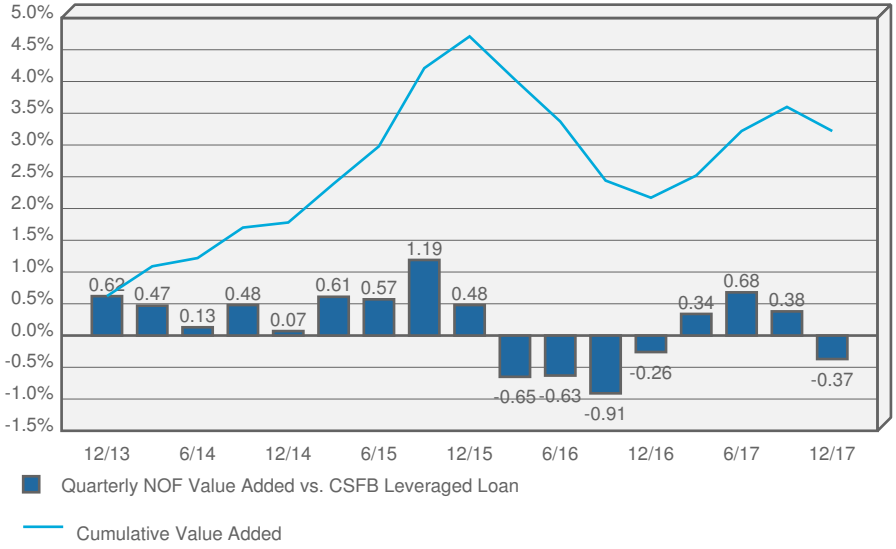
December 31, 2017

Cumulative Skill Analysis vs Benchmark



Excess Return:	0.76	Information Ratio:	0.67
Excess Risk:	1.12	T-Stat:	1.35

Value-Added Analysis vs Benchmark



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TIPS

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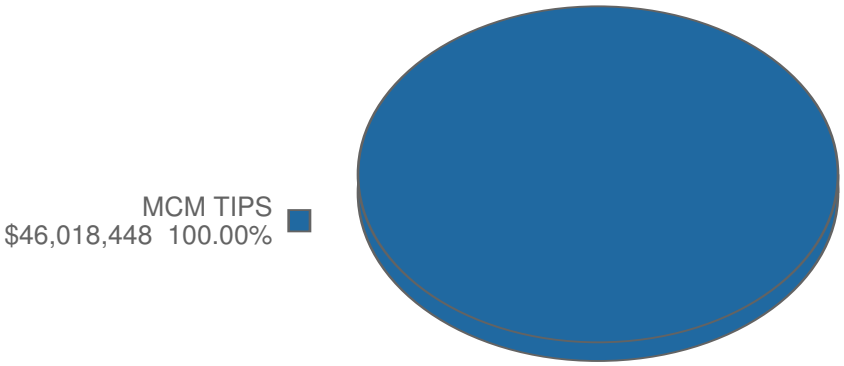
MANAGER ALLOCATION

TIPS Fixed Composite

As of December 31, 2017



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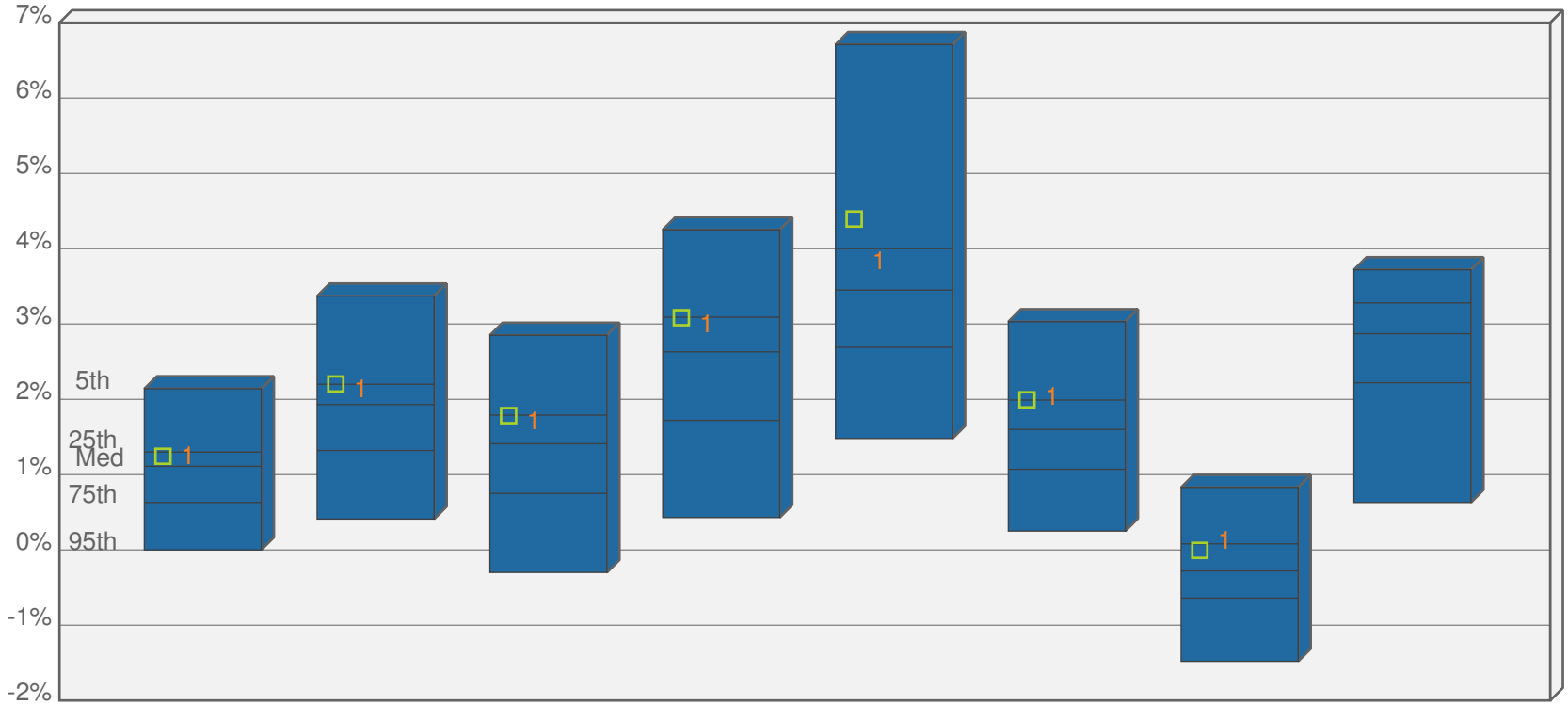
PERFORMANCE COMPARISON

TIPS Fixed Composite

Periods Ended December 31, 2017



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
□ TIPS Fixed Composite	1.26 (30)	2.22 (23)	1.80 (24)	3.10 (24)	4.41 (17)	2.01 (24)	0.01 (34)	
1 Bloomberg U.S. T	1.26 (30)	2.14 (34)	1.72 (31)	3.01 (29)	3.84 (31)	2.05 (23)	0.13 (20)	
5th %tile	2.14	3.37	2.85	4.25	6.71	3.03	0.83	3.72
25th %tile	1.30	2.20	1.79	3.09	4.00	1.99	0.08	3.28
Median	1.11	1.93	1.41	2.63	3.45	1.60	-0.28	2.87
75th %tile	0.63	1.32	0.75	1.72	2.69	1.07	-0.64	2.22
95th %tile	-0.00	0.41	-0.30	0.43	1.48	0.25	-1.48	0.63
Number of Funds	259	254	246	238	230	206	175	104

*Total Returns of TIPS Mutual Funds Universe - Net of Fees

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PERFORMANCE COMPARISON

Trailing Returns

Periods Ended December 31, 2017

	Quarter	2 Quarters	3 Quarters	1 Year	3 Years	5 Years	10 Years	Incept Date	Incept Ret
MCM TIPS									
Net of Fee Return	**1.26**	**2.22**	**1.80**	**3.10**				**12/31/16**	**3.10**
Bloomberg U.S. TIPS	1.26	2.14	1.72	3.01				12/31/16	3.01
Value Added	-0.00	0.08	0.07	0.09				12/31/16	0.09
TIPS Fixed Composite									
Net of Fee Return	**1.26**	**2.22**	**1.80**	**3.10**	**2.01**	**0.01**		**3/31/08**	**3.14**
Bloomberg U.S. TIPS	1.26	2.14	1.72	3.01	2.05	0.13		3/31/08	3.09
Value Added	-0.00	0.08	0.07	0.09	-0.04	-0.13		3/31/08	0.06

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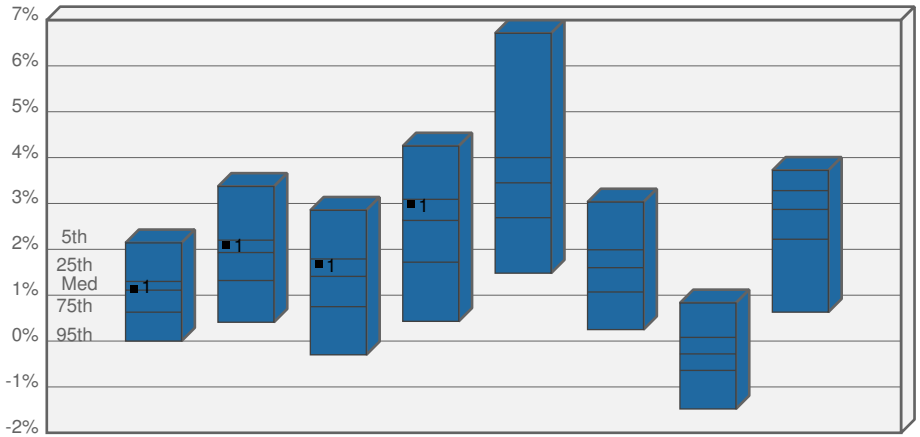
INVESTMENT MANAGER ANALYSIS

MCM TIPS

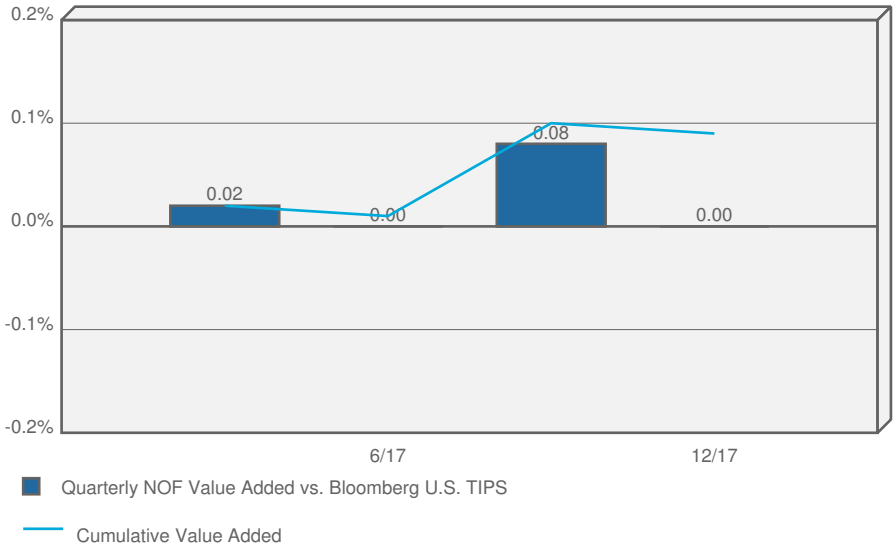
December 31, 2017

Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
■ MCM TIPS	1.26 (30)	2.22 (23)	1.80 (24)	3.10 (24)				
1 Bloomberg U.S.	1.26 (30)	2.14 (34)	1.72 (31)	3.01 (29)				
Median	1.11	1.93	1.41	2.63	3.45	1.60	-0.28	2.87
Number of Funds	259	254	246	238	230	206	175	104

Value-Added Analysis vs Benchmark



*Lipper Total Returns of TIPS Mutual Funds Universe - Net of Fees

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MLPs

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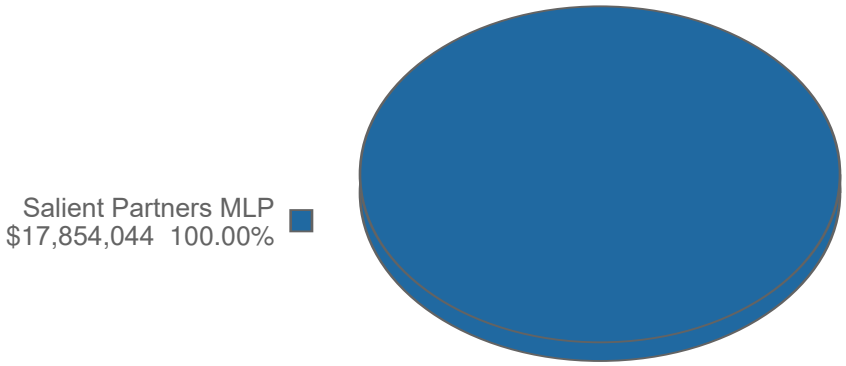
MANAGER ALLOCATION

MLP Composite

As of December 31, 2017



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COMMODITIES

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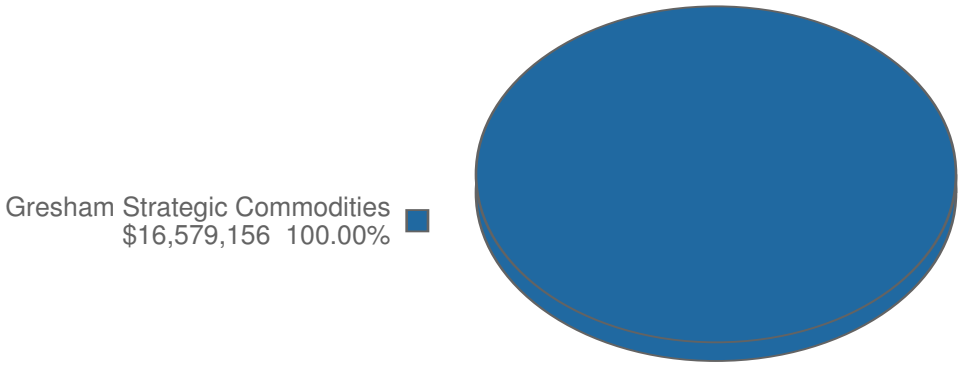
MANAGER ALLOCATION

Commodities Composite

As of December 31, 2017



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PERFORMANCE COMPARISON

Trailing Returns

Periods Ended December 31, 2017

	Quarter	2 Quarters	3 Quarters	1 Year	3 Years	5 Years	10 Years	Incept Date	Incept Ret
Gresham Strategic Commodities									
Net of Fee Return	**6.15**	**10.32**	**6.82**	**4.58**	**-4.75**	**-7.98**	**-5.94**	**3/31/07**	**-4.36**
Bloomberg Commodity Index	4.71	7.35	4.13	1.70	-5.03	-8.45	-6.83	3/31/07	-5.44
Value Added	1.44	2.97	2.70	2.88	0.29	0.47	0.88	3/31/07	1.08
Commodities Composite									
Net of Fee Return	**6.15**	**10.32**	**6.82**	**4.58**	**-4.75**	**-7.84**	**-5.51**	**3/31/07**	**-3.95**
Bloomberg Commodity Index	4.71	7.35	4.13	1.70	-5.03	-8.45	-6.83	3/31/07	-5.44
Value Added	1.44	2.97	2.70	2.88	0.29	0.61	1.32	3/31/07	1.49

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REAL ESTATE

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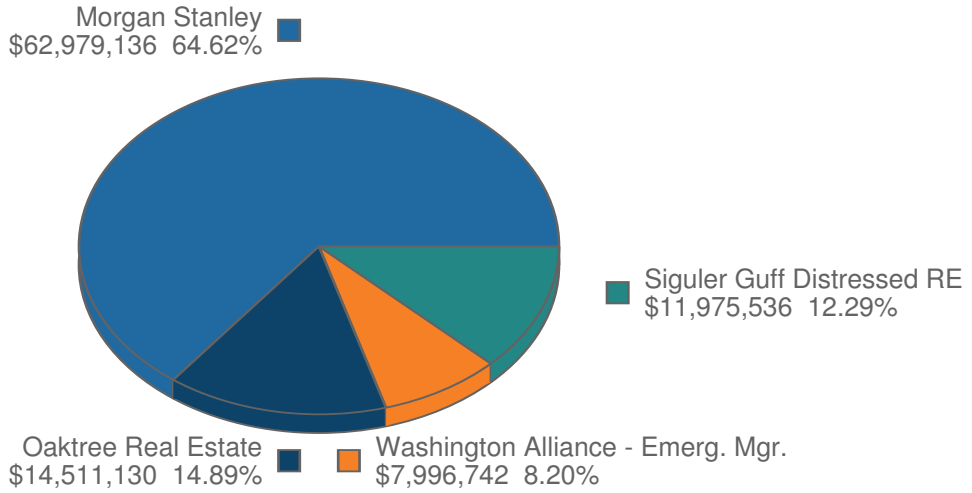
MANAGER ALLOCATION

Real Estate Composite

As of December 31, 2017



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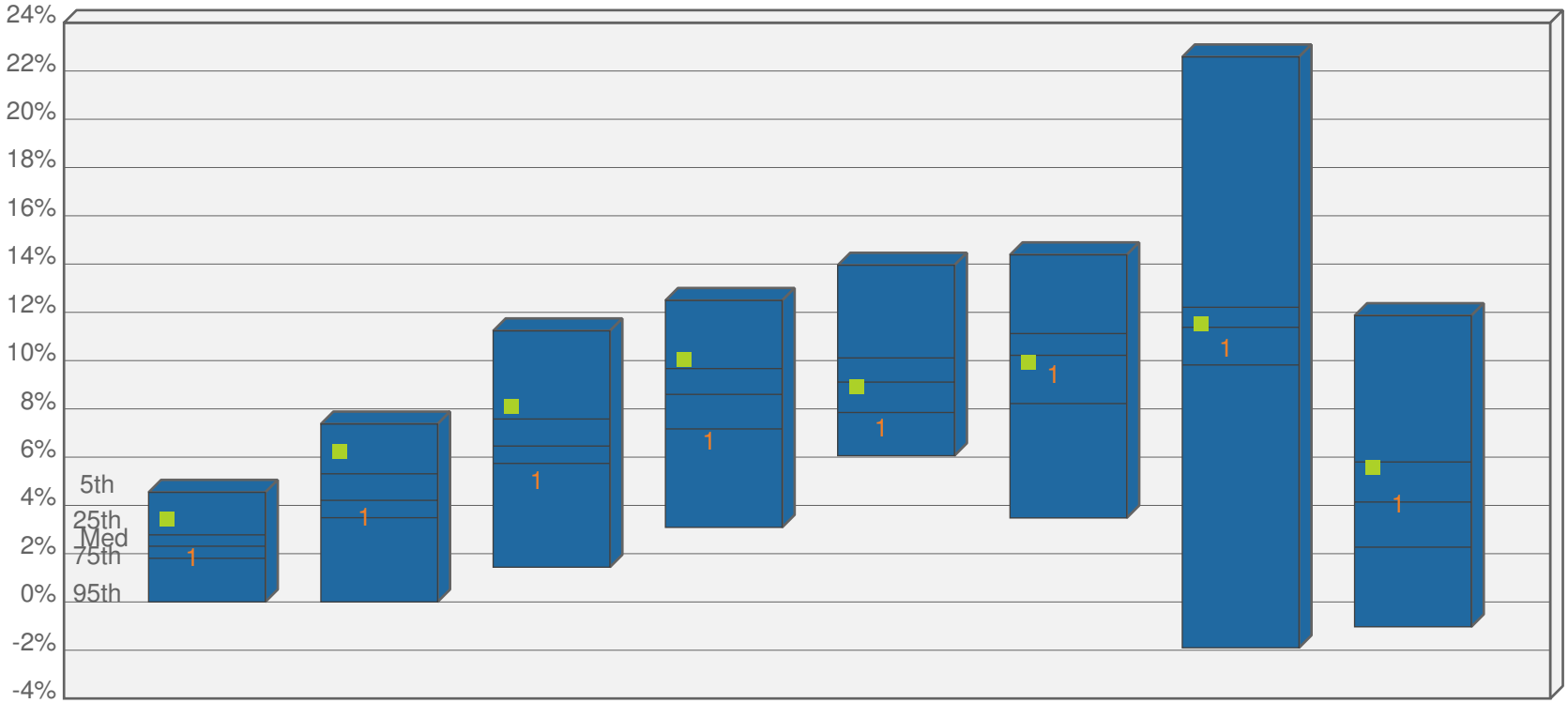
PERFORMANCE COMPARISON

Real Estate Composite

Periods Ended December 31, 2017



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
Real Estate Composite	3.48 (12)	6.28 (9)	8.17 (18)	10.11 (23)	8.99 (51)	9.97 (51)	11.58 (43)	5.61 (27)
1 NCREIF ODCE NOF	1.85 (73)	3.52 (73)	5.04 (84)	6.66 (80)	7.22 (82)	9.42 (61)	10.51 (64)	4.07 (50)
5th %tile	4.54	7.37	11.23	12.49	13.95	14.38	22.58	11.86
25th %tile	2.78	5.31	7.58	9.67	10.11	11.12	12.21	5.80
Median	2.31	4.21	6.46	8.60	9.11	10.22	11.38	4.14
75th %tile	1.81	3.49	5.74	7.17	7.85	8.22	9.82	2.27
95th %tile	0.00	0.00	1.44	3.09	6.06	3.48	-1.90	-1.03
Number of Funds	64	64	63	61	56	52	48	35

*TUCS Total Ret of Real Estate Investment Pools Universe - Gross of Fees

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PERFORMANCE COMPARISON

Trailing Returns

Periods Ended December 31, 2017

	Quarter	2 Quarters	3 Quarters	1 Year	3 Years	5 Years	10 Years	Incept Date	Incept Ret
Morgan Stanley									
Net of Fee Return	**2.08**	**4.37**	**6.70**	**8.75**	**10.82**	**12.54**	**5.57**	**3/31/03**	**8.95**
NCREIF ODCE NOF	1.85	3.52	5.04	6.66	9.42	10.51	4.07	3/31/03	7.31
Value Added	0.23	0.85	1.65	2.09	1.41	2.03	1.50	3/31/03	1.64
Oaktree Real Estate									
Net of Fee Return	**6.83**	**6.83**	**6.83**	**6.39**	**7.63**			**9/30/13**	**6.96**
Siguler Guff Distressed RE									
Net of Fee Return	**6.87**	**13.67**	**13.67**	**18.39**	**6.84**			**3/31/14**	**6.52**
Washington Alliance - Emerg. Mgr.									
Net of Fee Return	**2.30**	**9.87**	**15.57**	**15.57**	**16.11**			**9/30/13**	**12.46**
Real Estate Composite									
Net of Fee Return	**3.48**	**6.28**	**8.17**	**10.04**	**9.72**	**11.26**	**5.46**	**3/31/03**	**8.87**
NCREIF ODCE NOF	1.85	3.52	5.04	6.66	9.42	10.51	4.07	3/31/03	7.31
Value Added	1.63	2.76	3.13	3.38	0.30	0.75	1.39	3/31/03	1.57
ERECT Fund II									
Net of Fee Return	**1.33**	**7.19**	**4.91**	**6.30**	**7.18**	**7.48**	**6.26**	**6/30/05**	**6.85**
Consumer Price Index	-0.12	0.64	1.12	2.11	1.64	1.43	1.62	6/30/05	1.91
Value Added	1.45	6.55	3.79	4.19	5.54	6.05	4.64	6/30/05	4.94
ERECT Composite									
Net of Fee Return	**1.33**	**7.19**	**4.91**	**6.30**	**7.18**	**6.76**		**9/30/10**	**6.78**

Real Estate Composites returns do not include ERECT Funds

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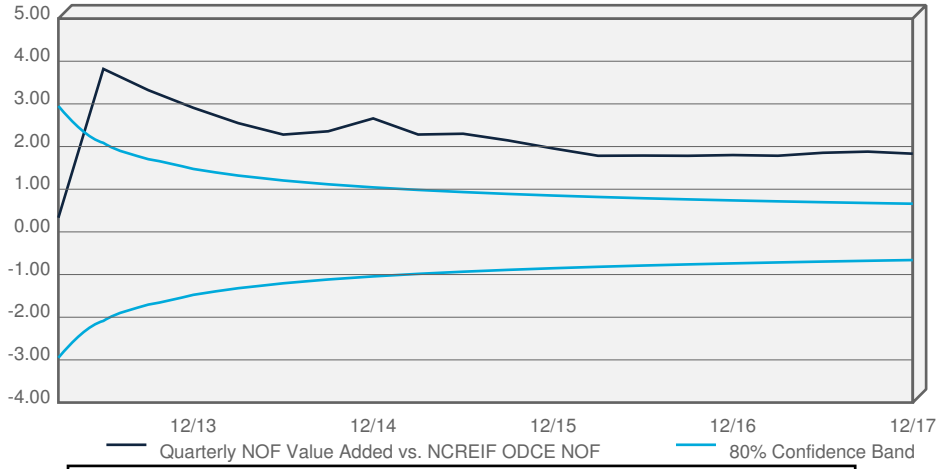
INVESTMENT MANAGER ANALYSIS

Morgan Stanley

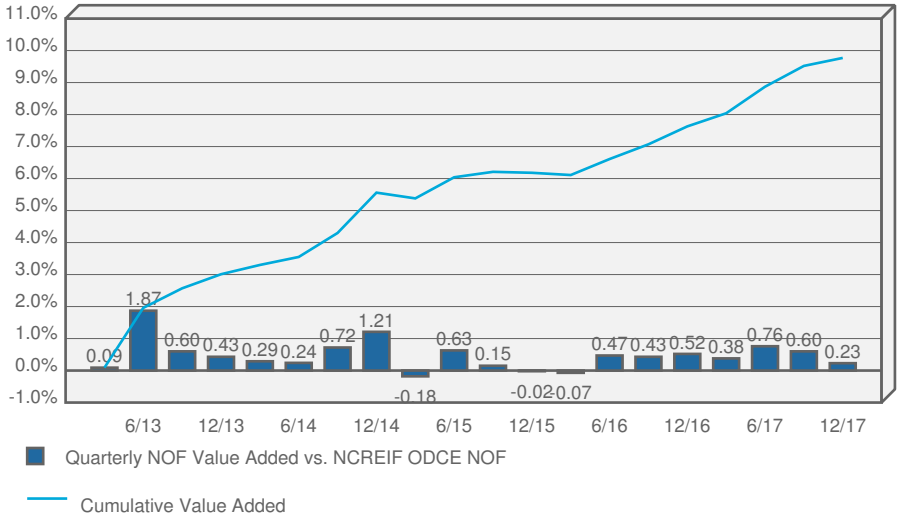
December 31, 2017

Cumulative Skill Analysis vs Benchmark

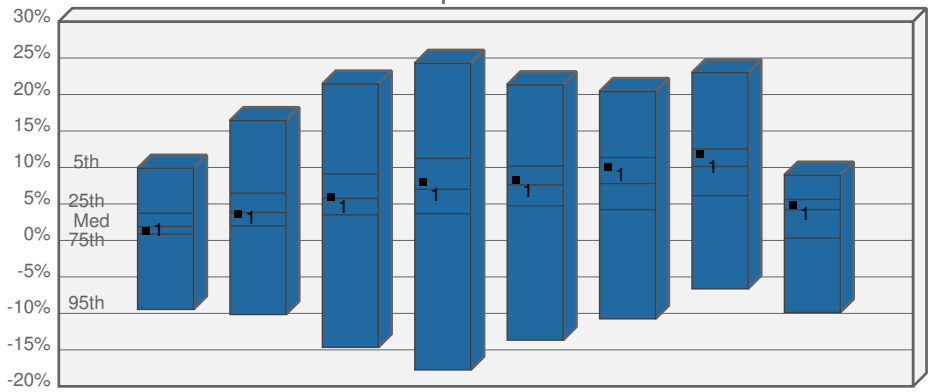


Excess Return:	1.83	Information Ratio:	2.04
Excess Risk:	0.90	T-Stat:	4.57

Value-Added Analysis vs Benchmark

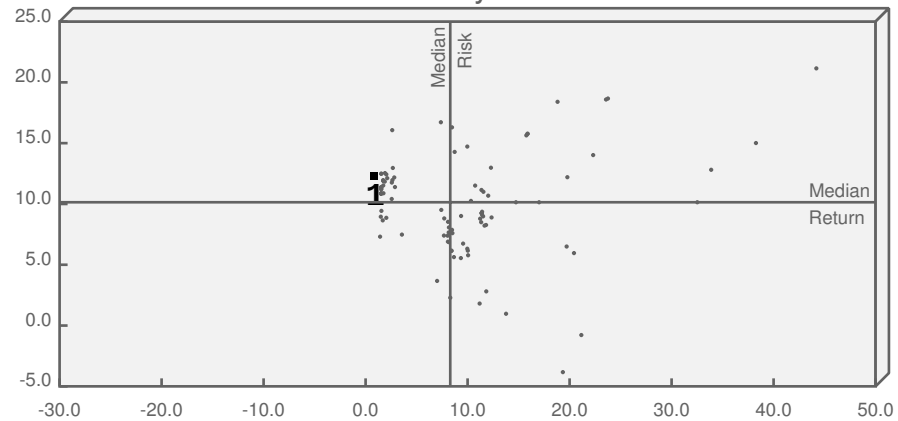


Performance Comparison vs Peer Universe*



	1 Quarter	2 Quarters	3 Quarters	1 Year	2 Years	3 Years	5 Years	10 Years
■ Morgan Stanley	2.08 (45)	4.37 (40)	6.70 (40)	8.75 (38)	8.99 (31)	10.82 (29)	12.54 (25)	5.57 (26)
1 NCREIF ODCE NO	0.85 (51)	3.52 (55)	5.04 (58)	6.66 (54)	7.22 (54)	9.42 (42)	10.52 (47)	4.07 (51)
Median	1.90	3.82	5.78	7.01	7.62	7.80	10.14	4.22
Number of Funds	348	342	337	320	317	283	218	128

Five Year Risk/Return Analysis vs Peer Universe*



Description	Legend	Gross Fee Ret Value	Gross Fee Ret Rank	Standard Deviation Value	Standard Deviation Rank
Morgan Stanley	■	12.54	25	1.90	85
NCREIF ODCE NOF	1	10.52	47	1.46	99
Median		10.14		8.30	

*Wilcop Total Returns of Real Estate Portfolios Universe - Gross of Fees

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PORTFOLIO RATE OF RETURN

Oaktree Real Estate*

As of December 31, 2017

Quarter	Commitment Value $	Beginning Capital Account	Contribution	Distribution	Appreciation	Expenses	Investment Fees	Ending Capital Account	Internal Rate of Return	Annualized IRR
09/13	20,000	0	9,400	0	0	0	0	9,400	0.00	NA
12/13		9,400	309	1,410	-19	0	309	7,971	-3.76	NA
03/14		7,971	4,000	0	-64	0	0	11,907	-4.16	NA
06/14		11,907	2,074	0	316	0	74	14,223	-1.39	NA
09/14		14,223	74	0	552	0	74	14,775	2.81	2.72
12/14		14,775	1,275	0	925	0	75	16,900	9.56	7.36
03/15		16,900	1,875	0	944	0	75	19,643	15.85	10.08
06/15		19,643	1,075	0	946	0	75	21,590	21.58	11.60
09/15		21,590	2,075	0	771	0	75	24,361	25.63	11.88
12/15		24,361	75	2,490	493	0	75	22,364	27.44	11.20
03/16		22,364	385	600	105	310	75	21,869	27.02	9.90
06/16		21,869	0	913	0	287	0	20,669	26.64	8.85
09/16		20,669	0	0	0	0	0	20,669	26.43	8.03
12/16		20,669	214	2,821	513	0	214	18,362	28.46	7.91
03/17		18,362	200	400	-15	139	61	17,947	28.08	7.25
06/17		17,947	0	964	0	236	0	16,747	28.27	6.80
09/17		16,747	0	524	0	76	0	16,147	28.54	6.42
12/17		16,147	0	2,738	1,103	0	0	14,511	36.38	7.50
Total	**20,000**		**23,032**	**12,859**	**6,570**	**1,049**	**1,182**	**14,511**	**36.38**	**7.50**

*Dollar values are shown in thousands

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PORTFOLIO RATE OF RETURN

Washington Alliance - Emerg. Mgr.*

As of December 31, 2017

Quarter	Commitment Value $	Beginning Capital Account	Contribution	Distribution	Appreciation	Expenses	Investment Fees	Ending Capital Account	Internal Rate of Return	Annualized IRR
09/13	5,000	0	1,376	0	0	0	0	1,376	0.00	NA
12/13		1,376	203	0	0	0	0	1,579	0.00	NA
03/14		1,579	819	0	0	0	0	2,397	0.00	NA
06/14		2,397	7	27	-124	0	7	2,246	-6.89	NA
09/14		2,246	1,810	90	200	0	0	4,166	3.25	3.21
12/14		4,166	0	152	95	0	0	4,109	6.55	5.14
03/15		4,109	0	0	0	0	0	4,109	6.00	3.93
06/15		4,109	803	0	462	0	11	5,363	20.84	11.34
09/15		5,363	0	200	355	0	0	5,519	31.06	14.38
12/15		5,519	0	214	160	0	0	5,465	34.65	14.03
03/16		5,465	0	0	0	0	0	5,465	33.58	12.20
06/16		5,465	829	0	0	0	0	6,294	32.68	10.77
09/16		6,294	0	200	0	0	0	6,094	31.56	9.52
12/16		6,094	0	0	778	0	0	6,872	52.51	13.78
03/17		6,872	371	227	0	0	0	7,016	51.32	12.51
06/17		7,016	0	0	364	0	0	7,380	60.03	13.30
09/17		7,380	0	226	530	0	0	7,683	73.24	14.66
12/17		7,683	384	256	185	0	0	7,997	76.78	14.28
Total	**5,000**		**6,602**	**1,593**	**3,005**	**0**	**18**	**7,997**	**76.78**	**14.28**

*Dollar values are shown in thousands

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PORTFOLIO RATE OF RETURN

Siguler Guff Distressed RE*

As of December 31, 2017

Quarter	Commitment Value $	Beginning Capital Account	Contribution	Distribution	Appreciation	Expenses	Investment Fees	Ending Capital Account	Internal Rate of Return	Annualized IRR
03/14	15,000	0	4,200	0	0	0	0	4,200	0.00	NA
06/14		4,200	0	900	0	0	0	3,300	0.00	NA
09/14		3,300	900	0	141	0	0	4,341	3.60	NA
12/14		4,341	900	0	-8	0	0	5,233	3.28	NA
03/15		5,233	0	462	0	0	0	4,771	3.13	2.83
06/15		4,771	690	2	-61	0	0	5,398	1.67	1.23
09/15		5,398	2,250	2	-182	0	0	7,465	-2.36	-1.48
12/15		7,465	375	2	108	0	0	7,946	-0.03	-0.02
03/16		7,946	465	2	0	0	0	8,409	-0.03	-0.01
06/16		8,409	1,163	2	0	0	0	9,570	-0.03	-0.01
09/16		9,570	264	2	609	0	0	10,441	9.88	3.67
12/16		10,441	570	186	0	0	0	10,826	9.37	3.18
03/17		10,826	0	2	450	0	0	11,273	15.70	4.80
06/17		11,273	0	369	0	0	0	10,904	15.15	4.29
09/17		10,904	0	2	694	0	0	11,597	24.61	6.28
12/17		11,597	0	406	785	0	0	11,976	35.15	8.11
Total	**15,000**		**11,776**	**2,337**	**2,536**	**0**	**0**	**11,976**	**35.15**	**8.11**

*Dollar values are shown in thousands

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PRIVATE EQUITY

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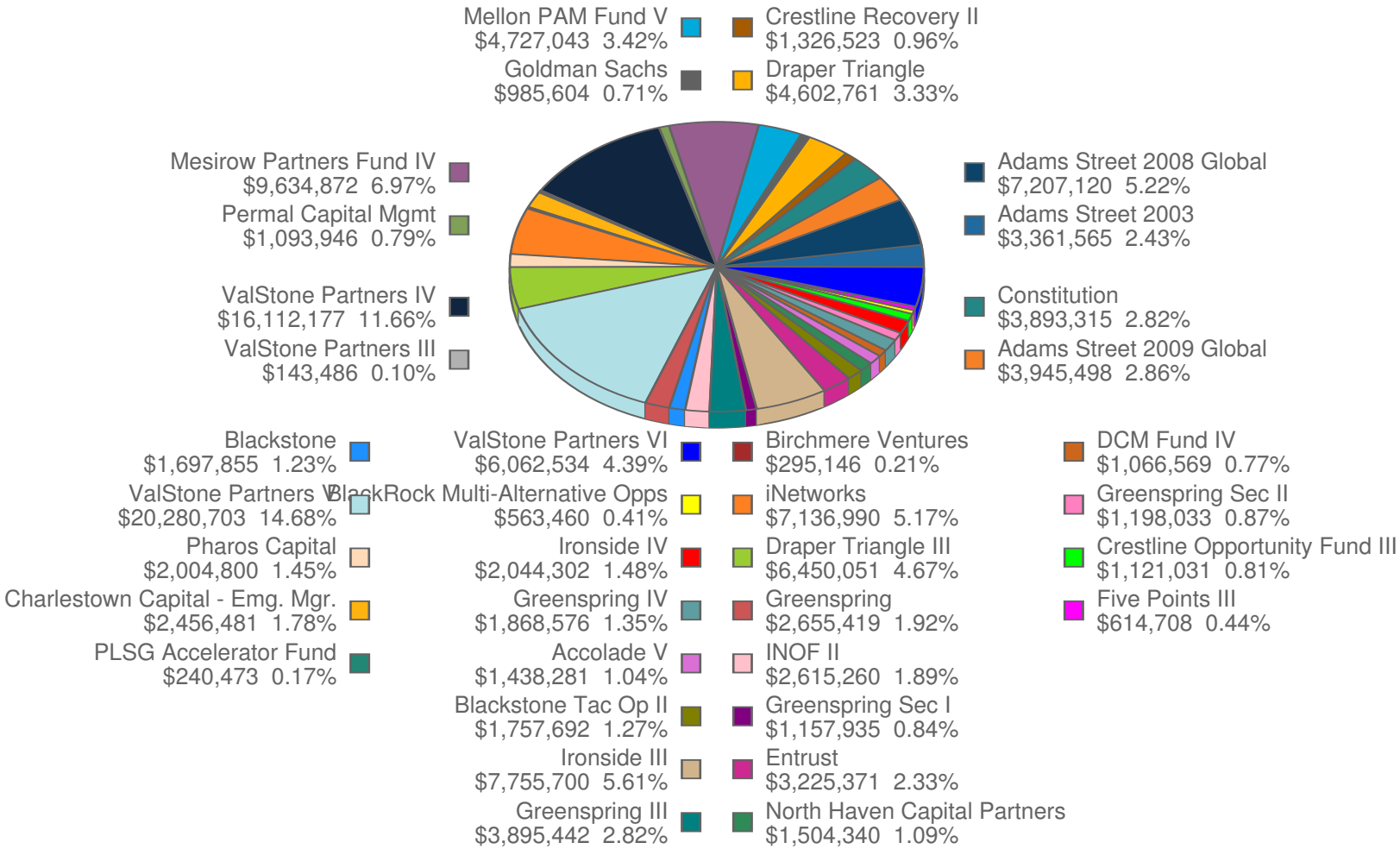
MANAGER ALLOCATION

Private Equity Composite

As of December 31, 2017



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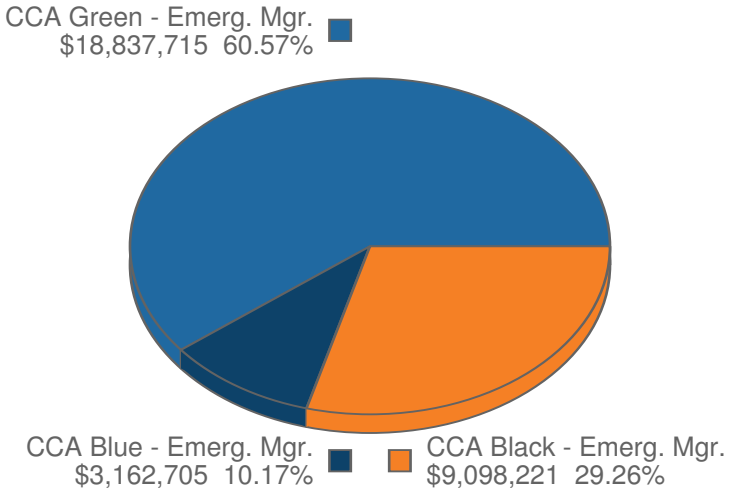
LIFE SETTLEMENT INVESTMENTS

Wilshire Consulting

MANAGER ALLOCATION

Life Settlement Composite

As of December 31, 2017



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PERFORMANCE COMPARISON

Trailing Returns

Periods Ended December 31, 2017

	Quarter	2 Quarters	3 Quarters	1 Year	3 Years	5 Years	10 Years	Incept Date	Incept Ret
CCA Green - Emerg. Mgr.									
Net of Fee Return	**-6.14**	**-7.38**	**-1.96**	**-11.94**	**-11.10**	**-5.38**		**9/30/09**	**8.26**
CCA Blue - Emerg. Mgr.									
Net of Fee Return	**3.98**	**-1.21**	**0.14**	**-5.82**	**-4.96**	**-3.60**		**12/31/12**	**-3.60**
CCA Black - Emerg. Mgr.									
Net of Fee Return	**2.93**	**2.76**	**5.93**	**6.28**	**8.52**			**12/31/14**	**8.52**
Life Settlement Composite									
Net of Fee Return	**-2.66**	**-4.00**	**0.44**	**-6.64**	**-6.61**	**-2.76**		**9/30/09**	**10.07**

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