

## Hoffman Estates Fire Pension Fund

Market Values as of September 30th 2019

TARGET ALLOCATION by ASSET CLASS				CURRENT ALLOCATION by ASSET CLASS		
Asset Allocation	Recommended Target Allocation	Portfolio Allocation	Percentage Difference	Target Allocation	Portfolio Allocation	Difference
<b>Total Equities - Domestic &amp; Int'l</b>	<b>65.00%</b>	<b>61.91%</b>	<b>-3.09%</b>	<b>\$58,267,063</b>	<b>\$55,497,373</b>	<b>-\$2,769,690</b>
<b>Large Cap Equity</b>	<b>35.00%</b>	<b>42.49%</b>	<b>7.49%</b>	<b>\$31,374,573</b>	<b>\$38,089,582</b>	<b>\$6,715,010</b>
T.Rowe Health Sciences I (THISX)*					\$1,796,250	
T. Rowe New America Growth (PNAIX)					\$4,188,922	
Madison Large Cap Core					\$6,655,024	
Aristotle Value Equity					\$12,286,365	
iShares Russell 3000 ETF (IWV)					\$13,162,730	
Rothschild SMA					\$291	
<b>Mid Cap Equity</b>	<b>4.00%</b>	<b>3.54%</b>	<b>-0.46%</b>	<b>\$3,585,665</b>	<b>\$3,174,853</b>	<b>-\$410,812</b>
Champlain Mid Cap (CPIX)					\$3,174,853	
<b>Small Cap Equity</b>	<b>4.00%</b>	<b>1.11%</b>	<b>-2.89%</b>	<b>\$3,585,665</b>	<b>\$998,509</b>	<b>-\$2,587,156</b>
T. Rowe QM US Small Cap (TQAI)*					\$998,509	
<b>Real Estate</b>	<b>3.00%</b>	<b>1.68%</b>	<b>-1.32%</b>	<b>\$2,689,249</b>	<b>\$1,508,501</b>	<b>-\$1,180,748</b>
Cohen & Steers REIT					\$1,508,501	
<b>International Equity</b>	<b>16.00%</b>	<b>11.82%</b>	<b>-4.18%</b>	<b>\$14,342,662</b>	<b>\$10,595,312</b>	<b>-\$3,747,350</b>
Tweedy Browne Global Value (TBGVX)					\$1,503,260	
Clearbridge Intl Growth					\$3,711,809	
Oakmark International I (OANIX)					\$2,329,223	
Invesco Intl SMID Y (OSMYX)					\$3,051,020	
<b>Emerging Markets</b>	<b>3.00%</b>	<b>1.26%</b>	<b>-1.74%</b>	<b>\$2,689,249</b>	<b>\$1,130,616</b>	<b>-\$1,558,633</b>
Invesco Oppenheimer DM Y (ODVYX)					\$1,130,616	
<b>Total Fixed Income (Including Cash)</b>	<b>35.00%</b>	<b>38.09%</b>	<b>3.09%</b>	<b>\$31,374,573</b>	<b>\$34,144,263</b>	<b>\$2,769,690</b>
<b>Fixed Income</b>	<b>33.00%</b>	<b>35.27%</b>	<b>2.27%</b>	<b>\$29,581,740</b>	<b>\$31,621,074</b>	<b>\$2,039,334</b>
Weaver Fixed Income					\$31,621,069	
William Blair					\$5	
<b>Cash &amp; Cash Equivalents</b>	<b>2.00%</b>	<b>2.81%</b>	<b>0.81%</b>	<b>\$1,792,833</b>	<b>\$2,523,189</b>	<b>\$730,356</b>
Cash Account					\$89,782	
Cash In Mutual Fund Account					\$976,168	
Illinois Funds*					\$1,457,239	
<b>TOTAL ALLOCATION</b>	<b>100.00%</b>	<b>100.00%</b>		<b>\$89,641,636</b>	<b>\$89,641,636</b>	
<b>*Outside Account</b>						

Disclaimer: This information and data is being provided at your request and is from sources considered reliable, but their accuracy and completeness is not guaranteed. It has been prepared for illustrative purposes only and is not intended to be used as a substitute transaction statements you receive from Morgan Stanley Smith Barney LLC. Please compare the data on this document carefully with your transaction statements to verify its accuracy.

# Hoffman Estates Fire Pension Fund

Quarterly Performance Report  
September 30, 2019

## Hoffman Estates Fire Pension Fund

### Asset Allocation Compliance

As of September 30, 2019

	Target Allocation (%)	Asset Allocation (%)	Differences (%)	Asset Allocation (\$)	Target Rebalance (\$)
Cash & Cash Equivalents	2.00	0.11	-1.89	89,782.31	1,618,010.47
Fixed Income	33.00	37.03	4.03	31,621,074.27	-3,442,493.45
Equity	65.00	61.10	-3.90	52,170,281.17	3,332,984.08
Hoffman Estates Fire Pension	100.00	100.00	0.00	85,389,638.85	-

	Target Allocation (%)	Asset Allocation (%)	Differences (%)	Asset Allocation (\$)	Target Rebalance (\$)
Cash & Cash Equivalents	2.00	0.11	-1.89	89,782.31	1,618,010.47
Emerging Markets	3.00	0.00	-3.00	-	2,561,689.17
Real Estate	3.00	1.77	-1.23	1,508,501.10	1,053,188.07
Mid Cap	4.00	3.72	-0.28	3,174,852.72	240,732.83
Small Cap	4.00	0.00	-4.00	-	3,415,585.55
International Equity	16.00	0.00	-16.00	-	13,662,342.22
Fixed Income	33.00	37.03	4.03	31,621,074.27	-3,442,493.45
Large Cap	35.00	57.38	22.38	48,995,428.45	-19,109,054.85
Hoffman Estates Fire Pension	100.00	100.00	0.00	85,389,638.85	-

## Hoffman Estates Fire Pension Fund

### Allocation by Asset Class

As of September 30, 2019

	Total Fund		Domestic Equity		International Equity		Domestic Fixed Income		Alternative Investment		Cash Equivalent	
	(\$)	%	(\$)	%	(\$)	%	(\$)	%	(\$)	%	(\$)	%
Hoffman Estates Fire Pension	85,389,639	100.00	32,140,372	37.64	12,516,751	14.66	31,591,547	37.00	1,898,744	2.22	7,242,225	8.48
Large Cap	48,995,428	57.38	28,965,519	59.12	12,516,751	25.55	-	-	391,000	0.80	7,122,159	14.54
Aristotle -Value Equity 092934	12,286,365	14.39	10,069,573	81.96	790,823	6.44	-	-	391,000	3.18	1,034,970	8.42
Madison - LCC 092935	6,655,024	7.79	1,544,294	23.20	-	-	-	-	-	-	5,110,730	76.80
Rothschild LCV 091687	291	0.00	-	-	-	-	-	-	-	-	291	100.00
Mutual Fund Account 091521	30,053,748	35.20	17,351,652	57.74	11,725,928	39.02	-	-	-	-	976,168	3.25
Mid Cap	3,174,853	3.72	3,174,853	100.00	-	-	-	-	-	-	-	0.00
Champlain Mid Cap 092700	3,174,853	3.72	3,174,853	100.00	-	-	-	-	-	-	-	0.00
Real Estate	1,508,501	1.77	-	-	-	-	-	-	1,507,745	99.95	757	0.05
Cohen & Steers REIT 091685	1,508,501	1.77	-	-	-	-	-	-	1,507,745	99.95	757	0.05
Fixed Income	31,621,074	37.03	-	-	-	-	31,591,547	99.91	-	-	29,528	0.09
William Blair-091520	5	0.00	-	-	-	-	-	-	-	-	5	100.00
Weaver- Intermediate 092404	31,621,069	37.03	-	-	-	-	31,591,547	99.91	-	-	29,523	0.09
Cash & Cash Equivalents	89,782	0.11	-	-	-	-	-	-	-	-	89,782	100.00
Cash Management Account 092408	89,782	0.11	-	-	-	-	-	-	-	-	89,782	100.00

## Hoffman Estates Fire Pension Fund

As of September 30, 2019

	1 Month	Since Inception	Inception Date
<b>Hoffman Estates Fire Pension</b>	<b>0.98</b>	<b>0.98</b>	<b>08/01/2019</b>
Custom Benchmark	1.36	0.60	
Difference	-0.38	0.38	
<b>Madison - LCC 092935</b>	<b>0.56</b>	<b>0.56</b>	<b>09/27/2019</b>
S&P 500 Total Return	1.87	-0.01	
Difference	-1.31	0.57	
<b>Aristotle -Value Equity 092934</b>	<b>-0.13</b>	<b>-0.13</b>	<b>09/26/2019</b>
Russell 1000 VL	3.57	-0.18	
Difference	-3.70	0.05	
<b>Champlain Mid Cap 092700</b>	<b>1.40</b>	<b>1.40</b>	<b>09/06/2019</b>
Russell Midcap	1.97	0.34	
Difference	-0.57	1.06	
<b>Mutual Fund Account 091521</b>	<b>1.52</b>	<b>1.76</b>	<b>08/23/2019</b>
S&P 500 Total Return	1.87	2.04	
Difference	-0.35	-0.28	
<b>Cohen &amp; Steers REIT 091685</b>	<b>1.07</b>	<b>1.11</b>	<b>08/20/2019</b>
FTSE NAREIT All Equity REITS	1.88	2.36	
Difference	-0.81	-1.25	
<b>Weaver- Intermediate 092404</b>	<b>-0.51</b>	<b>-0.36</b>	<b>08/20/2019</b>
BC Gov/Cr Intm	-0.36	-0.02	
Difference	-0.15	-0.34	
<b>Cash Management Account 092408</b>	<b>0.14</b>	<b>0.20</b>	<b>08/22/2019</b>
90-Day T-Bills	0.17	0.23	
Difference	-0.03	-0.03	

Returns for periods greater than one year are annualized.  
Returns are expressed as percentages.

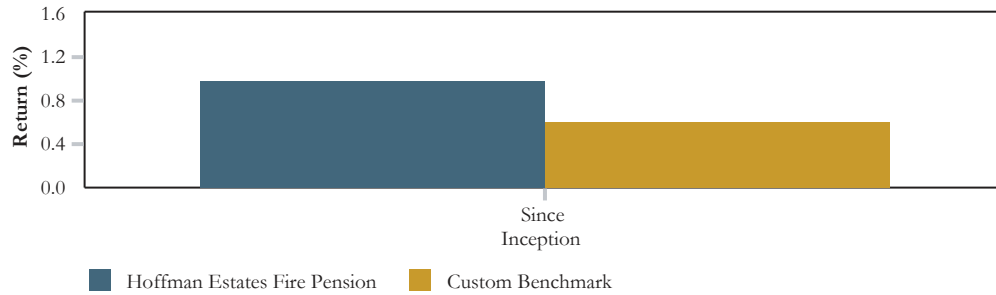
As of September 30, 2019

	Sep-2019	Aug-2019
<b>Hoffman Estates Fire Pension</b>		
Beginning Market Value	75,595,630	75,575,906
Net Contributions	8,933,447	-404,458
Income	222,952	52,947
Gain/Loss	637,610	371,235
Ending Market Value	85,389,639	75,595,630
<b>Aristotle -Value Equity 092934</b>		
Beginning Market Value	12,301,684	-
Net Contributions	-	-
Income	13,477	-
Gain/Loss	-28,796	-
Ending Market Value	12,286,365	-
<b>Madison - LCC 092935</b>		
Beginning Market Value	6,617,789	-
Net Contributions	-	-
Income	-	-
Gain/Loss	37,235	-
Ending Market Value	6,655,024	-
<b>Rothschild LCV 091687</b>		
Beginning Market Value	8,934,377	-
Net Contributions	-9,236,343	-
Income	24,181	-
Gain/Loss	278,077	-
Ending Market Value	291	-
<b>Champlain Mid Cap 092700</b>		
Beginning Market Value	3,131,437	-
Net Contributions	-260	-
Income	-	-
Gain/Loss	43,676	-
Ending Market Value	3,174,853	-

As of September 30, 2019

	Sep-2019	Aug-2019
<b>Mutual Fund Account 091521</b>		
Beginning Market Value	42,230,680	42,036,204
Net Contributions	-12,814,911	-5,323
Income	76,580	-
Gain/Loss	561,399	199,799
Ending Market Value	30,053,748	42,230,680
<b>Cohen &amp; Steers REIT 091685</b>		
Beginning Market Value	1,492,572	1,492,078
Net Contributions	-	-205
Income	9,768	2,993
Gain/Loss	6,161	-2,294
Ending Market Value	1,508,501	1,492,572
<b>Weaver- Intermediate 092404</b>		
Beginning Market Value	31,744,403	31,947,624
Net Contributions	37,989	-249,137
Income	98,819	12,070
Gain/Loss	-260,142	33,845
Ending Market Value	31,621,069	31,744,403
<b>William Blair-091520</b>		
Beginning Market Value	37,830	-
Net Contributions	-37,830	-139,885
Income	5	37,830
Gain/Loss	-	139,885
Ending Market Value	5	37,830
<b>Cash Management Account 092408</b>		
Beginning Market Value	90,146	100,000
Net Contributions	-485	-9,908
Income	122	54
Gain/Loss	-	-
Ending Market Value	89,782	90,146

Portfolio Performance (%)

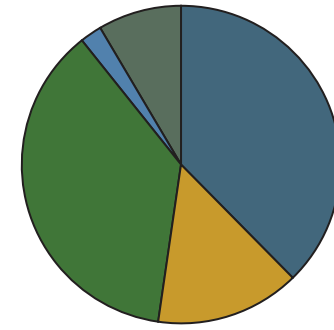


	Since Inception	Inception Date
Hoffman Estates Fire Pension	0.98	08/01/2019
Custom Benchmark	0.60	08/01/2019

	Since Inception	Inception Date
Hoffman Estates Fire Pension		08/01/2019
Beginning Market Value	75,576	
Net Contributions	8,539	
Fees/Expenses	-10	
Income	276	
Gain/Loss	1,009	
Ending Market Value	85,390	

Asset Allocation (\$000)

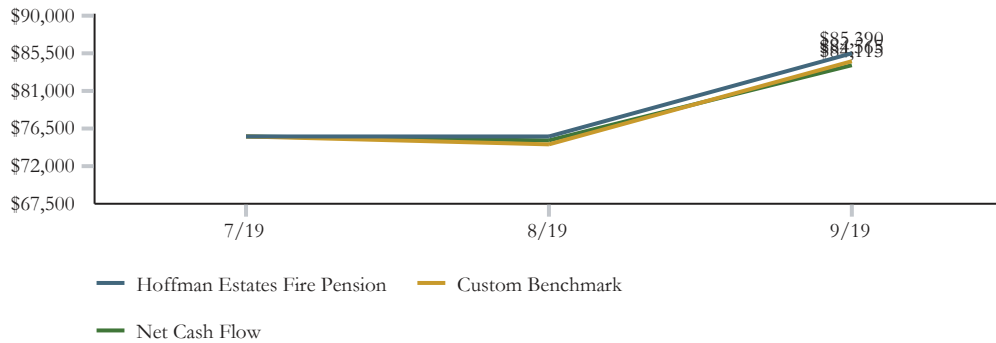
September 30, 2019 : \$85,390



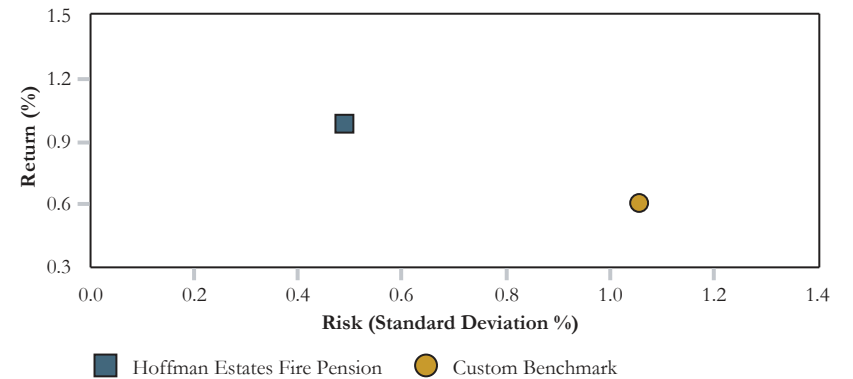
Segments	Market Value (\$000)	Allocation (%)
Domestic Equity	32,140.37	37.64
International Equity	12,516.75	14.66
Domestic Fixed Income	31,591.55	37.00
Alternative Investment	1,898.74	2.22
Cash Equivalent	7,242.23	8.48

Portfolio Characteristics vs. Custom Benchmark Since Inception

	Beta	Alpha	R-Squared	Sharpe Ratio	Inception Date
Hoffman Estates Fire Pension	0.46	0.35	1.00	0.62	08/01/2019

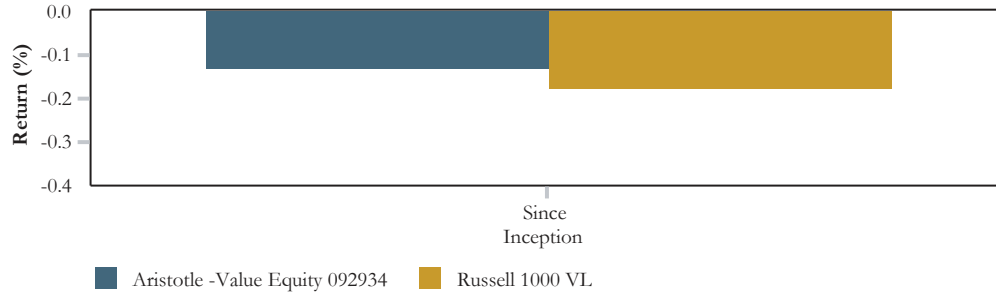


Risk/Return Analysis Since 08/19





**Portfolio Performance (%)**

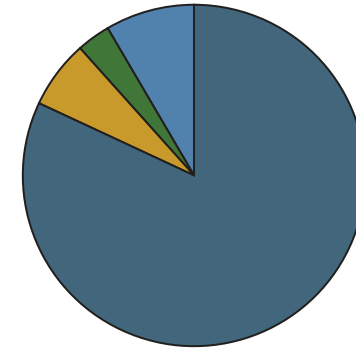


	Since Inception	Inception Date
Aristotle -Value Equity 092934	-0.13	09/26/2019
Russell 1000 VL	-0.18	09/26/2019

	Since Inception	Inception Date
Aristotle -Value Equity 092934		09/26/2019
Beginning Market Value	12,302	
Net Contributions	-	
Fees/Expenses	-	
Income	13	
Gain/Loss	-29	
Ending Market Value	12,286	

**Asset Allocation (\$000)**

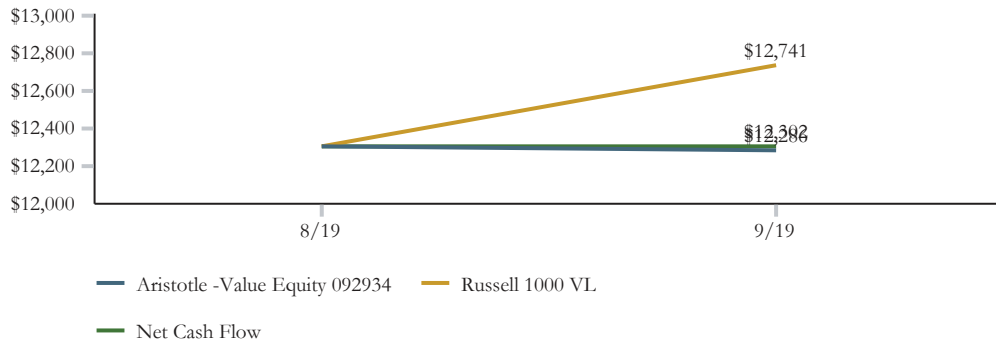
September 30, 2019 : \$12,286



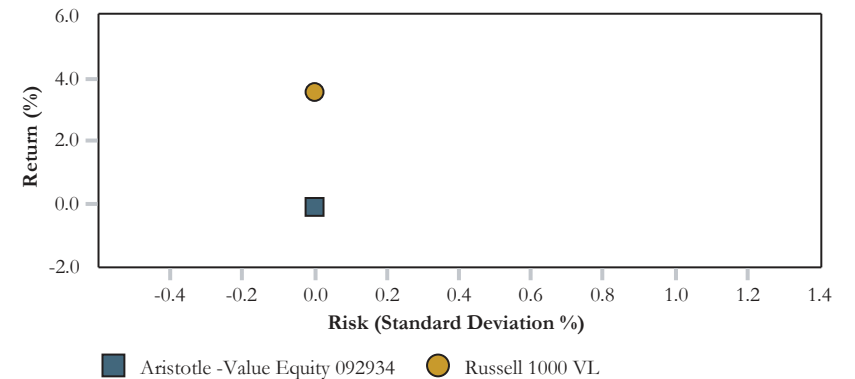
Segments	Market Value (\$000)	Allocation (%)
Domestic Equity	10,069.57	81.96
International Equity	790.82	6.44
Alternative Investment	391.00	3.18
Cash Equivalent	1,034.97	8.42

**Portfolio Characteristics vs. Russell 1000 VL Since Inception**

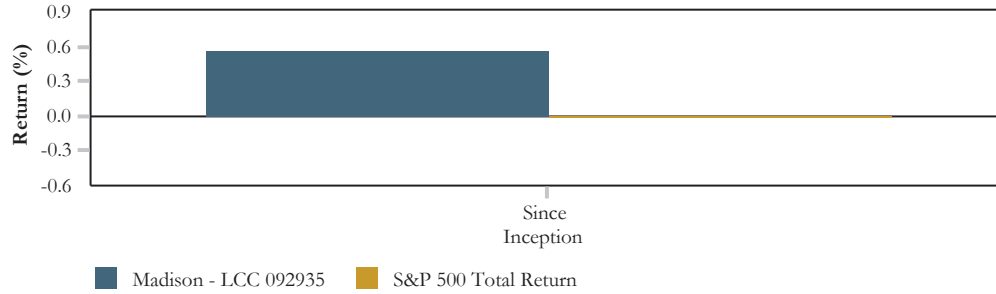
	Beta	Alpha	R-Squared	Sharpe Ratio	Inception Date
Aristotle -Value Equity 092934	N/A	N/A	N/A	N/A	09/26/2019



**Risk/Return Analysis Since 09/19**

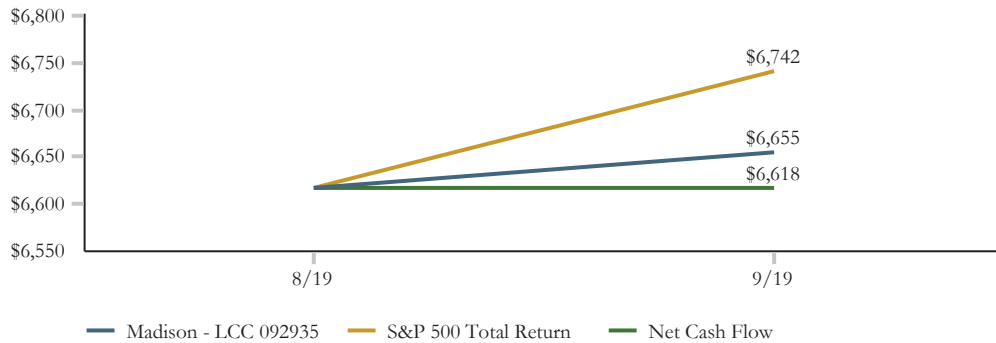


**Portfolio Performance (%)**



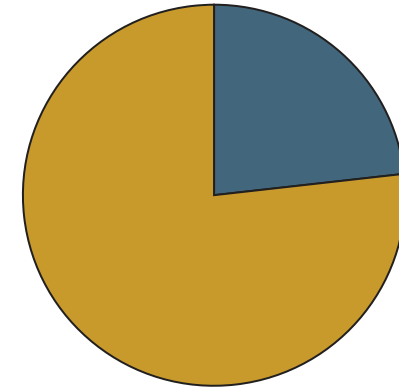
	Since Inception	Inception Date
Madison - LCC 092935	0.56	09/27/2019
S&P 500 Total Return	-0.01	09/27/2019

	Since Inception	Inception Date
Madison - LCC 092935		09/27/2019
Beginning Market Value	6,618	
Net Contributions	-	
Fees/Expenses	-	
Income	-	
Gain/Loss	37	
Ending Market Value	6,655	



**Asset Allocation (\$000)**

September 30, 2019 : \$6,655

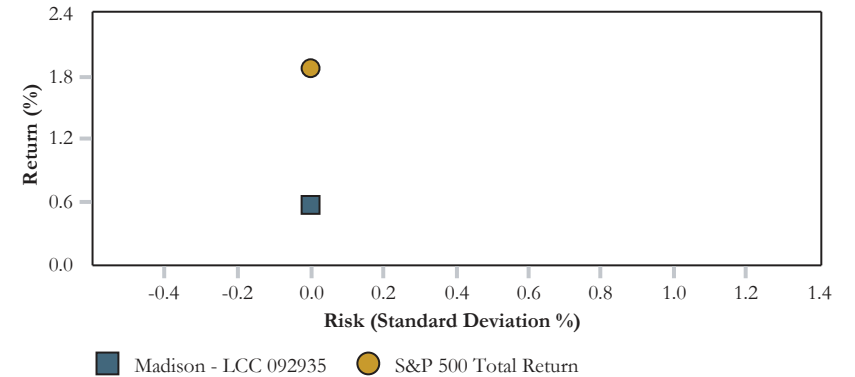


Segments	Market Value (\$000)	Allocation (%)
Domestic Equity	1,544.29	23.20
Cash Equivalent	5,110.73	76.80

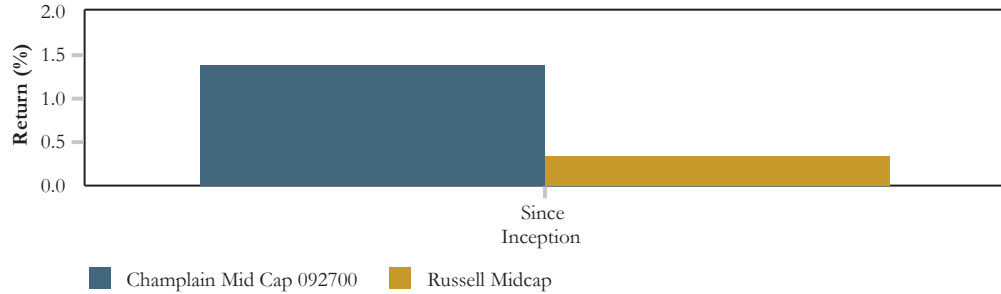
**Portfolio Characteristics vs. S&P 500 Total Return Since Inception**

	Beta	Alpha	R-Squared	Sharpe Ratio	Inception Date
Madison - LCC 092935	N/A	N/A	N/A	N/A	09/27/2019

**Risk/Return Analysis Since 09/19**

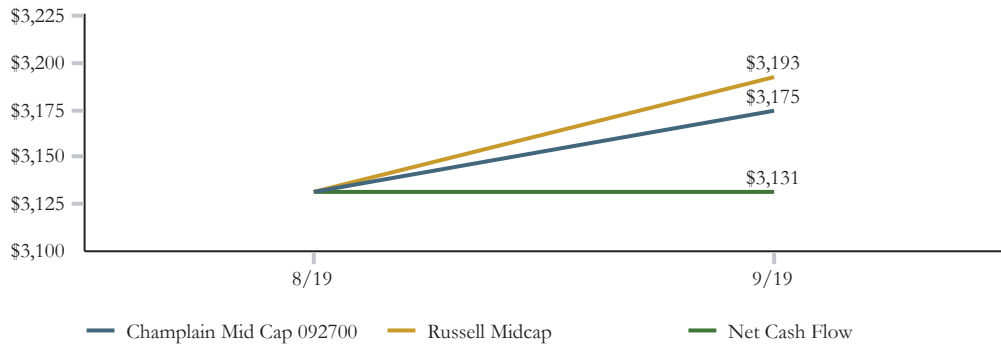


**Portfolio Performance (%)**



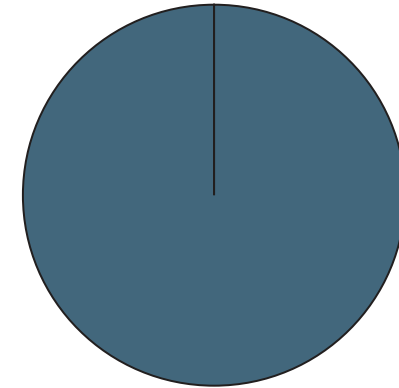
	Since Inception	Inception Date
Champlain Mid Cap 092700	1.40	09/06/2019
Russell Midcap	0.34	09/06/2019

	Since Inception	Inception Date
Champlain Mid Cap 092700		09/06/2019
Beginning Market Value	3,131	
Net Contributions	-	
Fees/Expenses	-	
Income	-	
Gain/Loss	44	
Ending Market Value	3,175	



**Asset Allocation (\$000)**

September 30, 2019 : \$3,175

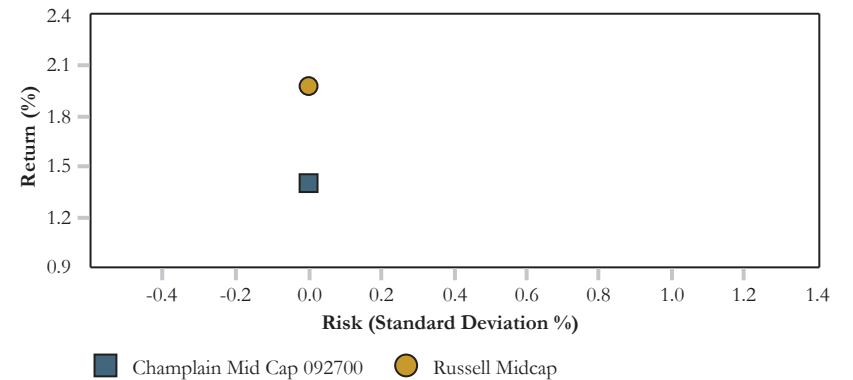


Segments	Market Value (\$000)	Allocation (%)
Domestic Equity	3,174.85	100.00
Cash Equivalent	-	0.00

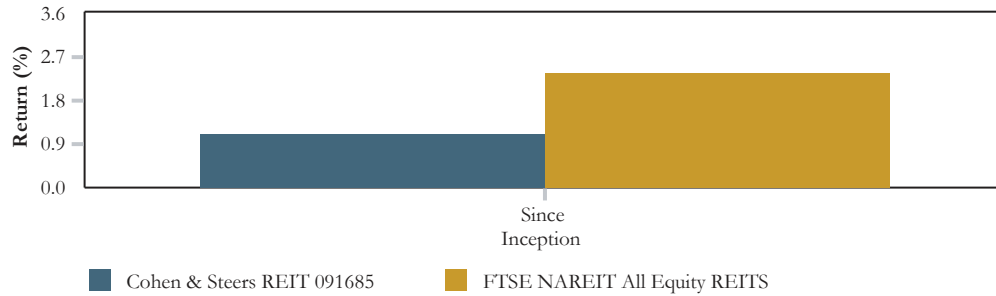
**Portfolio Characteristics vs. Russell Midcap Since Inception**

	Beta	Alpha	R-Squared	Sharpe Ratio	Inception Date
Champlain Mid Cap 092700	N/A	N/A	N/A	N/A	09/06/2019

**Risk/Return Analysis Since 09/19**

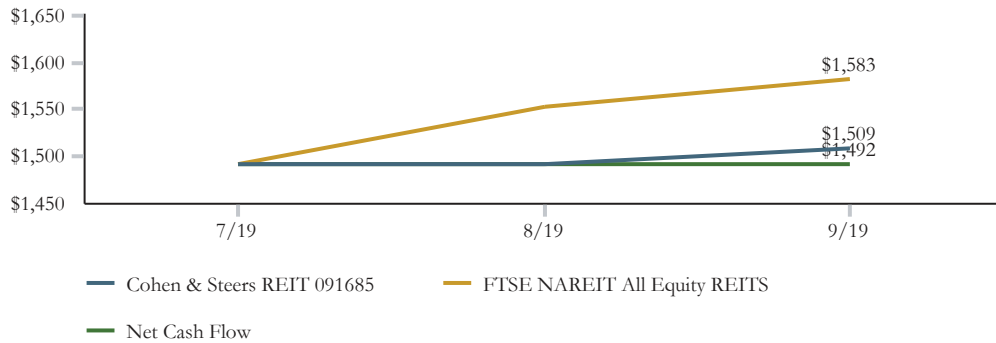


**Portfolio Performance (%)**



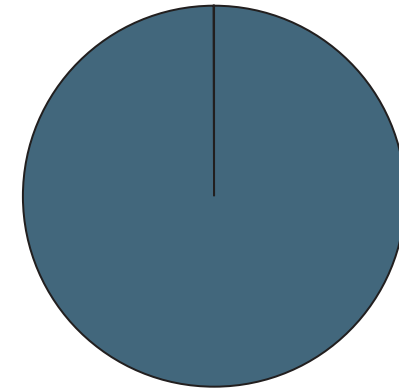
	Since Inception	Inception Date
Cohen & Steers REIT 091685	1.11	08/20/2019
FTSE NAREIT All Equity REITS	2.36	08/20/2019

	Since Inception	Inception Date
Cohen & Steers REIT 091685		08/20/2019
Beginning Market Value	1,492	
Net Contributions	-	
Fees/Expenses	-	
Income	13	
Gain/Loss	4	
Ending Market Value	1,509	



**Asset Allocation (\$000)**

September 30, 2019 : \$1,509

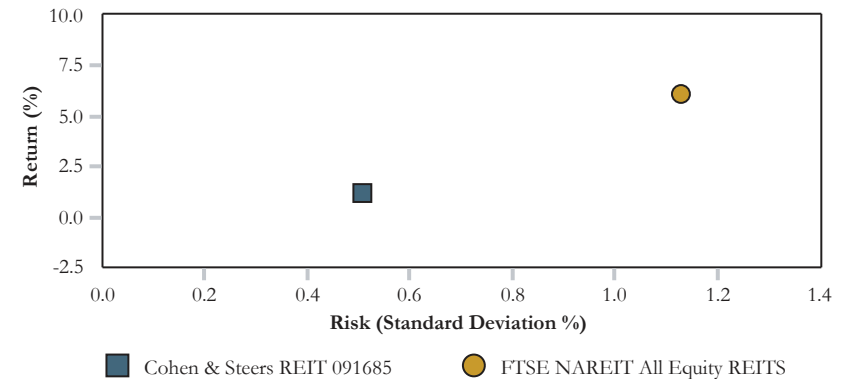


Segments	Market Value (\$000)	Allocation (%)
Alternative Investment	1,507.74	99.95
Cash Equivalent	0.76	0.05

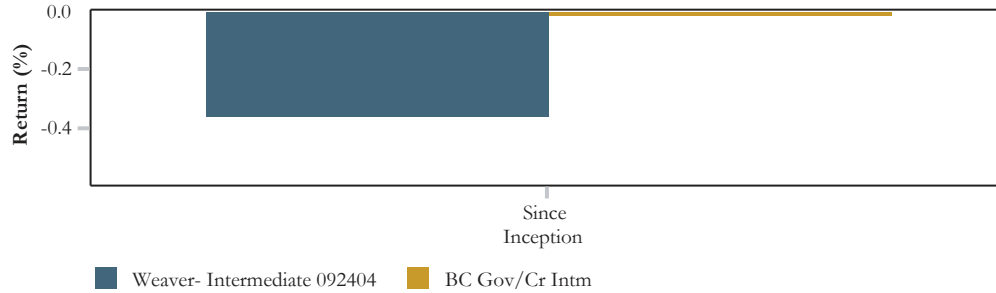
**Portfolio Characteristics vs. FTSE NAREIT All Equity REITS**

	Beta	Alpha	R-Squared	Sharpe Ratio	Inceptio Date
Cohen & Steers REIT 091685	-0.45	1.91	1.00	0.72	08/20/2019

**Risk/Return Analysis Since 08/19**



**Portfolio Performance (%)**

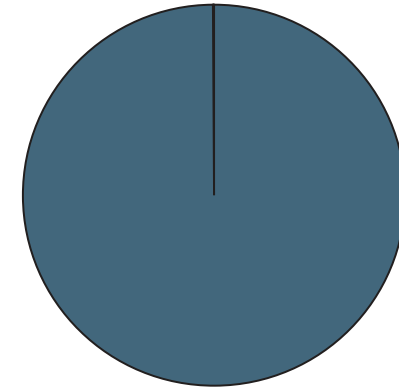


	Since Inception	Inception Date
Weaver- Intermediate 092404	-0.36	08/20/2019
BC Gov/Cr Intm	-0.02	08/20/2019

	Since Inception	Inception Date
Weaver- Intermediate 092404		08/20/2019
Beginning Market Value	31,948	
Net Contributions	-207	
Fees/Expenses	-4	
Income	111	
Gain/Loss	-226	
Ending Market Value	31,621	

**Asset Allocation (\$000)**

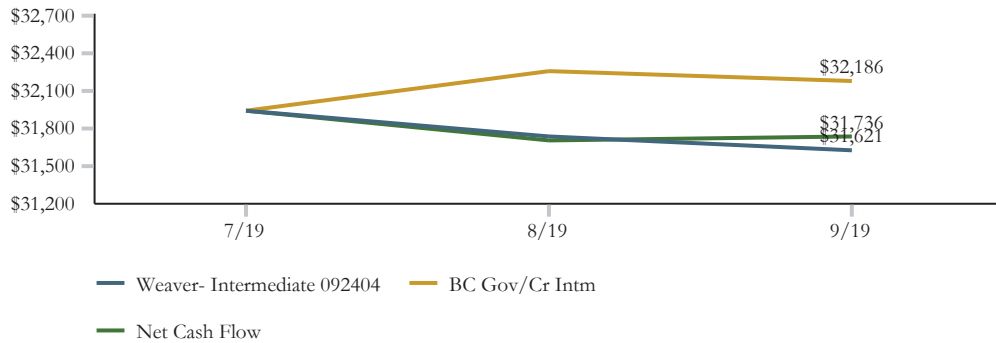
September 30, 2019 : \$31,621



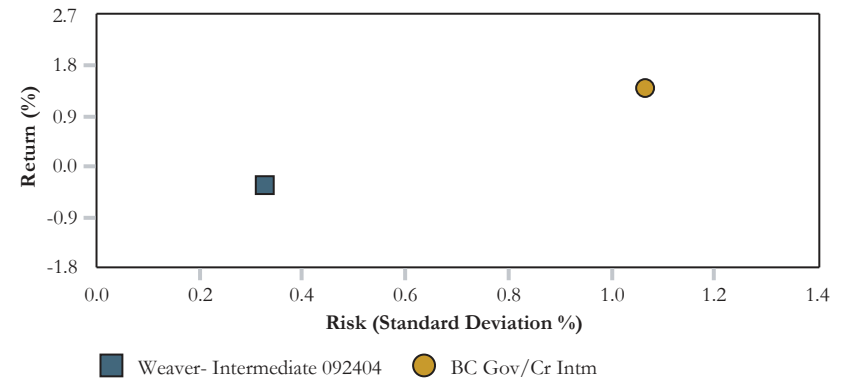
Segments	Market Value (\$000)	Allocation (%)
Domestic Fixed Income	31,591.55	99.91
Cash Equivalent	29.52	0.09

**Portfolio Characteristics vs. BC Gov/Cr Intm Since Inception**

	Beta	Alpha	R-Squared	Sharpe Ratio	Inception Date
Weaver- Intermediate 092404	0.31	-0.40	1.00	-1.14	08/20/2019



**Risk/Return Analysis Since 08/19**



As of September 30, 2019

Passive Portfolios	Weight (%)
<b>Aug-2019</b>	
S&P 500	35.00
S&P 400 MidCap Net	4.00
S&P 600 SC	4.00
FTSE NAREIT All Equity REITS	3.00
MSCI EAFE	16.00
MSCI EM Net	3.00
BC Gov/Cr Intm	33.00
90 Day T-Bill	2.00

# Performance Appendix

Performance Data below is net of fees. Please see the Morgan Stanley Smith Barney LLC Form ADV Part 2 Brochure for advisory accounts and/or any applicable brokerage account trade confirmation statements for a full disclosure of the applicable charges, fees and expenses. Your Financial Advisor will provide those documents to you upon request.

Account Name	QTD	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Aristotle -Value Equity 092934	--	--	--	--	--	--	-0.13	09/26/2019
Cash Management Account 092408	--	--	--	--	--	--	0.20	08/22/2019
Champlain Mid Cap 092700	--	--	--	--	--	--	1.39	09/06/2019
Cohen & Steers REIT 091685	--	--	--	--	--	--	1.10	08/20/2019
Madison - LCC 092935	--	--	--	--	--	--	0.56	09/27/2019
Mutual Fund Account 091521	--	--	--	--	--	--	1.75	08/23/2019
Rothschild LCV 091687	--	--	--	--	--	--	8.40	09/01/2019
Weaver- Intermediate 092404	--	--	--	--	--	--	-0.38	08/20/2019
William Blair-091520	--	--	--	--	--	--	--	

All performance above are Time Weighted(TWR) performance

## Glossary of Terms

**Active Contribution Return:** The gain or loss percentage of an investment relative to the performance of the investment benchmark.

**Active Exposure:** The percentage difference in weight of the portfolio compared to its policy benchmark.

**Active Return:** Arithmetic difference between the manager's return and the benchmark's return over a specified time period.

**Actual Correlation:** A measure of the correlation (linear dependence) between two variables X and Y, with a value between +1 and -1 inclusive. This is also referred to as coefficient of correlation.

**Alpha:** A measure of a portfolio's time weighted return in excess of the market's return, both adjusted for risk. A positive alpha indicates that the portfolio outperformed the market on a risk-adjusted basis, and a negative alpha indicates the portfolio did worse than the market.

**Best Quarter:** The highest quarterly return for a certain time period.

**Beta:** A measure of the sensitivity of a portfolio's time weighted return (net of fees) against that of the market. A beta greater than 1.00 indicates volatility greater than the market.

**Consistency:** The percentage of quarters that a product achieved a rate of return higher than that of its benchmark. The higher the consistency figure, the more value a manager has contributed to the product's performance.

**Core:** Refers to an investment strategy mandate that is blend of growth and value styles without a

pronounced tilt toward either style.

**Cumulative Selection Return (Cumulative Return):** Cumulative investment performance over a specified period of time.

**Distribution Rate:** The most recent distribution paid, annualized, and then divided by the current market price. Distribution rate may consist of investment income, short-term capital gains, long-term capital gains, and/or return of capital.

**Down Market Capture:** The ratio of average portfolio returns over the benchmark during periods of negative benchmark return. Lower values indicate better product performance.

**Downside Risk:** A measure similar to standard deviation, but focuses only on the negative movements of the return series. It is calculated by taking the standard deviation of the negative quarterly set of returns. The higher the value, the more risk the product has.

**Downside Semi Deviation:** A statistical calculation that measures the volatility of returns below a minimum acceptable return. This return measure isolates the negative portion of volatility: the larger the number, the greater the volatility.

**Drawdown:** A drawdown is the peak-to-trough decline during a specific period of an investment, fund or commodity.

**Excess over Benchmark:** The percentage gain or loss of an investment relative to the investment's benchmark.

**Excess Return:** Arithmetic difference between the manager's return and the risk-free return over a specified time period.

**Growth:** A diversified investment strategy which includes investment selections that have capital appreciation as the primary goal, with little or no dividend payouts. These strategies can include reinvestment in expansion, acquisitions, and/or research and development opportunities.

**Growth of Dollar:** The aggregate amount an investment has gained or lost over a certain time period, also referred to as Cumulative Return, stated in terms of the amount to which an initial dollar investment would have grown over the given time period.

**Investment Decision Process (IDP):** A model for structuring the investment process and implementing the correct attribution methodologies. The IDP includes every decision made concerning the division of the assets under management over the various asset categories. To analyze each decision's contribution to the total return, a modeling approach must measure the marginal value of every individual decision. In this respect, the hierarchy of the decisions becomes very important. We therefore use the IDP model, which serves as a proper foundation for registering the decisions and relating them to each other.

**Information Ratio:** Measured by dividing the active rate of return by the tracking error. The higher the Information Ratio, the more value-added contribution by the manager.

**Jensen's Alpha:** The Jensen's alpha measure is a risk-adjusted performance measure that represents the average return on a portfolio or investment above or below that predicted by the capital asset pricing model (CAPM) given the portfolio's or investment's beta and the average market return. This metric is also commonly referred to as alpha.

**Kurtosis:** A statistical measure that is used to describe the distribution, or skewness, of observed data around the mean, sometimes referred to as the volatility of volatility.

**Maximum Drawdown:** The drawdown is defined as the percent retrenchment from a fund's peak to the fund's trough value. It is in effect from the time the fund's retrenchment begins until a new fund high is reached. The maximum drawdown encompasses both the period from the fund's peak to the fund's valley (length), and the time from the fund's valley to a new fund high (recovery). It measures the largest percentage drawdown that has occurred in any fund's data record.

**Modern Portfolio Theory (MPT):** An investment analysis theory on how risk-averse investors can construct portfolios to optimize or maximize expected return based on a given level of market risk, emphasizing that risk is an inherent part of higher reward.

**Mutual Fund (MF):** An investment program funded by shareholders that trade in diversified holdings and is professionally managed.

**Peer Group:** A combination of funds that share the same investment style combined as a group for comparison purposes.

**Peer/ Plan Sponsor Universe:** A combination of asset pools of total plan investments by specific sponsor and plan types for comparison purposes.

**Performance Ineligible Assets:** Performance returns are not calculated for certain assets because accurate valuations and transaction data for these assets are not processed or maintained by us. Common examples of these include life insurance, some annuities and some assets held externally.

**Performance Statistics:** A generic term for various measures of investment performance measurement terms.

**Portfolio Characteristics:** A generic term for various measures of investment portfolio characteristics.

**Preferred Return:** A term used in the private equity (PE) world, and also referred to as a "Hurdle Rate." It refers to the threshold return that the limited partners of a private equity fund must receive, prior to the PE firm receiving its carried interest or "carry."

**Ratio of Cumulative Wealth:** A defined ratio of the Cumulative Return of the portfolio divided by the Cumulative Return of the benchmark for a certain time period.

**Regression Based Analysis:** A statistical process for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables

**Residual Correlation:** Within returns-based style analysis, residual correlation refers to the portion of a strategy's return pattern that cannot be explained by its correlation to the asset-class benchmarks to which it is being compared.

**Return:** A rate of investment performance for the specified period.

**Rolling Percentile Ranking:** A measure of an investment portfolio's ranking versus a peer group for a specific rolling time period (i.e. Last 3 Years, Last 5 years, etc.).

**R-Squared:** The percentage of a portfolio's performance explained by the behavior of the appropriate benchmark. High R-Squared means a higher correlation of the portfolio's performance to the appropriate benchmark.

**SA/CF (Separate Account/Comingled Fund):** Represents an acronym for Separate Account and Comingled Fund investment vehicles.

**Sector Benchmark:** A market index that serves as a proxy for a sector within an asset class.

**Sharpe Ratio:** Represents the excess rate of return over the risk free return divided by the standard deviation of the excess return. The result is the absolute rate of return per unit of risk. The higher the value, the better the product's historical risk-adjusted performance results in.

**Standard Deviation:** A statistical measure of the range of a portfolio's performance; the variability of a return around its average return over a specified time period.

**Total Fund Benchmark:** The policy benchmark for a complete asset pool that could consist of multiple investment mandates.

**Total Fund Composite:** The aggregate of multiple portfolios within an asset pool or household.

**Tracking Error:** A measure of standard deviation for a portfolio's investment performance, relative to the performance of an appropriate market benchmark.

**Treynor Ratio:** A ratio that divides the excess return (above the risk free rate) by the portfolio's beta to arrive at a unified measure of risk adjusted return. It is generally used to rank portfolios, funds and benchmarks. A higher ratio is indicative of higher returns per unit of market risk. This measurement can help determine if the portfolio is reaching its goal of increasing returns while managing market risk.

**Up Market Capture:** The ratio of average portfolio returns over the benchmark during periods of positive benchmark return. Higher values indicate better product performance.

**Upside Semi Deviation:** A statistical calculation that measures the volatility of returns above an acceptable return. This return measure isolates the positive portion of volatility: the larger the number, the greater the volatility.



**Value:** A diversified investment strategy that includes investment selections which tend to trade at a lower price relative to its dividends, earnings, and sales. Common attributes are stocks that include high dividend, low price-to-book ratio, and/or low price-to-earnings ratio.

**Worst Quarter:** The lowest rolling quarterly return for a certain time period.

#### Information Disclosures

*Performance results are annualized for time periods greater than one year and include all cash and cash equivalents, realized and unrealized capital gains and losses, and dividends, interest and income. The investment results depicted herein represent historical performance. As a result of recent market activity, current performance may vary from the figures shown. Past performance is not a guarantee of future results.*

*Please see the Morgan Stanley Smith Barney LLC Form ADV Part 2 Brochure for advisory accounts and/or any applicable brokerage account trade confirmation statements for a full disclosure of the applicable charges, fees and expenses. Your Financial Advisor will provide those documents to you upon request.*

*Benchmark indices and blends included in this material are for informational purposes only, are provided solely as a comparison tool and may not reflect the underlying composition and/or investment objective(s) associated with the account(s). Indices are unmanaged and not available for direct investment. Index returns do not take into account fees or other charges. Such fees and charges would reduce performance.*

*The performance data shown reflects past performance, which does not guarantee future results. Investment return and principal will fluctuate so that an investor's shares when redeemed may be worth more or less than original cost. Please note, current performance may be higher or lower than the performance data shown. For up to date month-end performance information, please contact your Financial Advisor or visit the funds' company website.*

*Investors should carefully consider the fund's investment objectives, risks, charges and expenses before investing. The prospectus and, if available the summary prospectus, contains this and other information that should be read carefully before investing. Investors should review the information in the prospectus carefully. To obtain a prospectus, please contact your Financial Advisor or visit the funds' company website.*

Past performance is no guarantee of future results.

Investing involves market risk, including possible loss of principal. **Growth investing** does not guarantee a profit or eliminate risk. The stocks of these companies can have relatively high valuations. Because of these high valuations, an investment in a growth stock can be more risky than an investment in a company with more modest growth expectations. **Value investing** involves the risk that the market may not recognize that securities are undervalued and they may not appreciate as anticipated. **Small and mid-capitalization companies** may lack the financial resources, product diversification and competitive strengths of larger companies. The securities of small capitalization companies may not trade as readily as, and be subject to higher volatility than those of larger, more established companies. **Bond funds** and bond holdings have the same interest rate, inflation and credit risks that are associated with the underlying bonds owned by the funds. The return of principal in bond funds, and in funds with significant bond holdings, is not guaranteed. **International securities'** prices may carry additional risks, including foreign economic, political, monetary

and/or legal factors, changing currency exchange rates, foreign taxes and differences in financial and accounting standards. International investing may not be for everyone. These risks may be magnified in emerging markets. **Alternative investments**, including private equity funds, real estate funds, hedge funds, managed futures funds, and funds of hedge funds, private equity, and managed futures funds, are speculative and entail significant risks that can include losses due to leveraging or other speculative investment practices, lack of liquidity, volatility of returns, restrictions on transferring interests in a fund, potential lack of diversification, absence and/or delay of information regarding valuations and pricing, complex tax structures and delays in tax reporting, less regulation and higher fees than mutual funds and risks associated with the operations, personnel and processes of the advisor. **Master Limited Partnerships** (MLPs) are limited partnerships or limited liability companies that are taxed as partnerships and whose interests (limited partnership units or limited liability company units) are traded on securities exchanges like shares of common stock. Currently, most MLPs operate in the energy, natural resources or real estate sectors. Investments in MLP interests are subject to the risks generally applicable to companies in the energy and natural resources sectors, including commodity pricing risk, supply and demand risk, depletion risk and exploration risk; and MLP interests in the real estate sector are subject to special risks, including interest rate and property value fluctuations, as well as risks related to general and economic conditions. Because of their narrow focus, MLPs maintain exposure to price volatility of commodities and/or underlying assets and tend to be more volatile than investments that diversify across many sectors and companies. MLPs are also subject to additional risks including: investors having limited control and rights to vote on matters affecting the MLP, limited access to capital, cash flow risk, lack of liquidity, dilution risk, conflict of interests, and limited call rights related to acquisitions.

**Mortgage backed securities** also involve prepayment risk, in that faster or slower prepayments than expected on underlying mortgage loans can dramatically alter the yield-to-maturity of a mortgage-backed security and prepayment risk includes the possibility that a fund may invest the proceeds at generally lower interest rates.

**Tax managed funds** may not meet their objective of being tax-efficient.

**Real estate** investments are subject to special risks, including interest rate and property value fluctuations, as well as risks related to general and economic conditions. **High yield** fixed income securities, also known as "junk bonds", are considered speculative, involve greater risk of default and tend to be more volatile than investment grade fixed income securities.

Credit quality is a measure of a bond issuer's creditworthiness, or ability to repay interest and principal to bondholders in a timely manner. The credit ratings shown are based on security rating as provided by Standard & Poor's, Moody's and/or Fitch, as applicable. Credit ratings are issued by the rating agencies for the underlying securities in the fund and not the fund itself, and the credit quality of the securities in the fund does not represent the stability or safety of the fund. Credit ratings shown range from AAA, being the highest, to D, being the lowest based on S&P and Fitch's classification (the equivalent of Aaa and C, respectively, by Moody(s). Ratings of BBB or higher by S&P and Fitch (Baa or higher by Moody's) are considered to be investment grade-quality securities. If two or more of the agencies have assigned different ratings to a security, the highest rating is applied. Securities that are not rated by all three agencies are listed as "NR".

"**Alpha tilt strategies** comprise a core holding of stocks that mimic a benchmark type index such as the S&P 500 to which additional securities are added to help tilt the fund toward potentially outperforming the market in an effort to enhance overall investment returns. Tilt strategies are subject to significant timing risk and could potentially expose investors to extended periods of underperformance."

**Custom Account Index:** The Custom Account Index is an investment benchmark based on your historical

target allocations and/or manager selection that you may use to evaluate the performance of your account. The Custom Account index does take into consideration certain changes that may have occurred in your portfolio since the inception of your account, i.e., asset class and/or manager changes. However, in some circumstances, it may not be an appropriate benchmark for use with your specific account composition. For detailed report of the historical composition of this blend please contact your Financial Advisor.

## Peer Groups

Peer Groups are a collection of similar investment strategies that essentially group investment products that share the same investment approach. Peer Groups are used for comparison purposes to compare and illustrate a client's investment portfolio versus its peer across various quantitative metrics like performance and risk. Peer Group comparison is conceptually another form of benchmark comparison whereby the actual investment can be ranked versus its peer across various quantitative metrics.

All Peer Group data are provided by Investment Metrics, LLC.

The URL below provides all the definitions and methodology about the various Peer Groups

<https://www.invmetrics.com/style-peer-groups>

## Peer Group Ranking Methodology

A percentile rank denotes the value of a product in which a certain percent of observations fall within a peer group. The range of percentile rankings is between 1 and 100, where 1 represents a high statistical value and 100 represents a low statistical value.

The 30th percentile, for example, is the value in which 30% of the highest observations may be found, the 65th percentile is the value in which 65% of the highest observations may be found, and so on.

Percentile rankings are calculated based on a normalized distribution ranging from 1 to 100 for all products in each peer group, where a ranking of 1 denotes a high statistical value and a ranking of 100 denotes a low statistical value. It is important to note that the same ranking methodology applies to all statistics, implying that a ranking of 1 will always mean highest value across all statistics.

For example, consider a risk/return assessment using standard deviation as a measure of risk. A percentile ranking equal to 1 for return denotes highest return, whereas a percentile ranking of 1 for standard deviation denotes highest risk among peers.

In addition, values may be used to demonstrate quartile rankings. For example, the third quartile is also known as the 75th percentile, and the median is the 50th percentile.

## Alternatives

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Alternatives may be either traditional alternative investment vehicles or non-traditional alternative strategy vehicles. Traditional alternative investment vehicles may include, but are not limited to, Hedge Funds, Fund of Funds (both registered and unregistered), Exchange Funds, Private Equity Funds, Private Credit Funds, Real Estate Funds, and Managed Futures Funds. Non-traditional alternative strategy vehicles may include, but are not limited to, Open or Closed End Mutual Funds, Exchange-Traded and Closed-End Funds, Unit Investment Trusts, exchange listed Real Estate Investment Trusts (REITs), and Master Limited Partnerships (MLPs). These non-traditional alternative strategy vehicles also seek alternative-like exposure but have significant differences from traditional alternative investment vehicles. Non-traditional alternative strategy vehicles may behave like, have characteristics of, or employ various investment strategies and techniques for both hedging and more speculative purposes such as short-selling, leverage, derivatives, and options, which can increase volatility and the risk of investment loss. Characteristics such as correlation to traditional markets, investment strategy, and market sector exposure can play a role in the classification of a traditional security being classified as alternative.

Traditional alternative investment vehicles are illiquid and usually are not valued daily. The estimated valuation provided will be as of the most recent date available and will be included in summaries of your assets. Such valuation may not be the most recent provided by the fund in which you are invested. No representation is made that the valuation is a market value or that the interest could be liquidated at this value. We are not required to take any action with respect to your investment unless valid instructions are received from you in a timely manner. Some positions reflected herein may not represent interests in the fund, but rather redemption proceeds withheld by the issuer pending final valuations which are not subject to the investment performance of the fund and may or may not accrue interest for the length of the withholding. Morgan Stanley does not engage in an independent valuation of your alternative investment assets. Morgan Stanley provides periodic information to you including the market value of an alternative investment vehicle based on information received from the management entity of the alternative investment vehicle or another service provider.

Traditional alternative investment vehicles often are speculative and include a high degree of risk. Investors should carefully review and consider potential risks before investing. Certain of these risks may include but are not limited to: • Loss of all or a substantial portion of the investment due to leveraging, short-selling, or other speculative practices; • Lack of liquidity in that there may be no secondary market for a fund; • Volatility of returns; • Restrictions on transferring interests in a fund; • Potential lack of diversification and resulting higher risk due to concentration of trading authority when a single advisor is utilized; • Absence of information regarding valuations and pricing; • Complex tax structures and delays in tax reporting; • Less regulation and higher fees than mutual funds; and • Risks associated with the operations, personnel, and processes of the manager. As a diversified global financial services firm, Morgan Stanley Wealth Management engages in a broad spectrum of activities including financial advisory services, investment management activities, sponsoring and managing private investment funds, engaging in broker-

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Indices are unmanaged and investors cannot directly invest in them. Composite index results are shown for illustrative purposes and do not represent the performance of a specific investment. Past performance is no guarantee of future results. Actual results may vary. Diversification does not assure a profit or protect against loss in a declining market. Any performance or related information presented has not been adjusted to reflect the impact of the additional fees paid to a placement agent by an investor (for Morgan Stanley placement clients, a one-time upfront Placement Fee of up to 3%, and for Morgan Stanley investment advisory clients, an annual advisory fee of up to 2.5%), which would result in a substantial reduction in the returns if such fees were incorporated.

For most investment advisory clients, the program account will be charged an asset-based wrap fee every quarter ("the Fee"). In general, the Fee covers investment advisory services and reporting. In addition to the Fee, clients will pay the fees and expenses of any funds in which their account is invested. Fund fees and expenses are charged directly to the pool of assets the fund invests in and impact the valuations. Clients must understand that these fees and expenses are an additional cost and will not be included in the Fee amount in the account statements.

As fees are deducted quarterly, the compounding effect will be to increase the impact of the fees by an amount directly related to the gross account performance. For example, for an account with an initial value of \$100,000 and a 2.5% annual fee, if the gross performance is 5% per year over a three year period, the compounding effect of the fees will result in a net annual compound rate of return of approximately 2.40% per year over a three year period, and the total value of the client's portfolio at the end of the three year period would be approximately \$115,762.50 without the fees and \$107,372.63 with the fees. Please see the applicable Morgan Stanley Smith Barney LLC Form ADV Part 2A for more information including a description of the fee schedule. It is available at [www.morganstanley.com/ADV](http://www.morganstanley.com/ADV) <<http://www.morganstanley.com/ADV>> or from your Financial Advisor/Private Wealth Advisor.

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### **Money Market Funds**

You could lose money in Money Market Funds. Although MMFs classified as government funds (i.e., MMFs that invest 99.5% of total assets in cash and/or securities backed by the U.S government) and retail funds (i.e., MMFs open to natural person investors only) seek to preserve value at \$1.00 per share, they cannot guarantee they will do so. The price of other MMFs will fluctuate and when you sell shares they may be worth more or less than originally paid. MMFs may impose a fee upon sale or temporarily suspend sales if liquidity falls below required minimums. During suspensions, shares would not be available for purchases, withdrawals, check writing or ATM debits. A MMF investment is not insured or guaranteed by

the Federal Deposit Insurance Corporation or other government agency.