



STATE OF VERMONT
VERMONT PENSION INVESTMENT COMMISSION

TO: **House Committee on Government Operations**
Representative Sarah Copeland Hanzas, Chair

Senate Committee on Government Operations
Senator Jeanette K. White, Chair

FROM: **Vermont Pension Investment Commission**
Thomas J. Golonka, Chair
Kimberly G. Gleason, Vice-Chair

DATE: January 10, 2022

SUBJECT: Report Act 75 – Relating Membership and Duties of the VPIC

In 2021, the General Assembly of the State of Vermont enacted Act 75, an act relating to the membership and duties of the Vermont Pension Investment Commission and the creation of the Pension Benefits, Design, and Funding Task Force. Act 75 requires the Vermont Pension Investment Commission (VPIC) to submit a comprehensive report to the House and Senate Committees on Government Operations on or before January 15, 2022 and we are happy to hereby submit that report. We look forward to discussing the information in this report with your Committees.

Fiscal Year 2021 Investment Performance

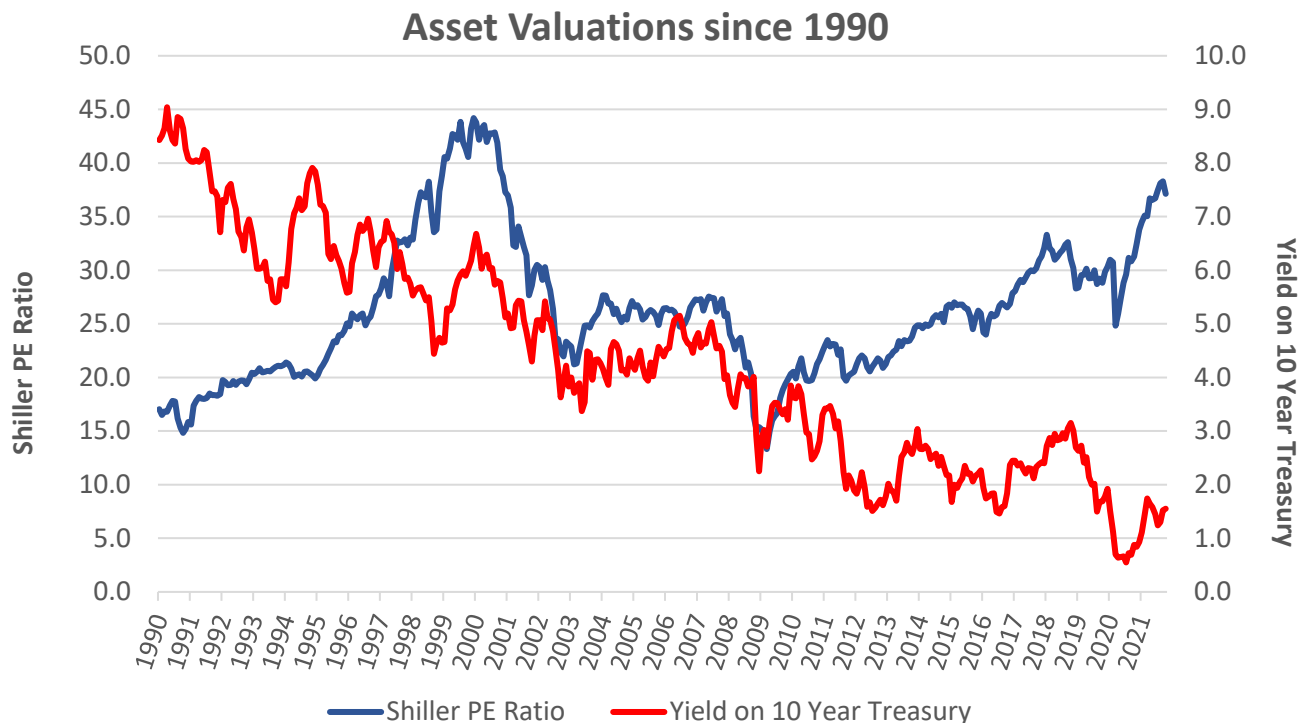
FY21's investment performance is detailed in Appendix A. As outlined on page 17 of Appendix A, the combined assets of the three statewide pension plans generated a 24.62% return net of investment management fees for the fiscal year ended June 30, 2021 (FY21). This strong performance was welcomed from an actuarial standpoint as it far exceeded the 7.0% assumed rate of return and more than offset all investment experience losses over the prior 10 years. As outlined below, though, we do not expect such strong returns to continue as valuations of equity and debt investments are unusually high relative to history and relative valuation tends to be a powerful driver of future investment returns. High valuations tend to be followed by periods of lower investment returns and conversely, low valuations tend to be followed by periods of higher investment performance. Indeed, our consultant's set of capital market assumptions has been lowered across the board – an industry wide trend. This is outlined on page 7 of Appendix B.

Pension Plan Funding Overview

As outlined on the chart in Appendix C, FY21’s strong investment performance contributed to increases in each of three statewide pension plan’s actuarial funded ratio. Further, the use of five-year smoothing leaves four-fifths of the FY21’s excess returns to offset any potential actuarial losses over the next four years. In the case of VSTRS and VMERS, FY21’s smoothed actuarial investment gains more than offset net demographic losses. In the case of VSERS, demographic losses exceeded the investment gain by \$14.5 million.

Actuarial Assumed Rate of Return and the Investment Environment

The actuarial valuations for both FY20 and FY21 reflect a 7.0% actuarial assumed rate of return, though actual investment returns were below 7% in FY20 and well above in FY21. As we think about future investment returns, we do so with an eye on current equity valuations and interest rates. As outlined in the chart below, both the Shiller Cyclically Adjusted Price/Earnings Ratio and the yield on the 10-year Treasury indicate that the valuations of both equity and debt investments are high relative to history. Further detail on current valuations relative to history can be seen on pages 5-7 of Appendix A. These metrics carry little predictive value for actual returns over the next several years. However, they have more accurately predicted lower investment returns over longer periods as the equity and fixed income markets return to more normal valuations. This implies that accurately forecasting when and precisely how such metrics revert to lower levels is very difficult but leads us to expect future returns to be lower than those of the recent past. That, in turn, implies continued downward pressure on the actuarial assumed rate of return.



It is important to keep in mind that we are not designing our strategic asset allocation targets with the sole objective of generating a return equal to the actuarial assumed rate of return. In contrast, we design the strategic asset allocation targets to maximize investment returns *within prudent levels of risk and liquidity*. Our duty is to strike a balance between the pursuit of return against the protection of the pension plans' assets. The actuarial assumed rate of return is informed by actual and expected future returns but is separate and distinct from the investment process. Its chief function is to set a prudent level of contributions and includes many other inputs such as actuarial valuations, experience studies, and asset/liability studies. Ultimately, the actuary recommends the assumed rate of return and the inflation assumption. Prior to Act 75 of 2021, the boards of the three statewide pension plans and VPIC had to agree to change these assumptions. Act 75 of 2021 tasked VPIC with determining them and we plan to conduct a comprehensive asset/liability study as of June 30, 2022, and to collaborate with the actuary to reevaluate as appropriate.

While our current long-term capital market assumptions do anticipate returns lower than 7.0%, we caution that it is nearly impossible to accurately forecast near-term investment returns given their high variability year to year. Unlike the volatility in our actual investment returns over time, changes to the actuarial assumed rate of return trend much more slowly. This allows for some measure of predictability in state and local government budgets for funding the ADEC (actuarially determined employer contribution). If our assumptions prove to be either too optimistic or too pessimistic, annual actuarial valuations effectively reset funding requirements to assure the pursuit of intergenerational equity in bearing the cost of public services.

Asset Allocation Study and Portfolio Design

Our latest asset allocation study report can be seen in Appendix B.

Annually, Segal, the actuary for the three statewide pension plans tabulates demographic data for all members and retirees and calculates a pension liability which represents the present value of the obligation to provide a defined benefit pension plan to state employees, teachers, and municipal employees in Vermont. The actuary also tabulates the assets on hand to fund these pension liabilities and, ultimately, an unfunded actuarial liability (UAL). The UAL represents the shortfall between assets on hand and the benefits due to the members and beneficiaries of the plans that must be made up by current and future contributions from both members and their employers and future investment returns.

To illustrate the importance of investment earnings in funding public sector defined benefit plans, we looked at funding sources for nationwide public pensions from 1998-2019 and found the following breakdown:

Investment earnings	61%
Employer contributions	27%
Employee contributions	12%

While obviously contributions create the corpus on which investment returns can be generated and given that over time investment earnings on that corpus is the largest source of pension funding, it is essential that we have an investment program that is strategically aligned with the pension liabilities it is designed to fund. Annually, VPIC conducts an asset allocation study to assure that

the portfolio is strategically aligned with the actuarial characteristics of the three statewide pension plans. This incorporates a thorough analysis of each Plan's need to generate strong long-term returns to fund long-term pension liabilities at the lowest cost to taxpayers possible, to maintain sufficient liquidity to fund current pension payments to retirees, and to balance these factors at prudent risk levels. The actuarial valuations and experience studies are important inputs to portfolio design, and they help inform prudent limits on illiquidity and risk, both of which materially influence investment returns.

VPIC evaluates these factors among three broad classes of investments: growth assets, downturn-hedging assets, and inflation-hedging assets¹. The portfolio design process begins with a high-level analysis of each Plan's funding and cash flow metrics. Understanding these characteristics is essential to fully understand each Plan's tolerance for illiquidity, which we believe adds to long-term investment returns.

Working with its staff and investment consultant, VPIC examines a variety of model efficient investment portfolios with varying levels of liquidity and risk. Within each portfolio, VPIC assigns expected returns, risk (standard deviation), and correlation to each component and runs *Monte Carlo* analyses. Such analyses show VPIC how each model portfolio is expected to perform on several metrics over the long-run and give VPIC important insights into expected investment return, cash flows, funded status, risk levels, and required employer (i.e., taxpayer) contributions.

It is important to note that VPIC's *Monte Carlo* simulations show a normal distribution of returns and factors. We all know, however, that investment outcomes are not always normally distributed. In fact, they are powerfully affected by events like periods of high inflation, falling interest rates, high earnings growth, low earnings growth, and other abnormal trends. These trends can be amplified by monetary and fiscal policies. Further, more significant market disruptions do occur periodically (e.g., tech bubble, great financial crisis, Covid-19 equity selloff). To better understand the impact of such events, VPIC conducts additional scenario stress tests on the portfolios under consideration. The intent of these analyses is not to forecast any certain future trend; rather, it is to better understand the tradeoffs among alternative portfolios during different investment scenarios and market dislocations.

Capital market assumptions determine the portfolio's expected return over the long run, but do not represent VPIC's budgeted return

Capital market assumptions are long term forecasts of investment return and risk for each investment class, as well as forecasts of correlation with other investment classes. These factors drive the *Monte Carlo* risk modeling described above. Many investment managers and consultants release their capital market assumptions on an annual basis, with interim updates if market volatility warrants. Such assumptions are specific to each firm's market outlook and, when applied to a portfolio's asset allocation targets, show the expected range of returns that will result if the capital market assumptions come to fruition.

¹ Detailed on page 110 of Appendix A.

VPIC's current target portfolio, using its current consultant's (RVK) capital market assumptions, is expected to generate a long-term compound return of 5.4%, again, if all the capital market assumptions in the model come to fruition. This represents a decline in expected returns from the prior year's 6.5%. As outlined on page 7 of Appendix B, RVK lowered their 2021 capital market assumptions for most asset classes. While there is some dispersion among the different sources of capital market assumptions, which have consistently trended lower over the past 20 years across the institutional investment profession, they are reflective of high valuations and low interest rates.

VPIC considers actuarial recommendations and capital market assumptions in setting the actuarial assumed rate of return and we expect to see continued downward pressure

Nationwide, we have seen a gradual decline in actuarial assumed rates of return for public pension plans. From 2001-2021, the average U.S. public pension plan assumed rate of return declined from 8.05% to 7.03%². As of October 2021, the median actuarial assumed rate of return (AROR) for U.S. public sector defined benefit plans was 7.0%, after an increasing number of public funds reduced their AROR below 7.0%³. Because the assumed rate of return is used to discount pension liabilities and determine the actuarially determined employer contribution, a declining rate drives liabilities and employer contributions higher, all else being equal.

In Vermont, the process of setting the actuarial assumed rate of return incorporates input from the retirement systems' actuary (i.e., actuarial valuations, actuarial experience studies, and a formal recommendation). Historically, to effect a change to the rate, the three statewide pension plan boards and VPIC had to convene jointly to receive the actuary's analyses and recommendations, then vote separately on the recommendations. The rate could only be changed by a positive vote of all four bodies convened in a joint session. Act 75 of 2021 changed this process and placed responsibility for setting the actuarial assumed rate of return, as well as the inflation assumption and smoothing period, with the Vermont Pension Investment Commission. VPIC intends to conduct a comprehensive asset/liability study in conjunction with the actuarial valuations of the three statewide pension plans as of June 30, 2022. These studies should shed light on the actuarial assumptions now under VPIC's oversight. Given current levels of equity valuation and interest rates, we expect to see continued downward pressure on the actuarial assumed rate of return.

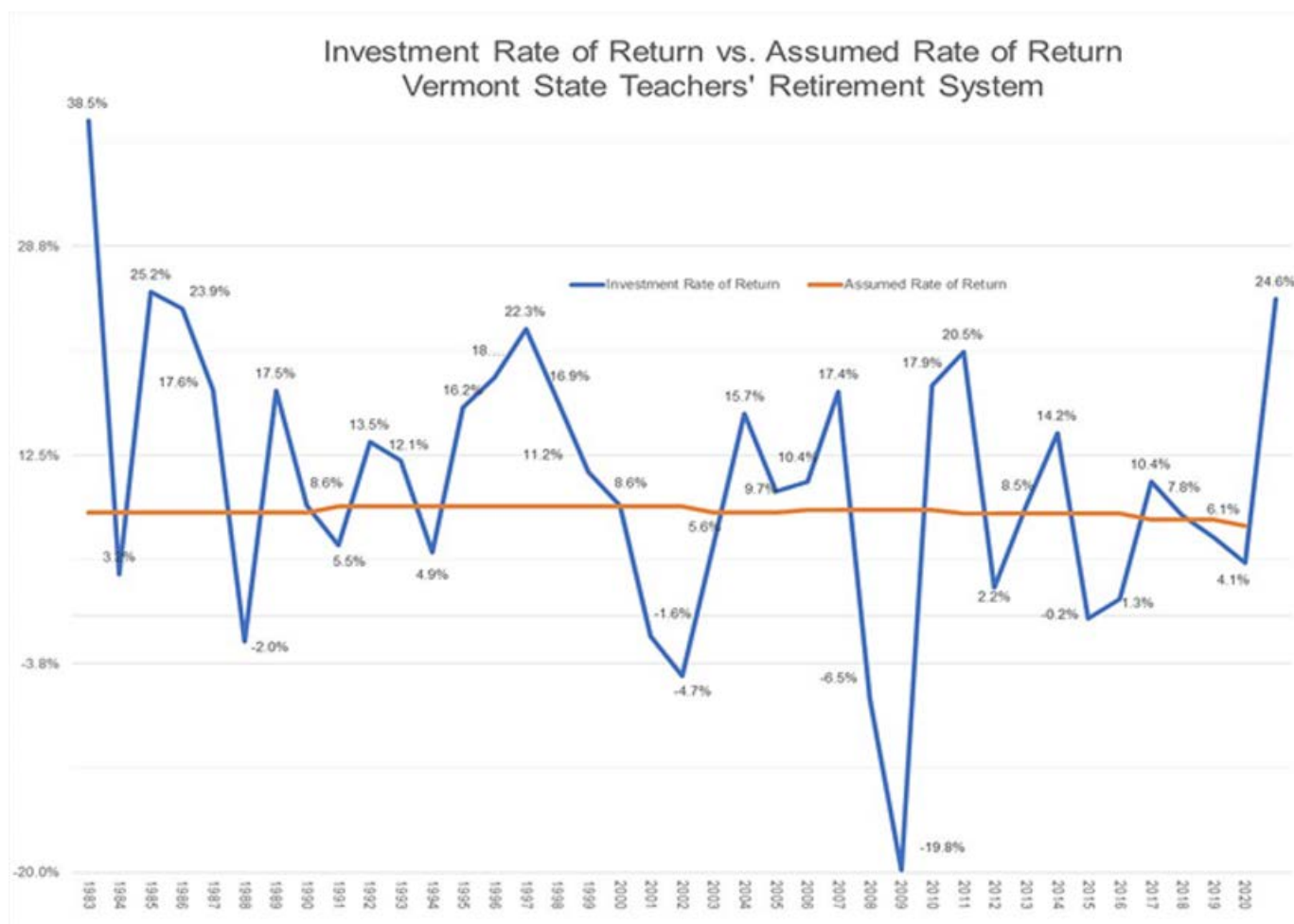
Recent market volatility highlights returns' end-point sensitivity

VPIC does not view its capital market assumptions, expected rate of return, or the actuarial assumed rate of return as accurate forecasts of future returns, especially over short periods of time. Instead, it uses these factors to better understand the tradeoffs among a variety of model risk efficient portfolios over varying capital market scenarios. Indeed, a look at past returns reveals that, even over short periods of time, actual portfolio results can vary significantly and rarely equate with expectations. The chart below shows actual VPIC returns versus the actuarial assumed rate of return over time.⁴ To highlight this point, consider the 4% return for fiscal year ended June 30, 2020.

² [Equable "Assumed Rate of Return v. Interest Rates, 2001-2021"](#)

³ [NASRA "Change in Median and Average Public Pension Plan Investment Return Assumption"](#)

⁴ Office of the Vermont State Treasurer



While above the median of other public plans, it fell short of the 7.0% actuarial assumption. One year later, VPIC's portfolio generated a one-year return of nearly 25%, well above the 7.0% actuarial assumption.

To account for these differences between actual and expected performance, the actuary uses a variety of smoothing techniques to minimize volatility in employer funding requirements and to assure intergenerational equity.

VPIC Strategic Investment Themes

We have embraced several overarching themes in managing the investments of the three statewide pension plans, as summarized below:

Simplify: Simplifying the construction of the VPIC portfolios allows for stronger oversight by a lean investment team.

Reduce fees: Outperforming passive benchmarks consistently is difficult. Because most passive indices are investable at a very low fee, we set the bar high for active managers and their higher

fees and focus active management largely where passive investment is not possible or where the probability of commensurate returns for active management risk is highest.

Underwrite everything: Understanding each investment manager’s strategy, holdings, and role in the portfolio is essential for a prudent level of oversight by staff and VPIC. This theme resulted in the avoidance of an \$80 million loss from the termination of a complex structured product.

Illiquidity premium increases returns: Illiquid assets (i.e., private equity, private credit, and non-core real estate) have a proven ability to outperform their public market equivalent benchmarks. Accordingly, we have targeted 24% of the fund to illiquid growth assets and are systematically building them out over a prudent number of vintage years to ensure diversification.

Liquidity needs must be fully understood and assured: While illiquid assets tend to generate higher returns than their liquid counterparts, building a prudently diversified portfolio is not simply adding higher-returning assets and removing lower-return assets. Because illiquid assets cannot be readily monetized to pay retirement benefits, their use is limited by the need for liquidity. Having a full understanding of current liquidity needs and a source for liquidity, especially during economic downturns, is essential to avoid selling discounted assets and locking in losses.

Net returns must justify all investment manager fees: While we can and do invest in fully liquid stock and bond index funds for a very low fee, we do utilize active managers we believe have an ability to consistency add value in excess of their fees. To that end, we analyze all investment managers’ performance *net of all fees*, and we have a formalized process for dealing with those that fall short of expectations.

Independent third-party report on the operations of the Commission

Pursuant to Sec 3 of Act 75, the Commission engaged RVK to conduct a governance and operations review and formulate recommendations on best practices and necessary actions to transfer the Commission to an independent entity. Their report is [available at this link](#). We direct your attention specifically to their 14 recommendations on pages 7 - 9 of that report⁵. These recommendations reveal several high-level themes and highlight the importance of VPIC’s autonomy and minimizing the influence of political and electoral issues of the moment on the investment of pension plan assets held in trust for the sole benefit of plan participants. The ability for VPIC to act with substantial independence and exclusive focus on the investment program and the funding of pension benefits is almost certain to be most valuable to the plans’ participants and the State during times of market and economic stress.

Conclusion and recommendations

Managing the investment portfolios of the three statewide pension plans is an exercise in balancing risk and liquidity with the need for higher investment returns as prudence allows. Instead of just seeking to maximize investment returns, we are tasked with strategically aligning the portfolios

⁵ [“Vermont Pension Investment Commission Governance and Investment Program Review Report” by RVK Investment Program Review Team, January 6, 2022](#)

with the pension fund's demographic and financial characteristics. As fiduciaries, our goal is to maximize long-term investment returns within acceptable levels of risk and liquidity. To that end, we have engaged best-in-class investment advisors to work with our professional staff to prudently oversee these important assets for the exclusive purpose of providing retirement benefits to Vermont teachers, state employees, and municipal employees, at best cost to Vermont taxpayers.

VPIC's responsibility to prudently oversee the assets of the three statewide pension plans is not an administrative function. In contrast, it is a professional responsibility that is governed by the Commissioners' fiduciary duty to the members and beneficiaries of the pension plans. While assuring a prudent level of administrative spending is certainly important, it is far overshadowed by the financial consequences of VPIC's statutory responsibility for developing an investment strategy that maximizes investment returns within prudent levels of risk and liquidity and the newly assigned responsibility for accurately setting the actuarial assumed rate of return to assure intergenerational equity. Failure to use all reasonable resources at hand to execute these two significant responsibilities risks incurring a much greater cost than the level of administrative spending needed to execute the investment program.

To aid us in carrying out our responsibilities as Commissioners, we respectfully ask you to consider the following recommendations:

1. Clarify VPIC's autonomy in determining its administrative budget, staffing, and compensation, as outlined in [RVK's report](#). We do not envision this being a blank check; rather, it should require full transparency and accountability to the legislature and Governor. Act 75's creation of the Joint Public Pension Oversight Committee, the Governor's right to appoint two financial expert Commissioners, and the appointment of Commissioners by the Vermont League of Cities and Towns and the Vermont School Boards Association could facilitate ongoing VPIC oversight and assure its prudent investment of statewide pension plan assets.
2. Remove Sec. 522 (h) (i) (1) altogether. This section states "the Commission shall have the administrative and technical support of the Office of the State Treasurer". We believe this item is best handled by a memorandum of agreement between VPIC and the Treasurer that can evolve over time as needed.
3. Clarify Section 523 (h) (2) to allow us to make our annual reports available on our website, [VPIC.Vermont.Gov](#) instead of mailing them. This would provide instant access not only to beneficiaries, but to the public at large and save us the expenses associated with mailing 60,000 postcards.

Report Act 75 – Relating Membership and Duties of the VPIC

We thank the legislature and the Governor for recognizing the importance of VPIC's independence and autonomy. We believe Act 75 positions us well for future oversight of the assets of the three statewide pension plans.

We look forward to discussing our first annual report with you and your colleagues at your convenience.

Sincerely,



Thomas J. Golonka, Chair



Kimberly G. Gleason, Vice Chair



STATE OF VERMONT
VERMONT PENSION INVESTMENT COMMISSION

Attachment A:

June 30, 2021 Investment

Performance Analysis Report



Quarterly Investment Performance Analysis

Vermont Pension Investment Committee

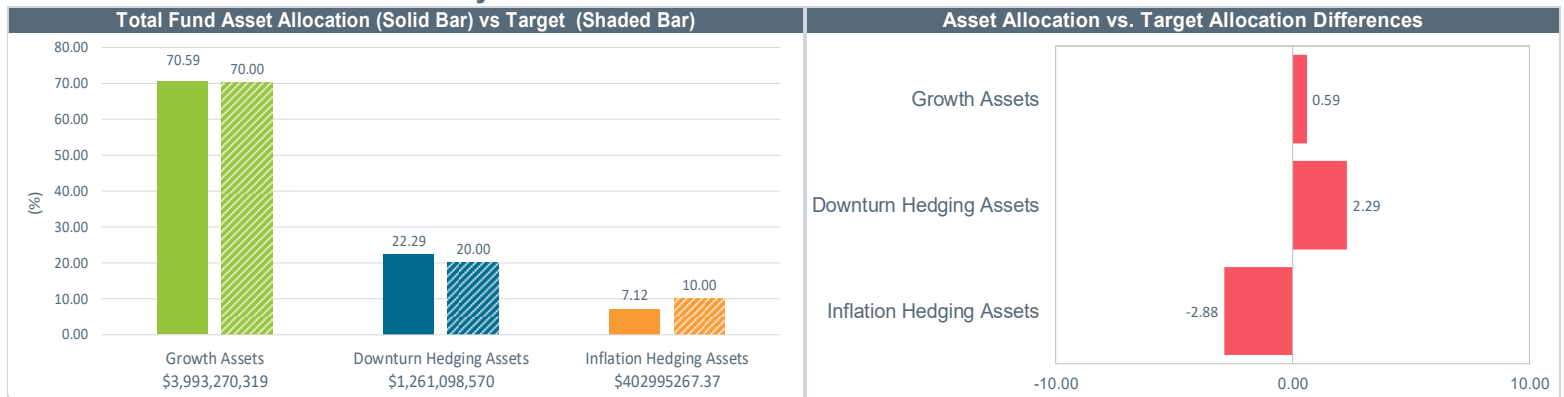
Period Ended: June 30, 2021



Vermont Pension Investment Committee

Total Fund Dashboard Summary

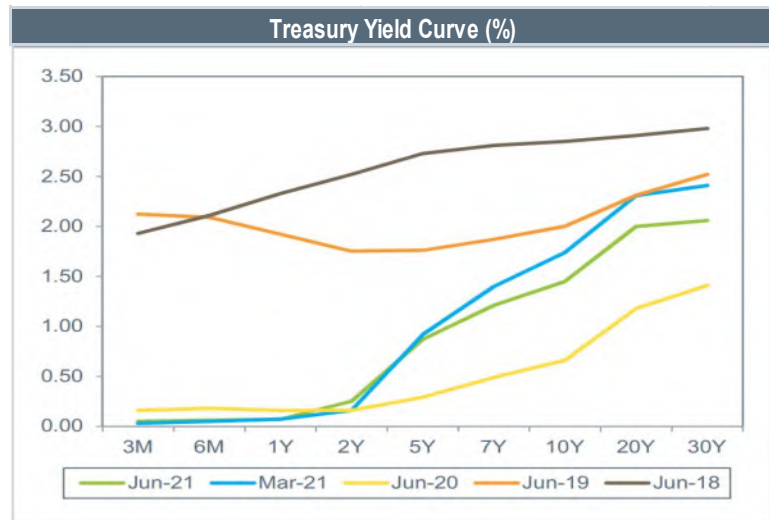
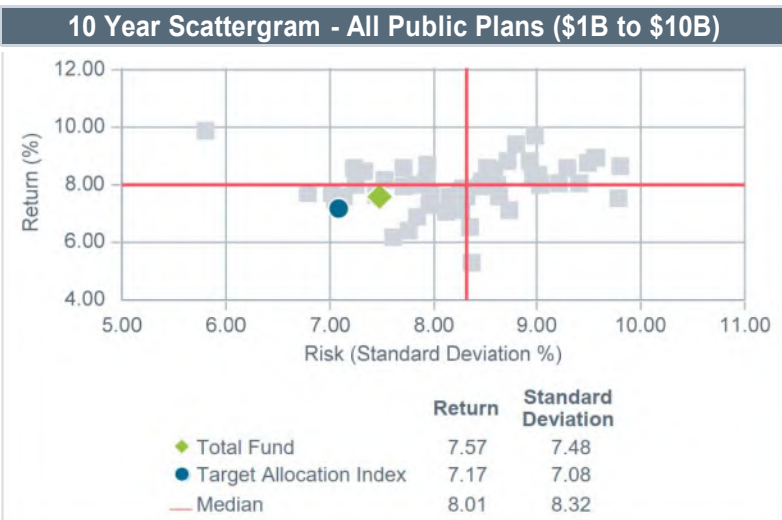
As of June 30, 2021



Schedule of Investable Assets						
Period Ending	Beginning Market Value	+ Net Cash Flow	+ Gain/Loss	=	Ending Market Value	% Return
Quarter	5,374,453,690	-56,484,369	339,394,835		5,657,364,156	6.33

Total Fund Performance										
	QTD	CYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Incep. Date
Total Fund	6.33	8.35	24.62	11.15	10.37	7.57	6.47	13.16	6.70	7/1/2005
Target Allocation Index	4.11	7.12	22.95	10.67	9.78	7.17	6.44	12.51	6.66	
Difference	2.22	1.23	1.67	0.48	0.59	0.40	0.03	0.65	0.04	

Performance by Allocation Bucket										
	QTD	CYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Incep. Date
Growth Assets	8.23	12.71	-	-	-	-	-	-	26.51	9/1/2020
MSCI ACW IM Index (USD) (Net)	7.18	12.68	40.94	14.24	14.55	9.90	7.74	16.25	26.33	
Difference	1.05	0.03	-	-	-	-	-	-	0.18	
Downturn Hedging Assets	1.90	-1.59	-	-	-	-	-	-	-0.83	9/1/2020
Bloomberg US Agg Bond Index	1.83	-1.61	-0.34	5.34	3.03	3.39	4.43	7.51	-1.00	
Difference	0.07	0.02	-	-	-	-	-	-	0.17	
Inflation Hedging Assets	2.14	0.48	-	-	-	-	-	-	0.79	9/1/2020
Consumer Price Index+2.5%	3.21	5.60	8.03	5.11	4.99	4.42	4.51	3.90	6.70	
Difference	-1.07	-5.12	-	-	-	-	-	-	-5.91	



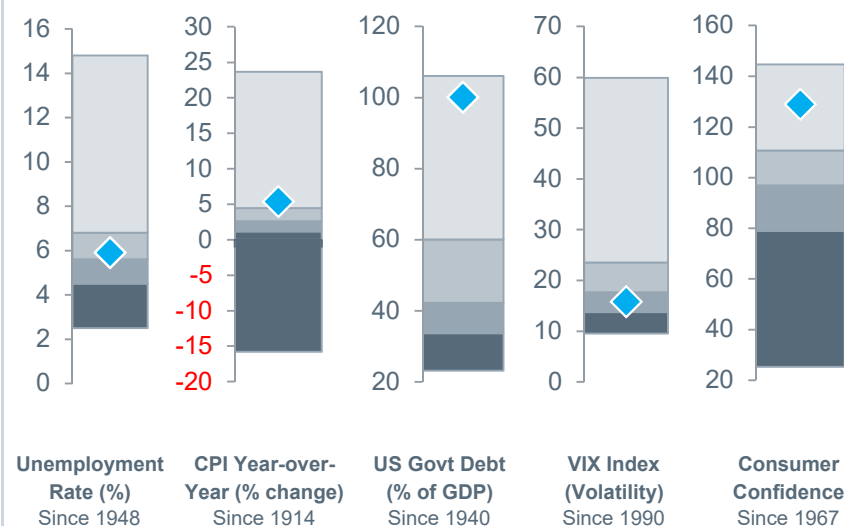
Performance is shown net of fees. Allocations may not sum up to 100% exactly due to rounding.



Second Quarter Economic Environment

Optimism stemming from reopening efforts, lifted mask mandates, and a proposed bipartisan infrastructure spending bill in the US was balanced with concerns regarding emerging variants of the coronavirus and increasing inflation. Global equity markets provided strong gains in Q2 led by the US equity market. Joining equity markets in positive territory were commodities and REITs. Aggregate fixed income markets generally trailed, although issues with longer dated maturities or that are inflation-linked fared better. Key inflation indicators experienced significant year-over-year increases in Q2, but many forecasters view these elevated levels as transitory. Currently, Fed officials are projecting two rate increases by the end of 2023 but remain sensitive to repeating the taper tantrum experienced in 2013. Inflation is also rising outside of the US which notably led both the Bank of Canada and Bank of England to announce the tapering of their bond purchasing programs. Progress in the US labor market recovery was mixed in Q2. The jobs reports in April and May failed to meet expectations, but the gains in the June report outpaced most forecasts. The unemployment rate remains above target levels, although the Congressional Budget Office projected that the rate would decline to 3.6% by the end of 2022. Overall, the economic recovery continues to advance, with the International Monetary Fund forecasting global GDP growth of 6.0% and 4.4% in 2021 and 2022, respectively.

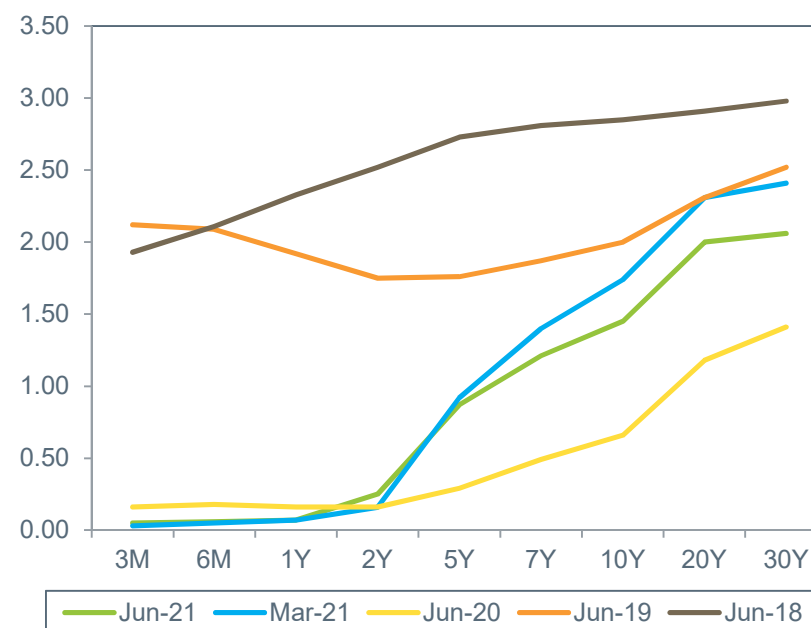
Key Economic Indicators

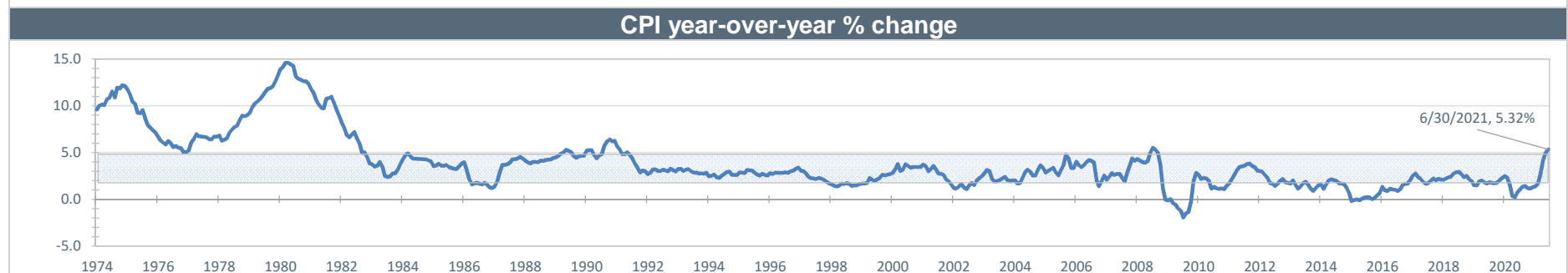
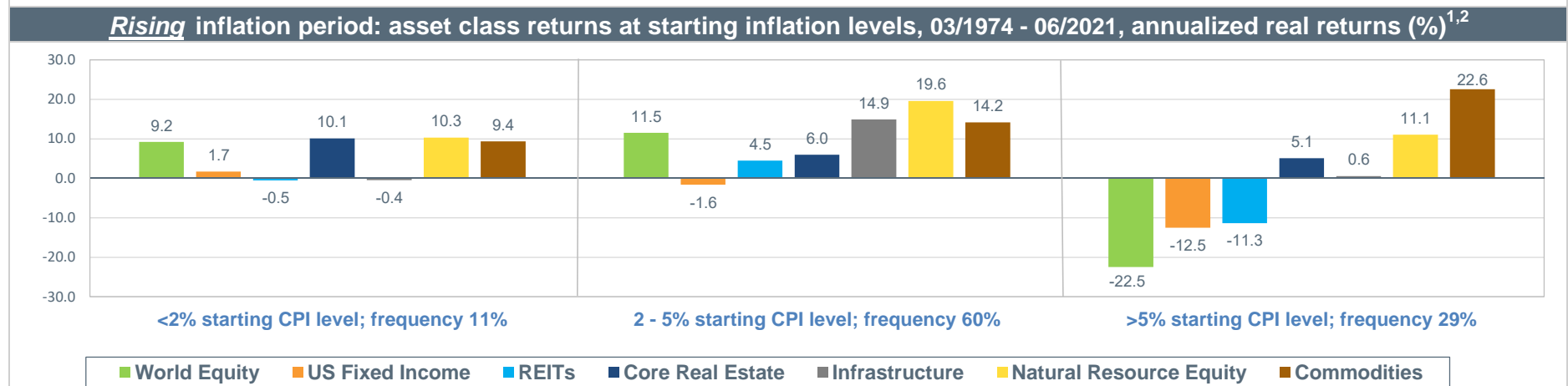
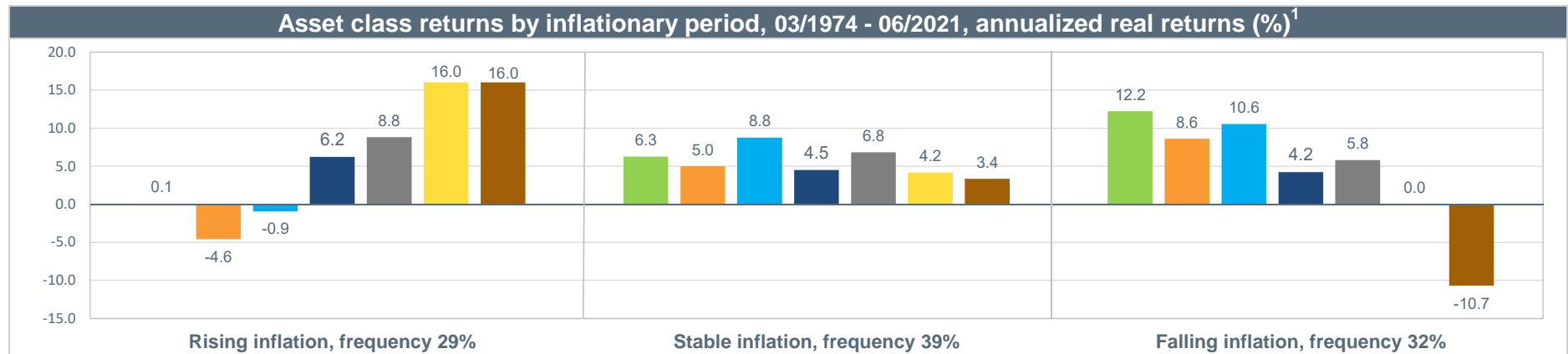


Economic Indicators	Jun-21	Mar-21	Jun-20	Jun-18	20 Yr
Federal Funds Rate (%)	0.08 ▲	0.06	0.08	1.91	1.37
Breakeven Infl. - 5 Yr (%)	2.50 ▼	2.60	1.17	2.08	1.83
Breakeven Infl. - 10 Yr (%)	2.34 ▼	2.37	1.34	2.13	2.02
CPI YoY (Headline) (%)	5.4 ▲	2.6	0.6	2.9	2.1
Unemployment Rate (%)	5.9 ▼	6.0	11.1	4.0	6.1
Real GDP YoY (%)	12.2 ▲	0.5	-9.1	3.3	1.8
PMI - Manufacturing	60.6 ▼	64.7	52.2	59.7	53.1
USD Total Wtd Idx	112.85 ▼	114.13	120.78	113.26	103.17
WTI Crude Oil per Barrel (\$)	73.5 ▲	59.2	39.3	74.2	63.2
Gold Spot per Oz (\$)	1,770 ▲	1,708	1,781	1,253	1,048

Market Performance (%)	QTD	CYTD	1 Yr	5 Yr	10 Yr
S&P 500 (Cap Wtd)	8.55	15.25	40.79	17.65	14.84
Russell 2000	4.29	17.54	62.03	16.47	12.34
MSCI EAFE (Net)	5.17	8.83	32.35	10.28	5.89
MSCI EAFE SC (Net)	4.34	9.04	40.98	12.03	8.38
MSCI Emg Mkts (Net)	5.05	7.45	40.90	13.03	4.29
Bloomberg US Agg Bond	1.83	-1.61	-0.34	3.03	3.39
ICE BofAML 3 Mo US T-Bill	0.00	0.02	0.09	1.17	0.63
NCREIF ODCE (Gross)	3.93	6.12	8.02	6.57	9.60
FTSE NAREIT Eq REIT (TR)	12.02	21.96	38.02	6.31	9.41
HFRI FOF Comp	2.87	4.95	18.29	6.12	3.85
Bloomberg Cmdty (TR)	13.30	21.15	45.61	2.40	-4.44

Treasury Yield Curve (%)





¹: Real returns are based on US CPI and are calculated using quarterly periodicity. A rising inflation period is defined as any quarter when Y/Y US CPI rose by 0.3% or more; a falling inflation period when Y/Y CPI fell by -0.3% or more in a quarter; the remaining periods are classified as stable inflation. Starting date for Core Real Estate is March 1978. ²: Starting CPI level is based on Y/Y US CPI in a given quarter; rising inflation period is defined in Footnote 1.

Data: World Equity: MSCI World Index (net). US Fixed Income: BB US Gov Bond Index through 12/31/1975, and BB US Agg Index thereafter. REIT: FTSE NAREIT Equity REITs Index through 12/31/1995, and MSCI World/Real Estate GR USD Index thereafter. Infrastructure: 50/50 Blend of Datastream World Pipelines and Datastream World Gas, Water & Multi-Utilities through 12/31/2001, and S&P Global Infrastructure thereafter. Natural Resource Equity: 50/50 Datastream World Oil & Gas and Datastream World Basic Materials through 11/30/2002, and S&P Global Natural Resources thereafter. Commodity: S&P GSCI through 12/31/1991, and BB Commodity Index thereafter.

Second Quarter Review

Broad Market

US equity markets built on the solid start to 2021, with strong performance in Q2 driven by continued monetary and fiscal stimulus, along with increasing vaccination rates leading to economic reopening efforts across the country. The S&P 500 Index finished Q2 up 8.5%. The forward P/E ratio of the S&P 500 Index continues to be above historical levels; however, it has seen a slight decrease relative to Q1.

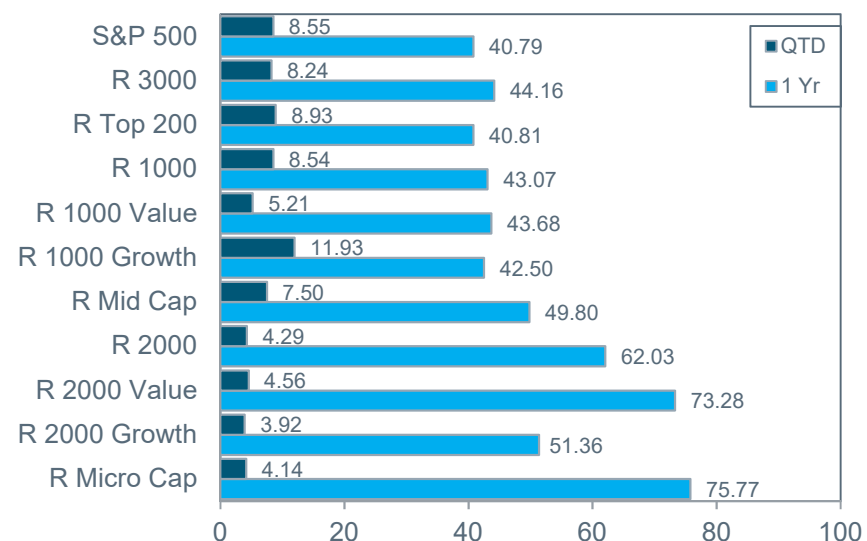
Market Cap

Large-cap stocks significantly outperformed their smaller-cap counterparts. The Russell 2000 Index returned 4.29% compared to 8.55% for the S&P 500.

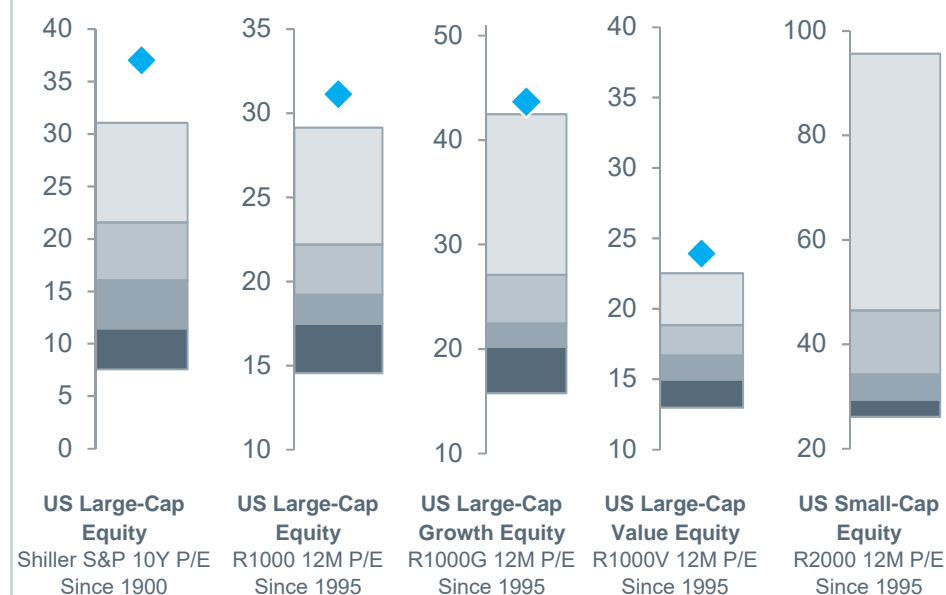
Style and Sector

Large- and mid-cap growth stocks outperformed value in Q2, however, value stocks continued to lead growth stocks in the small-cap space. The Russell 1000 Growth Index returned 11.9% versus 5.2% for the Russell 1000 Value Index.

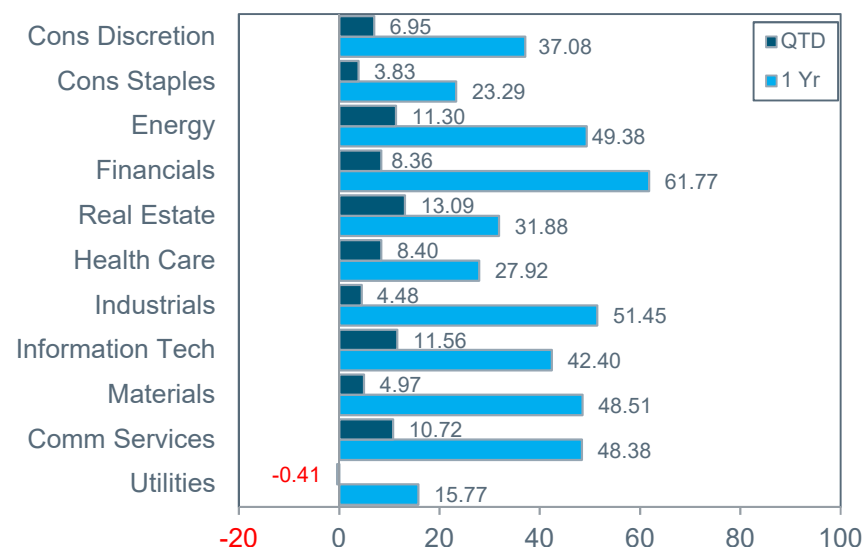
Style and Capitalization Market Performance (%)



Valuations



S&P 500 Index Sector Performance (%)



Valuation data courtesy of Bloomberg Professional Service and Robert J. Shiller, Irrational Exuberance, Second Edition.

P/E metrics shown represent the 5th through 95th percentiles to minimize the effect of outliers.

Current R2000 P/E is unavailable due to negative earnings per share as of 6/30/2021.

Second Quarter Review

Developed Markets

Developed international markets delivered positive returns in Q2, as growth outperformed value in a reversal of the value rally experienced in Q1, while small-cap stocks slightly trailed their large counterparts. Active management did well this quarter, with a majority of developed international equity managers beating their benchmarks in the large- and small-cap universes.

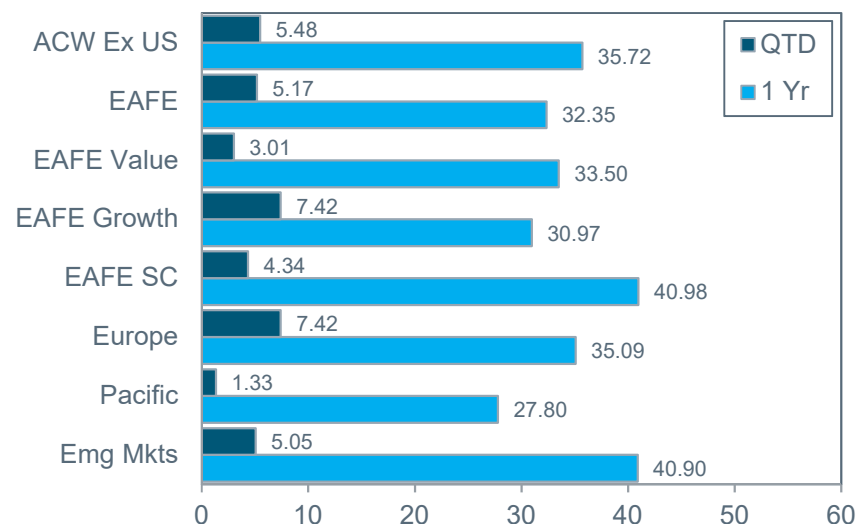
Emerging Markets

Emerging markets lagged developed markets in Q2 but still continued a trend of positive performance. Contrary to the reversal seen in developed markets, emerging market value stocks continued to outperform growth while small-cap stocks also continued their outperformance over large. Active manager results in emerging markets were mixed, with just under half outpacing their benchmarks for the quarter.

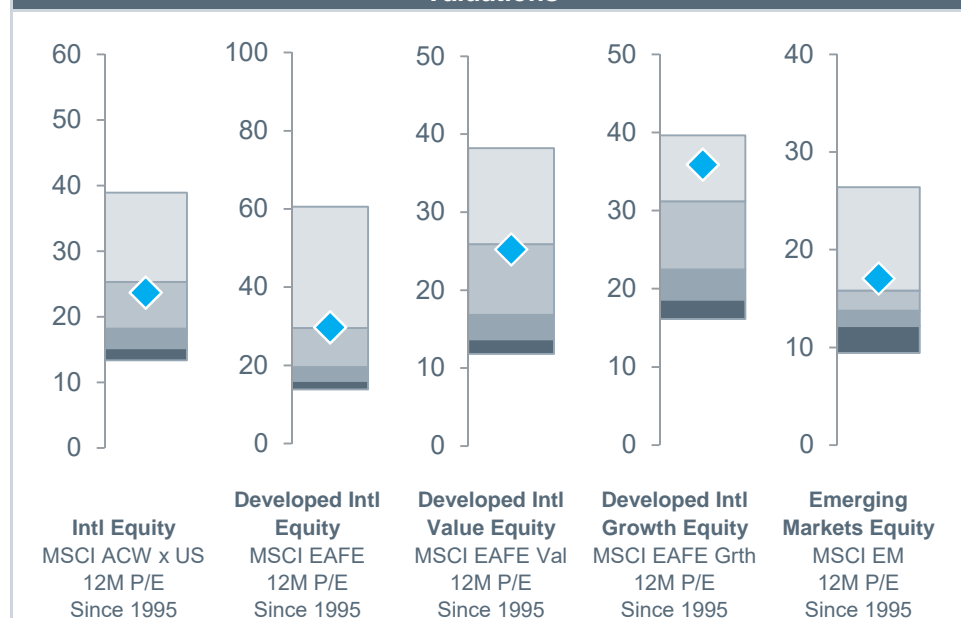
Market Cap & Style

In international markets, growth stocks outperformed value, while large-cap stocks outperformed small-cap. In emerging markets, value stocks outperformed growth, while small-cap stocks outperformed large-cap.

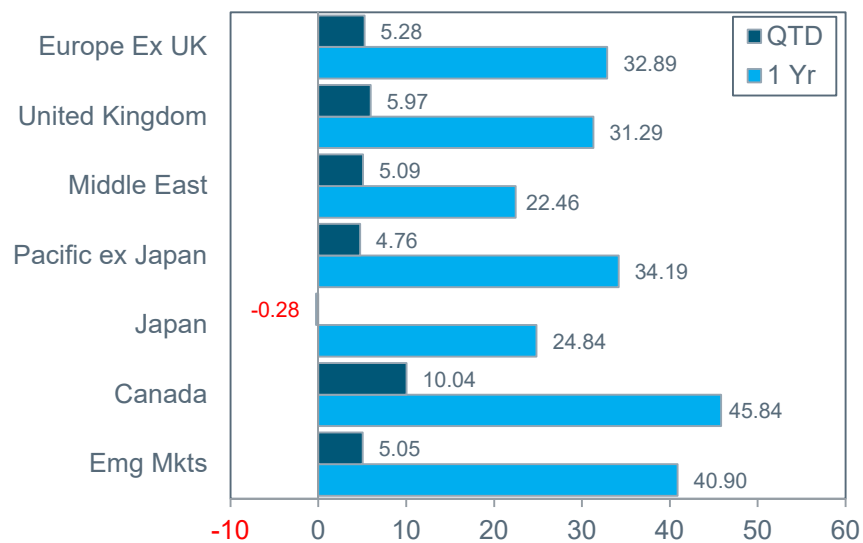
MSCI Style and Capitalization Market Performance (%)



Valuations



MSCI Region Performance (%)



Valuation data courtesy of Bloomberg Professional Service.

P/E metrics shown represent the 5th through 95th percentiles to minimize the effect of outliers.

All returns are shown net of foreign taxes on dividends.

Second Quarter Review

Broad Market

The Bloomberg US Aggregate Index returned 1.8% in Q2, partially retracing losses from Q1, while overall remaining down -1.6% YTD. Treasury yields fell back despite an easing of pandemic related restrictions which supported economic growth and rising inflationary pressures.

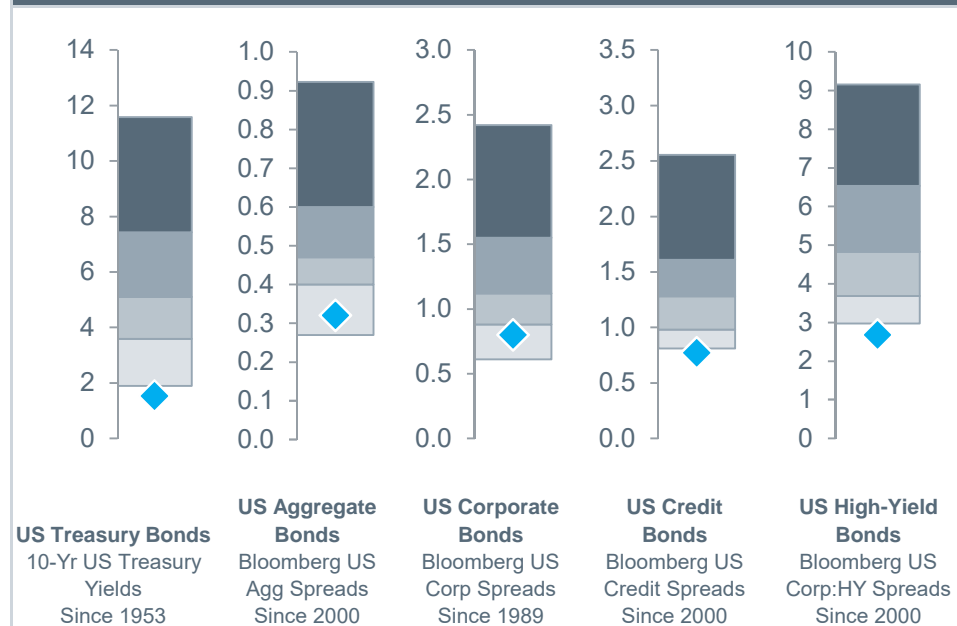
Credit Market

Lower quality investment grade debt rated BBB outperformed both the investment grade and high yield credit markets, a departure from the trend in past quarters of lowest quality credit outperforming higher grade debt. In Q2, the Bloomberg US Credit Index returned 3.3%, with the Bloomberg BBB Credit Index returning 3.7%.

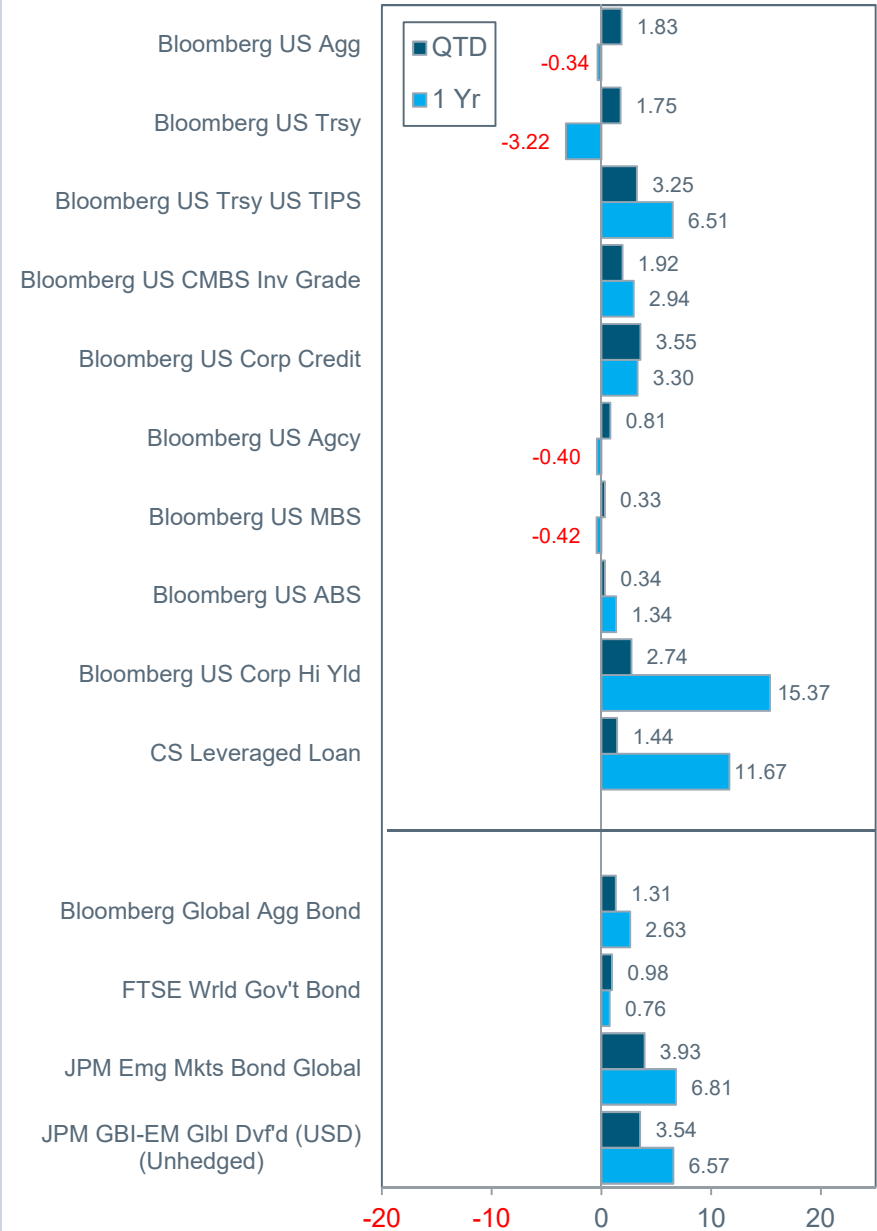
Emerging Market Debt

Emerging market debt saw improved performance compared to Q1 on the heels of falling US Treasury yields and rising commodity prices, contributing to broadly positive emerging market debt performance.

Valuations



Fixed Income Performance (%)



Valuation data courtesy of Bloomberg Professional Service.

Valuations shown represent the 5th through 95th percentiles to minimize the effect of outliers.

Second Quarter Review - Absolute Return

General Market - Hedge Funds

Diversified hedge funds posted another strong quarter, returning 4.0% and bringing YTD returns to 10.0% according to the HFRI Fund Weighted Composite Index. Heightened levels of activity across convertible bond issuance, IPOs, SPACs, and M&A provided fertile ground for event-driven funds, and equity beta tailwinds continued to add to returns in the hedged equity space. Event-driven strategies have outperformed relative value YTD, and directional strategies have outperformed low net exposure and market neutral approaches.

General Market - Global Tactical Asset Allocation (GTAA)

Global Tactical Asset Allocation strategies that RVK follows closely largely generated positive absolute returns in Q2, ranging from the low- to midsingle digits. Long-biased strategies produced mixed results versus a less diversified blended benchmark of 60% US equity and 40% US fixed income, which returned 5.8% in Q2. Generally, strategies that have maintained a value bias, especially within emerging markets, outperformed relative to peers.

Second Quarter Review - Real Assets

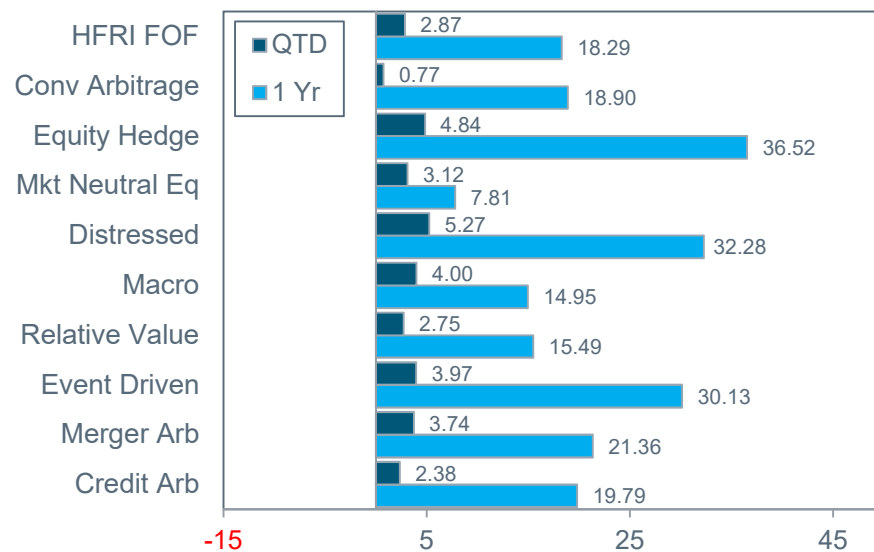
General Market - Diversified Inflation Strategies (DIS)

Diversified Inflation Strategies that RVK follows closely primarily generated strong positive absolute performance, ranging from the midsingle digits to low double-digits. In Q2, commodities, listed infrastructure, natural resource equities, REITs, and TIPS all posted positive absolute returns. Commodities led the way, with the Bloomberg Commodity Index posting a 13.3% return, largely driven by energy, with metals and agriculture also posting strong returns.

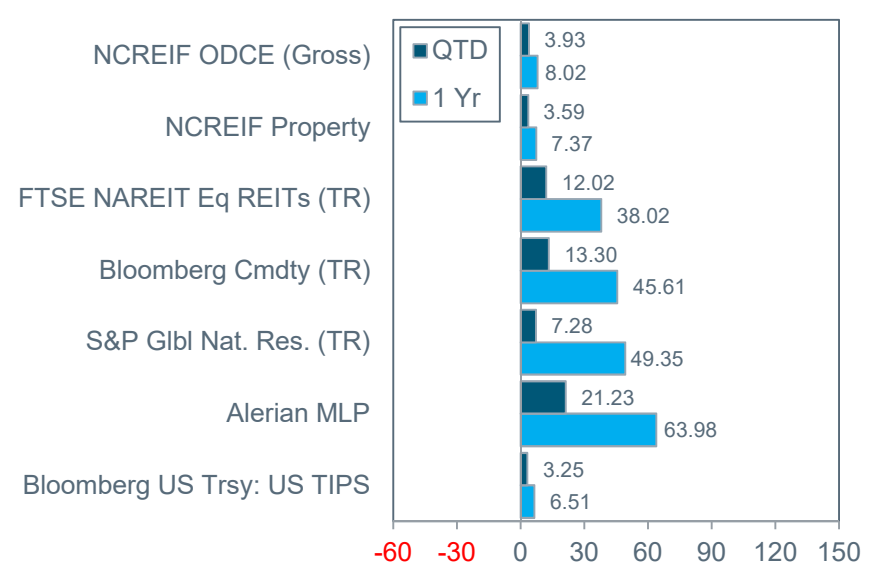
General Market - Real Estate

Core private real estate generated a positive 3.9% return in Q2, as reported by the NFI-ODCE Index, with the total return comprising of 1.0% income and 2.9% price appreciation. While the income trends in line with historical levels, price appreciation rebounded meaningfully by 1.8% from the level recorded in Q1. Publicly traded real estate investments outperformed their private market counterparts by a meaningful margin.

HFRI Hedge Fund Performance (%)



Real Asset Performance (%)



Annual Asset Class Performance

As of June 30, 2021

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	YTD
Best	39.38	8.44	78.51	27.94	22.49	20.00	38.82	30.14	15.02	21.31	37.28	8.35	31.49	19.96	21.96
	16.23	5.24	58.21	26.85	15.99	18.23	32.39	19.31	9.59	17.13	33.01	1.87	26.00	18.40	21.15
	15.97	2.06	46.78	22.04	13.56	18.06	29.30	13.69	3.20	11.96	25.03	0.01	25.53	18.31	17.54
	11.63	-2.35	31.78	18.88	8.29	17.32	22.78	12.50	1.38	11.77	21.83	-1.26	24.96	16.12	15.25
	11.17	-10.01	28.01	16.83	7.84	16.35	13.94	5.97	0.55	11.19	14.65	-2.08	22.01	13.16	9.04
	10.25	-21.37	27.17	16.36	4.98	16.00	8.96	4.89	0.05	9.29	13.96	-3.33	19.59	12.34	8.83
	6.97	-26.16	26.46	15.12	2.11	15.81	7.99	4.04	-0.27	8.77	10.71	-4.02	18.44	10.99	8.35
	6.60	-30.15	26.29	15.06	1.81	12.69	7.44	3.64	-0.81	8.52	7.77	-4.38	17.15	10.88	7.45
	5.88	-33.79	18.91	14.44	0.10	10.94	2.47	3.37	-1.44	6.67	7.62	-4.62	14.32	7.82	6.12
	5.49	-35.65	11.47	10.16	-4.13	8.78	0.07	2.45	-2.20	4.68	7.50	-4.68	8.72	7.51	4.97
	5.00	-37.00	11.41	7.75	-5.72	6.98	-2.02	0.04	-3.30	2.65	5.23	-11.01	8.43	7.11	3.62
	1.87	-37.74	5.93	6.54	-12.14	4.79	-2.60	-2.19	-4.41	2.18	3.54	-11.25	8.39	1.19	1.73
	1.45	-43.38	1.92	6.31	-13.32	4.21	-8.61	-4.90	-4.47	1.00	3.01	-13.79	7.69	0.67	0.02
	-1.57	-47.01	0.21	5.70	-15.94	0.11	-8.83	-4.95	-14.92	0.51	1.70	-14.58	5.34	-3.12	-1.61
Worst	-15.70	-53.33	-29.76	0.13	-18.42	-1.06	-9.52	-17.01	-24.66	0.33	0.86	-17.89	2.28	-8.00	-4.64
<div> <div>Total Fund Net (All Plans)</div> <div>S&P 500 - US Large Cap</div> <div>R 2000 - US Small Cap</div> <div>MSCI EAFE (Net) - Int'l Dev.</div> <div>MSCI EAFE SC (Net) - Int'l SC</div> <div>MSCI EM (Net) - Int'l Emg Mkts</div> <div>Bloombrg US Agg Bond - FI</div> <div>Bloombrg US Corp Hi Yield - FI</div> <div>Bloombrg US Trsy US TIPS - FI</div> <div>Bloombrg US Gov Credit Lng - FI</div> <div>NCREIF ODCE (Gross) - Real Estate</div> <div>FTSE NAREIT Eq REITs Index (TR)</div> <div>HFRI FOF Comp Index - ARS</div> <div>Bloombrg Cmdty (TR) - Commod.</div> <div>ICE BofAML 3 Mo T-Bill - Cash Equiv</div> </div>															

NCREIF ODCE (Gross) performance is reported quarterly; performance is shown N/A in interim-quarter months.

Combined Plans



Manager Research Updates

Each quarter RVK sends a short questionnaire to each of the VPIC's investment managers which serves as the basis for providing VPIC and Staff with updates on the Funds' investment managers; critical and non-critical updates from the quarter are included below. In addition, RVK's Manager Research team keeps the VPIC RVK Consulting Team and VPIC Staff informed of any organizational or investment related developments (should any arise) intra-quarter.

Manager Research Updates: Critical

There were no critical manager updates during the quarter.

Manager Research Updates: Non-Critical

Acadian

Acadian had announced that Co-Founder and Co-CEO, John Chisholm, will be retiring June 2022. Ross Dowd will continue as sole CEO following John's retirement. RVK has no concerns with this change. In addition, Devin Nial, SVP, Portfolio Manager, left to pursue other opportunities on April 9th, 2021. Due to the size of the team, quantitative nature of the process, and tenure at the firm, this is not a cause for concern. With such a large team of investment professionals (approximately 100), some degree of attrition on an annual basis is expected.

Ares

In August, Ares Management Corporation ("Ares") announced that Michael R. McFerran was involuntarily terminated as Partner, Chief Operating Officer and Chief Financial Officer of Ares. The Board of Directors' decision to terminate Mr. McFerran was made following a thorough and comprehensive investigation by outside legal counsel. The investigation found that Mr. McFerran engaged in inappropriate personal relationships and interactions with certain employees in violation of company policies. Jarrod Phillips, who is a Partner and Chief Accounting Officer at Ares, has been appointed as Chief Financial Officer, effective August 2021. Mr. Phillips joined the Firm in January of 2016 as Chief Accounting Officer and has served as the Chief Financial Officer of Ares Acquisition Corporation since May of 2020. The Firm's Chief Executive Officer, Michael Arougheti will assume the role of Chief Operating Officer, until such a time that an appropriate replacement is identified; either internally or externally sourced.

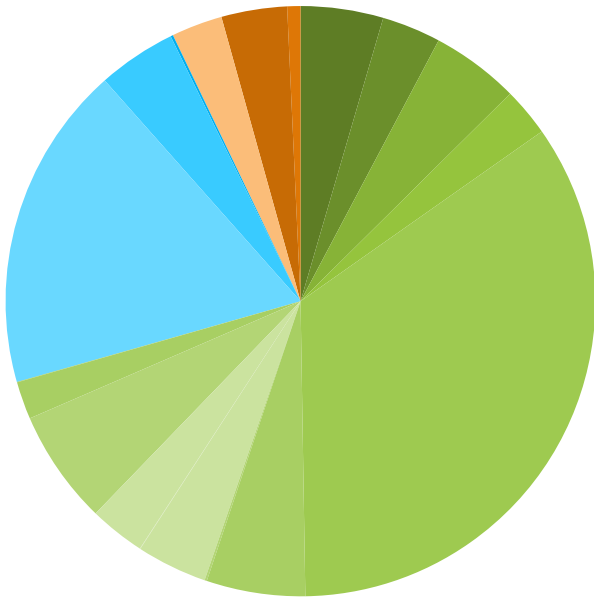
RVK reviewed Ares' Harassment and Sexual Harassment policies (contained in the Code of Ethics) during our most recent due diligence meetings in late 2020. We found the Firm's rules of conduct to be reasonable and consistent with industry standards. Additionally, through formal attestation processes, all Ares employees are required to review the Code of Ethics and to participate in sexual harassment training annually. Furthermore, prior to the incident, the Firm had established an independent, outside hotline that can be accessed anonymously to report any violations of company policies without the fear of retaliation. RVK sees this independent "whistleblower" reporting system as evidence of the Firm's commitment to the enforcement of internal policies, and the protection of its employees.

RVK continues to monitor the situation, but we have found no indication of a systemic cultural problem that could have allowed or fostered such an incident. Rather, at this time we are inclined to conclude that this was a one-off situation. We believe Mr. McFerran's role and responsibilities will be able to be adequately assumed by those individuals mentioned above without material impact to the firm's business, operational or investment activities.

Vermont Pension Investment Committee
Asset Allocation By Manager

As of June 30, 2021

June 30, 2021 : \$5,657,364,156



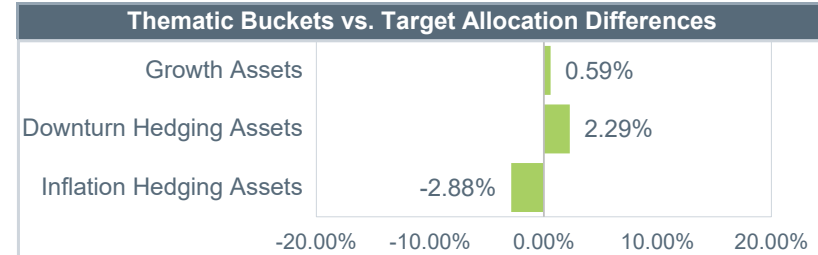
	Market Value (\$)	Allocation (%)
Blackrock S&P 500 (EqI Wtd) (CF)	255,868,375	4.52
Champlain US Mid Cap Core (SA)	183,004,705	3.23
SSgA Russell 2000 Growth (Ex Tobacco) (SA)	14,084	0.00
Acadian International All Cap (SA)	273,326,520	4.83
Mondrian International Equity (SA)	150,693,788	2.66
BlackRock MSCI ACW IMI (CF)	1,950,919,853	34.48
Artisan Global Opportunities (CF)	305,843,167	5.41
PIMCO Liquidation (SA)	7,302,989	0.13
Wellington Opportunistic EMD (CF)	218,818,864	3.87
PIMCO Unconstrained (SA)	1,620,321	0.03
Private Debt	172,936,141	3.06
Private Equity	354,781,123	6.27
Non-Core Real Estate	117,052,482	2.07
Pinnacle Natural Resources (CF)	1,087,907	0.02
BlackRock US Agg (CF)	1,010,510,130	17.86
PIMCO Core (SA)	242,876,835	4.29
Vermont Cash (SA)	7,711,604	0.14
BlackRock TIPS (CF)	158,441,949	2.80
UBS Trumbull Properties (CF)	203,423,045	3.60
Private Infrastructure/Land	41,129,193	0.73
Real Estate Cash (CF)	1,080	0.00

Allocations shown may not sum up to 100% exactly due to rounding. Market values for SSgA Russell 2000 Growth (SA), Pinnacle Natural Resources (CF) and PIMCO Unconstrained (SA) represent residual assets after liquidation. During 06/2021, Blackrock Transition was liquidated.

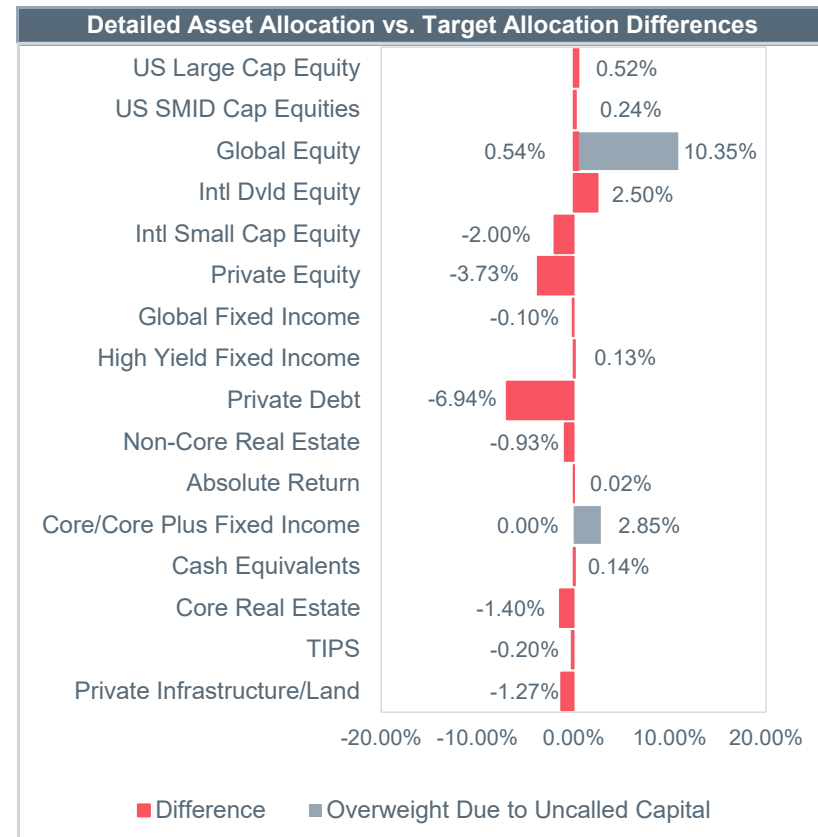
Vermont Pension Investment Committee
Total Fund
Asset Allocation vs. Target Allocation

As of June 30, 2021

Thematic Buckets vs. Target Allocation			
	Market Value (\$)	Allocation (%)	Target (%)
Growth Assets	3,993,270,319	70.59	70.00
Downturn Hedging Assets	1,261,098,570	22.29	20.00
Inflation Hedging Assets	402,995,267	7.12	10.00
Total Fund	5,657,364,156	100.00	100.00



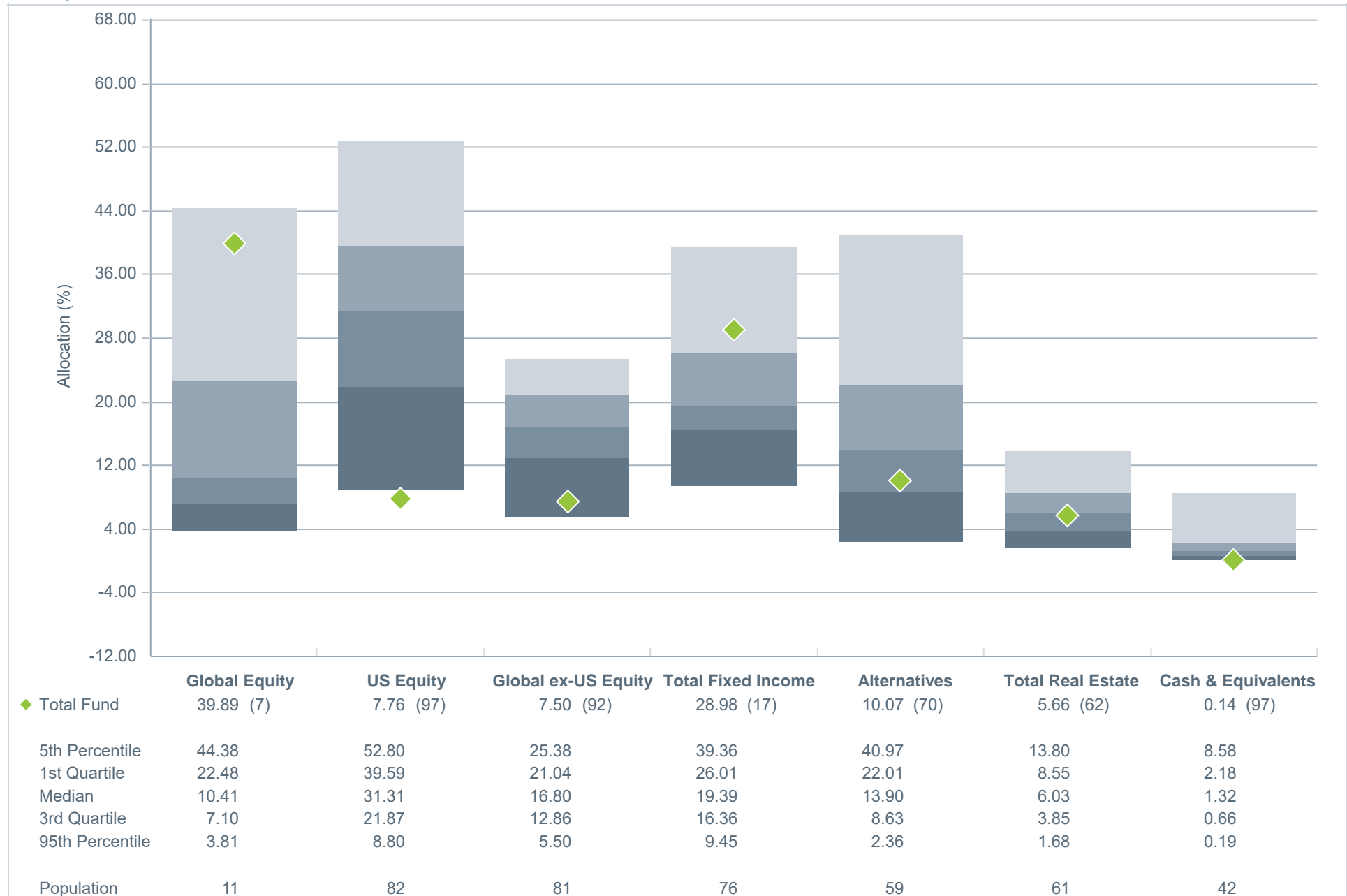
Detailed Asset Allocation vs. Target Allocation			
	Market Value (\$)	Allocation (%)	Target (%)
US Large Cap Equity	255,868,375	4.52	4.00
US SMID Cap Equities	183,018,789	3.24	3.00
Global Equity	2,256,763,020	39.89	29.00
Intl Dvld Equity	424,020,308	7.50	5.00
Intl Small Cap Equity	-	0.00	2.00
Private Equity	354,781,123	6.27	10.00
Global Fixed Income	220,439,185	3.90	4.00
High Yield Fixed Income	7,302,989	0.13	0.00
Private Debt	172,936,141	3.06	10.00
Non-Core Real Estate	117,052,482	2.07	3.00
Absolute Return	1,087,907	0.02	0.00
Core Fixed Income	1,253,386,966	22.15	20.00
Cash Equivalents	7,711,604	0.14	0.00
Core Real Estate	203,424,125	3.60	5.00
TIPS	158,441,949	2.80	3.00
Private Infrastructure/Land	41,129,193	0.73	2.00
Total Fund	5,657,364,156	100.00	100.00



Allocations shown may not sum up to 100% exactly due to rounding. Please note, the "Detailed Asset Allocation vs. Target Allocation Differences" table reflects the Commission's decision to allocate uncalled / uncommitted capital in line with long-term thematic allocations: 71% to Growth Assets (Blackrock MSCI ACW IMI Fund), 19% to Downturn Hedging Assets (Blackrock US Aggregate Fund), and 10% to Inflation Hedging Assets (Blackrock TIPS Fund). The TIPS composite is currently underweight target.

Vermont Pension Investment Committee
All Public Plans (\$1B to \$10B) (Custom PG)
Plan Sponsor TF Asset Allocation

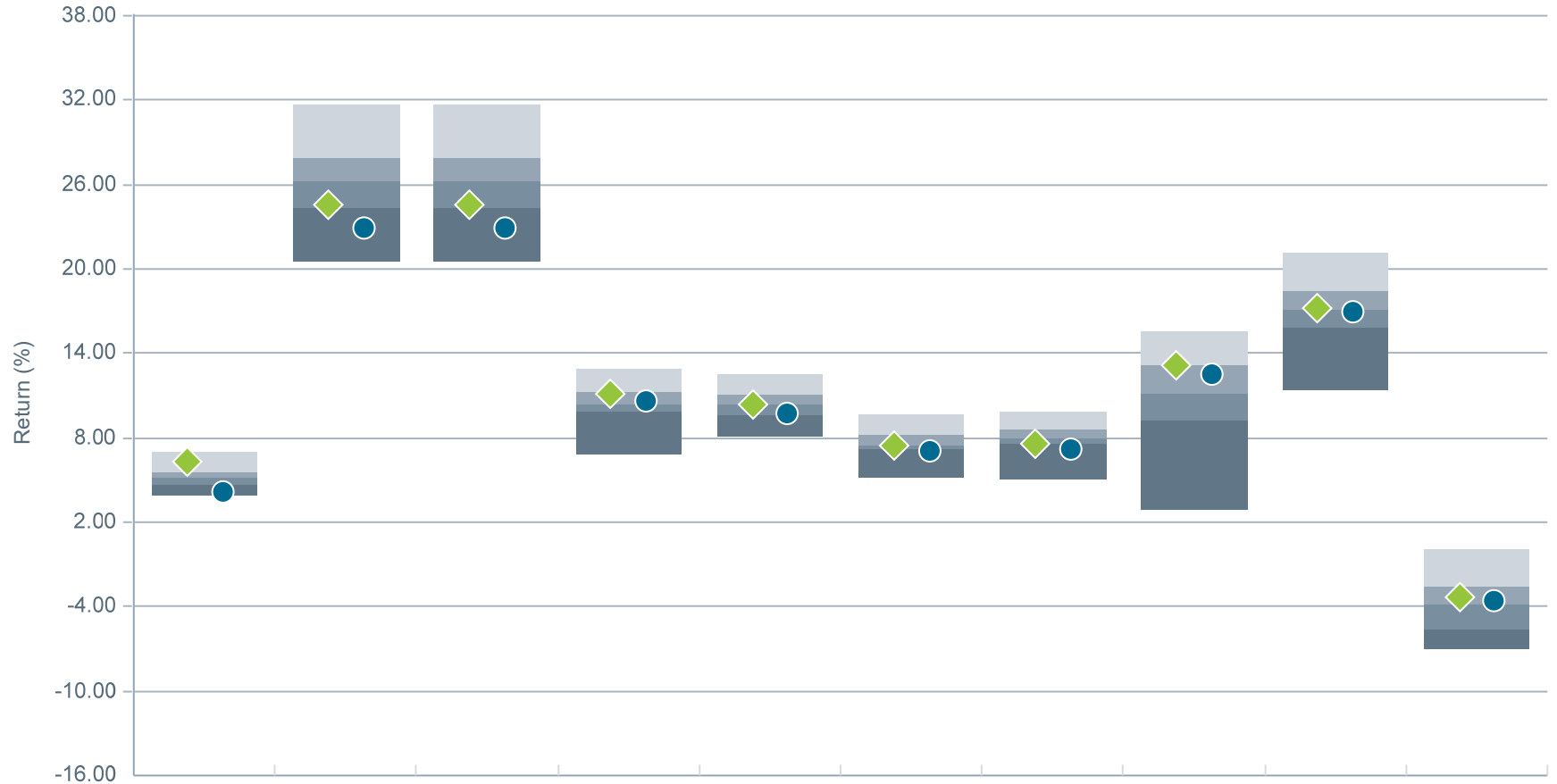
As of June 30, 2021



Parentheses contain percentile ranks. Total Fixed Income includes TIPS.

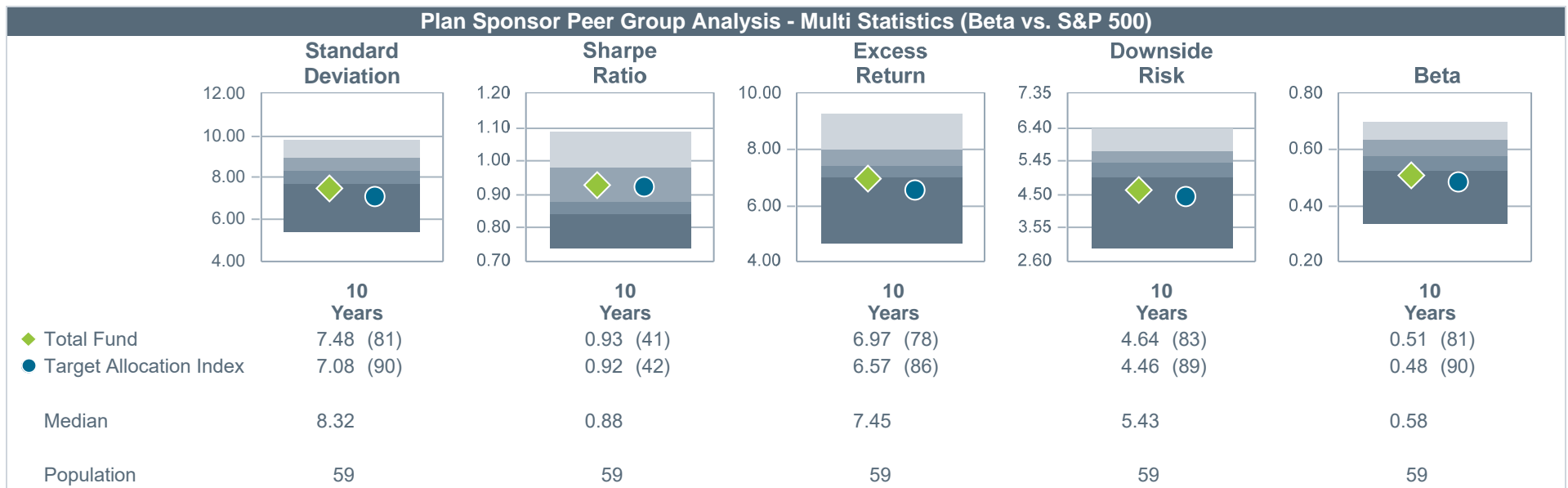
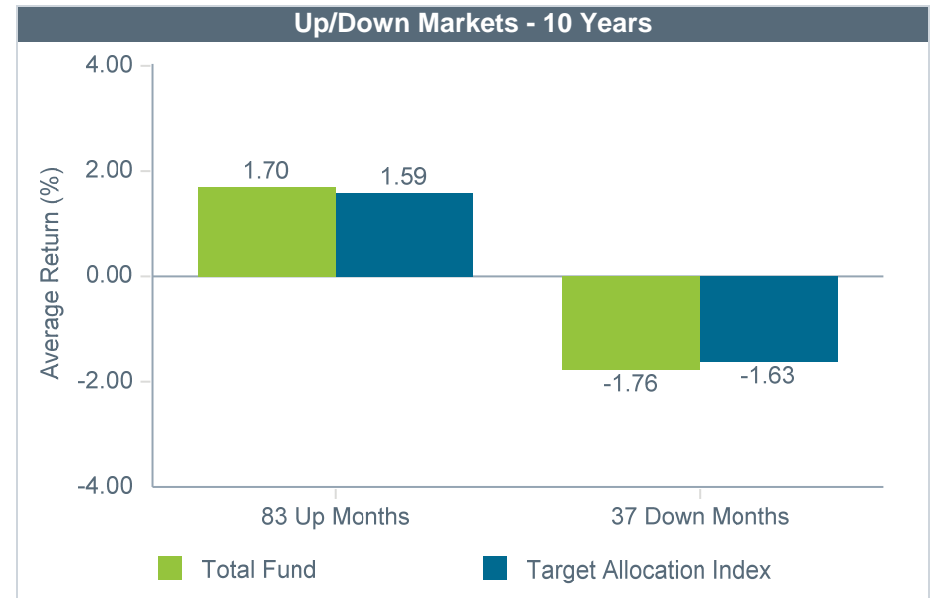
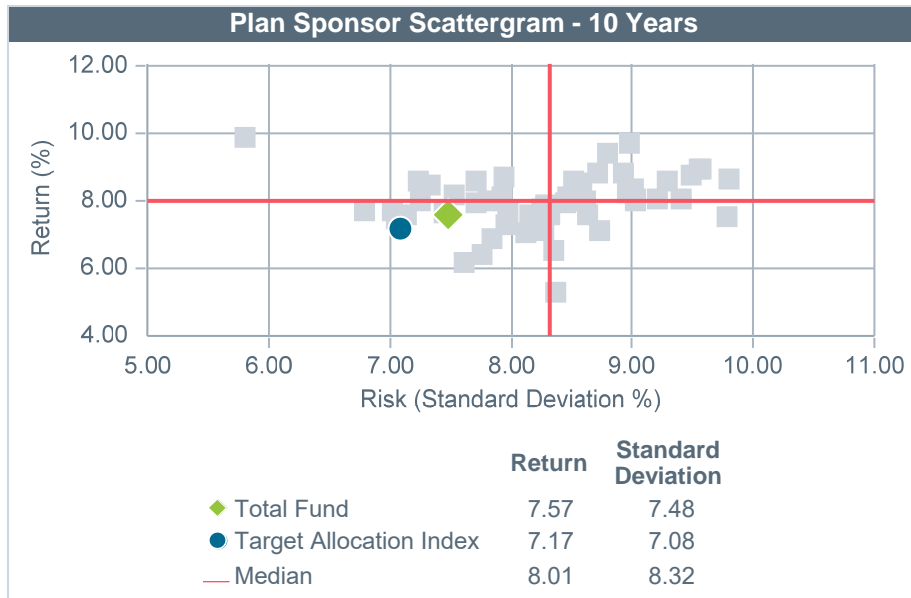
Vermont Pension Investment Committee
All Public Plans (\$1B to \$10B) (Custom PG)
Plan Sponsor Peer Group Analysis

As of June 30, 2021



	QTD	FYTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018
◆ Total Fund	6.33 (9)	24.62 (71)	24.62 (71)	11.15 (28)	10.37 (50)	7.43 (54)	7.57 (76)	13.16 (27)	17.15 (49)	-3.33 (40)
● Target Allocation Index	4.11 (92)	22.95 (87)	22.95 (87)	10.67 (42)	9.78 (72)	7.13 (78)	7.17 (83)	12.51 (33)	16.91 (55)	-3.63 (46)
5th Percentile	6.91	31.72	31.72	12.93	12.57	9.61	9.91	15.51	21.17	0.16
1st Quartile	5.54	27.89	27.89	11.32	11.12	8.20	8.60	13.21	18.50	-2.61
Median	5.20	26.15	26.15	10.40	10.36	7.51	8.01	11.15	17.09	-3.88
3rd Quartile	4.65	24.31	24.31	9.81	9.66	7.16	7.57	9.26	15.77	-5.62
95th Percentile	3.84	20.55	20.55	6.76	8.14	5.14	5.04	2.85	11.38	-6.95
Population	72	71	71	66	65	63	59	88	78	54

Performance shown is net of fees. Parentheses contain percentile ranks.



Performance shown is net of fees. Calculation is based on monthly periodicity. Parentheses contain percentile ranks.

Vermont Pension Investment Committee
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation		Performance (%)									
	Market Value (\$)	Actual (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
Total Fund	5,657,364,156	100.00	6.33	24.62	24.62	11.15	10.37	7.57	6.47	13.16	6.70	07/01/2005
Target Allocation Index			4.11	22.95	22.95	10.67	9.78	7.17	6.44	12.51	6.66	
Difference			2.22	1.67	1.67	0.48	0.59	0.40	0.03	0.65	0.04	
Actual Allocation Index			4.75	23.93	23.93	10.10	9.61	7.07	6.39	11.20	6.59	
Difference			1.58	0.69	0.69	1.05	0.76	0.50	0.08	1.96	0.11	
Growth Assets	3,993,270,319	70.59	8.23	-	-	-	-	-	-	-	26.51	09/01/2020
MSCI ACW IM Index (USD) (Net)			7.18	40.94	40.94	14.24	14.55	9.90	7.74	16.25	26.33	
Difference			1.05	-	-	-	-	-	-	-	0.18	
Downturn Hedging Assets	1,261,098,570	22.29	1.90	-	-	-	-	-	-	-	-0.83	09/01/2020
Bloomberg US Agg Bond Index			1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	-1.00	
Difference			0.07	-	-	-	-	-	-	-	0.17	
Inflation Hedging Assets	402,995,267	7.12	2.14	-	-	-	-	-	-	-	0.79	09/01/2020
Consumer Price Index+2.5%			3.21	8.03	8.03	5.11	4.99	4.42	4.51	3.90	6.70	
Difference			-1.07	-	-	-	-	-	-	-	-5.91	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Manager inception dates shown represent the first full month of available performance. Fiscal year ends 6/30. Please see addendum for custom benchmark definitions. Private Asset market values and performance are lagged to match custodian reported net asset values. Accordingly, fund reported performance will lag benchmark reported performance.

Vermont Pension Investment Committee
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
Total Fund	5,657,364,156	100.00	100.00	6.33	24.62	24.62	11.15	10.37	7.57	6.47	13.16	6.70	07/01/2005
Target Allocation Index				4.11	22.95	22.95	10.67	9.78	7.17	6.44	12.51	6.66	
Difference				2.22	1.67	1.67	0.48	0.59	0.40	0.03	0.65	0.04	
Actual Allocation Index				4.75	23.93	23.93	10.10	9.61	7.07	6.39	11.20	6.59	
Difference				1.58	0.69	0.69	1.05	0.76	0.50	0.08	1.96	0.11	
All Public Plans (\$1B to \$10B)				5.20	26.15	26.15	10.40	10.36	8.01	6.76	11.15	6.91	
Rank				9	71	71	28	50	76	67	27	68	
Domestic Equity	438,887,164	7.76	7.00	7.26	48.96	48.96	16.64	16.36	13.90	-	19.02	13.96	01/01/2011
Russell 3000 Index				8.24	44.16	44.16	18.73	17.89	14.70	10.78	20.89	14.62	
Difference				-0.98	4.80	4.80	-2.09	-1.53	-0.80	-	-1.87	-0.66	
US Large Cap Equity	255,868,375	4.52	4.00	6.85	50.66	50.66	15.19	15.43	13.66	10.41	13.03	10.31	07/01/2005
S&P 500 Index (Cap Wtd)				8.55	40.79	40.79	18.67	17.65	14.84	10.73	18.40	10.60	
Difference				-1.70	9.87	9.87	-3.48	-2.22	-1.18	-0.32	-5.37	-0.29	
Blackrock S&P 500 (EqI Wtd) (CF)	255,868,375	4.52	-	6.85	50.66	50.66	-	-	-	-	13.03	20.80	07/01/2019
S&P 500 Index (Eq Wtd)				6.90	50.71	50.71	16.41	15.68	13.76	10.98	12.83	20.75	
Difference				-0.05	-0.05	-0.05	-	-	-	-	0.20	0.05	
IM U.S. Large Cap Equity (MF) Median				8.22	40.68	40.68	18.02	17.10	13.73	10.14	18.34	22.80	
Rank				68	7	7	-	-	-	-	64	59	
US SMID Cap Equities	183,018,789	3.24	3.00	7.77	46.20	46.20	18.07	17.82	14.24	11.13	27.32	10.95	07/01/2005
Russell 2500 Index				5.44	57.79	57.79	15.24	16.35	12.86	10.25	19.99	10.45	
Difference				2.33	-11.59	-11.59	2.83	1.47	1.38	0.88	7.33	0.50	
Champlain US Mid Cap Core (SA)	183,004,705	3.23	-	7.76	46.20	46.20	18.07	18.66	15.09	-	27.32	16.18	10/01/2009
Custom SMID Cap Equity Index				5.90	59.50	59.50	14.28	16.43	12.75	10.18	19.99	14.24	
Difference				1.86	-13.30	-13.30	3.79	2.23	2.34	-	7.33	1.94	
IM U.S. SMID Cap Equity (MF) Median				4.87	52.55	52.55	14.63	16.05	12.41	10.31	20.27	13.98	
Rank				7	76	76	34	35	19	-	41	26	
Global Equity	2,256,763,020	39.89	29.00	7.48	40.60	40.60	14.10	-	-	-	19.91	9.32	02/01/2018
MSCI ACW IM Index (USD) (Net)				7.18	40.94	40.94	14.24	14.55	9.90	7.74	16.25	10.63	
Difference				0.30	-0.34	-0.34	-0.14	-	-	-	3.66	-1.31	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Manager inception dates shown represent the first full month of available performance. Fiscal year ends 6/30. Please see addendum for custom benchmark definitions. Private Asset market values and performance are lagged to match custodian reported net asset values. Accordingly, fund reported performance will lag benchmark reported performance. Negative cash performance is due to a valuation decline in the Blackrock Transition account during its liquidation.

Vermont Pension Investment Committee
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
BlackRock MSCI ACW IMI (CF)	1,950,919,853	34.48	-	7.27	41.53	41.53	-	-	-	-	16.77	19.93	07/01/2019
MSCI ACW IM Index (USD) (Net)				7.18	40.94	40.94	14.24	14.55	9.90	7.74	16.25	19.41	
Difference				0.09	0.59	0.59	-	-	-	-	0.52	0.52	
IM Global Equity (MF) Median				6.95	39.41	39.41	13.96	13.31	9.73	7.52	15.21	19.06	
Rank				45	42	42	-	-	-	-	44	46	
Artisan Global Opportunities (CF)	305,843,167	5.41	-	8.93	35.04	35.04	21.47	-	-	-	40.50	21.47	07/01/2018
MSCI ACW Index (USD) (Net)				7.39	39.26	39.26	14.57	14.61	9.90	7.60	16.25	14.57	
Difference				1.54	-4.22	-4.22	6.90	-	-	-	24.25	6.90	
IM Global Equity (MF) Median				6.95	39.41	39.41	13.96	13.31	9.73	7.52	15.21	13.96	
Rank				20	67	67	12	-	-	-	14	12	
International Equity	424,020,308	7.50	7.00	6.32	39.51	39.51	8.60	10.32	5.43	4.15	4.91	5.52	07/01/2005
MSCI EAFE Index (USD) (Net)				5.17	32.35	32.35	8.27	10.28	5.89	4.40	7.82	5.66	
Difference				1.15	7.16	7.16	0.33	0.04	-0.46	-0.25	-2.91	-0.14	
Acadian International All Cap (SA)	273,326,520	4.83	-	7.06	42.32	42.32	9.40	13.40	8.43	5.51	12.37	6.76	11/01/2005
MSCI EAFE IM Index (USD) (Net)				5.04	33.57	33.57	8.28	10.53	6.22	4.69	8.47	5.61	
Difference				2.02	8.75	8.75	1.12	2.87	2.21	0.82	3.90	1.15	
IM All EAFE (MF) Median				5.17	32.88	32.88	8.19	9.89	5.69	4.34	8.17	5.26	
Rank				11	7	7	33	8	9	23	33	15	
Mondrian International Equity (SA)	150,693,788	2.66	-	5.00	34.11	34.11	5.84	7.54	5.15	4.28	-4.01	5.41	07/01/2005
MSCI EAFE Index (USD) (Net)				5.17	32.35	32.35	8.27	10.28	5.89	4.40	7.82	5.66	
Difference				-0.17	1.76	1.76	-2.43	-2.74	-0.74	-0.12	-11.83	-0.25	
IM All EAFE (MF) Median				5.17	32.88	32.88	8.19	9.89	5.69	4.34	8.17	5.59	
Rank				58	40	40	77	85	65	53	98	57	
Fixed Income	1,481,129,140	26.18	24.00	2.21	1.29	1.29	5.28	4.19	4.20	-	8.18	4.42	01/01/2011
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	3.49	
Difference				0.38	1.63	1.63	-0.06	1.16	0.81	-	0.67	0.93	
Core Fixed Income	1,253,386,966	22.15	20.00	1.91	-	-	-	-	-	-	-	-0.83	09/01/2020
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	-1.00	
Difference				0.08	-	-	-	-	-	-	-	0.17	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Manager inception dates shown represent the first full month of available performance. Fiscal year ends 6/30. Please see addendum for custom benchmark definitions. Private Asset market values and performance are lagged to match custodian reported net asset values. Accordingly, fund reported performance will lag benchmark reported performance. Negative cash performance is due to a valuation decline in the Blackrock Transition account during its liquidation.

Vermont Pension Investment Committee
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
BlackRock US Agg (CF)	1,010,510,130	17.86	-	1.84	-0.31	-0.31	-	-	-	-	7.54	4.38	06/01/2019
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	4.56	
Difference				0.01	0.03	0.03	-	-	-	-	0.03	-0.18	
IM U.S. Broad Mkt Core FI(MF)				1.93	1.25	1.25	5.62	3.31	3.51	4.41	8.19	5.10	
Rank				60	88	88	-	-	-	-	71	81	
PIMCO Core (SA)	242,876,835	4.29	-	2.19	-	-	-	-	-	-	-	-0.23	09/01/2020
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	-1.00	
Difference				0.36	-	-	-	-	-	-	-	0.77	
IM U.S. Broad Mkt Core FI(MF)				1.93	1.25	1.25	5.62	3.31	3.51	4.41	8.19	0.11	
Rank				20	-	-	-	-	-	-	-	63	
Emerging Markets Debt	218,818,864	3.87	4.00	3.97	-	-	-	-	-	-	-	2.84	09/01/2020
JPM Emg Mkts Bond Gbl Index (USD)				3.93	6.81	6.81	6.48	4.44	5.34	6.74	5.88	2.70	
Difference				0.04	-	-	-	-	-	-	-	0.14	
Wellington Opportunistic EMD (CF)	218,818,864	3.87	-	3.97	7.37	7.37	6.83	5.44	5.76	-	7.69	6.52	12/01/2009
JPM Emg Mkts Bond Gbl Index (USD)				3.93	6.81	6.81	6.48	4.44	5.34	6.74	5.88	6.11	
Difference				0.04	0.56	0.56	0.35	1.00	0.42	-	1.81	0.41	
IM Emerging Markets Debt (MF) Median				3.71	9.08	9.08	6.15	4.67	4.32	5.83	5.57	5.22	
Rank				34	90	90	27	20	3	-	15	4	
High Yield Fixed Income	7,302,989	0.13	0.00	2.36	20.27	20.27	4.09	5.23	5.42	6.38	3.26	6.32	06/01/2006
Bloomberg US Corp Hi Yld Index				2.74	15.37	15.37	7.45	7.48	6.66	7.53	7.11	7.46	
Difference				-0.38	4.90	4.90	-3.36	-2.25	-1.24	-1.15	-3.85	-1.14	
PIMCO Liquidation (SA)	7,302,989	0.13	-	2.36	20.27	20.27	-	-	-	-	3.26	3.92	08/01/2018
Bloomberg US Corp Hi Yld Index				2.74	15.37	15.37	7.45	7.48	6.66	7.53	7.11	7.27	
Difference				-0.38	4.90	4.90	-	-	-	-	-3.85	-3.35	
IM U.S. High Yield Bonds (MF) Median				2.59	14.69	14.69	6.43	6.39	5.54	6.22	5.28	6.23	
Rank				67	9	9	-	-	-	-	81	95	
Private Debt	172,936,141	3.06	10.00	1.29	15.92	15.92	5.82	-	-	-	2.07	6.18	01/01/2018
CS Lvg'd Loan Index+2% (Spliced)				1.95	12.98	12.98	4.81	5.24	4.51	4.72	3.12	4.74	
Difference				-0.66	2.94	2.94	1.01	-	-	-	-1.05	1.44	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Manager inception dates shown represent the first full month of available performance. Fiscal year ends 6/30. Please see addendum for custom benchmark definitions. Private Asset market values and performance are lagged to match custodian reported net asset values. Accordingly, fund reported performance will lag benchmark reported performance. Negative cash performance is due to a valuation decline in the Blackrock Transition account during its liquidation.

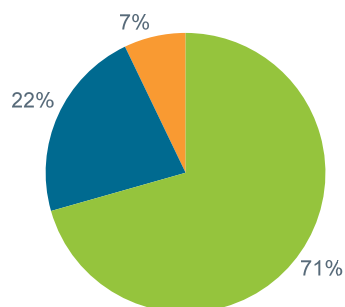
Vermont Pension Investment Committee
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

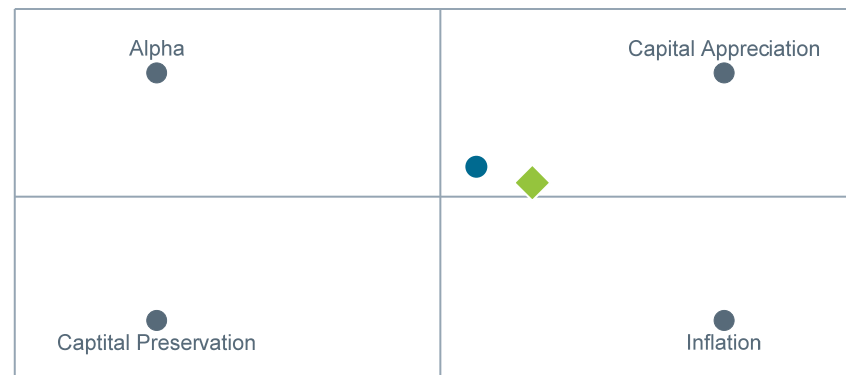
	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
Private Equity	354,781,123	6.27	10.00	27.32	59.23	59.23	24.49	22.38	-	-	17.19	19.31	01/01/2013
Cambridge US Prvt Eq Index				0.00	35.55	35.55	15.67	16.57	13.90	12.71	21.32	14.69	
Difference				27.32	23.68	23.68	8.82	5.81	-	-	-4.13	4.62	
Non-Core Real Estate	117,052,482	2.07	3.00	3.63	8.87	8.87	4.75	8.79	-	-	-1.65	9.38	09/01/2014
NCREIF ODCE Index+2% (Spliced)				4.19	8.70	8.70	5.94	6.39	8.92	7.07	1.60	8.11	
Difference				-0.56	0.17	0.17	-1.19	2.40	-	-	-3.25	1.27	
Inflation Hedging Assets (Spliced)	402,995,267	7.12	10.00	2.14	-2.39	-2.39	-0.33	2.79	7.62	-	-2.82	8.40	01/01/2011
CPI+2.5% (Spliced)				3.21	6.70	6.70	5.28	6.00	8.72	6.93	0.75	9.03	
Difference				-1.07	-9.09	-9.09	-5.61	-3.21	-1.10	-	-3.57	-0.63	
TIPS	158,441,949	2.80	2.00	3.24	-	-	-	-	-	-	-	2.98	09/01/2020
Bloomberg US Trsy US TIPS Index				3.25	6.51	6.51	6.53	4.17	3.40	4.56	10.99	3.00	
Difference				-0.01	-	-	-	-	-	-	-	-0.02	
BlackRock TIPS (CF)	158,441,949	2.80	-	3.24	6.49	6.49	6.45	4.12	3.33	-	10.97	3.74	12/01/2009
Bloomberg US Trsy US TIPS Index				3.25	6.51	6.51	6.53	4.17	3.40	4.56	10.99	3.78	
Difference				-0.01	-0.02	-0.02	-0.08	-0.05	-0.07	-	-0.02	-0.04	
IM U.S. TIPS (MF) Median				2.71	6.51	6.51	5.76	3.72	2.70	3.87	9.64	3.14	
Rank				20	52	52	21	29	12	-	26	11	
Core Real Estate	203,424,125	3.60	5.00	1.27	-3.52	-3.52	-0.99	1.83	7.17	-	-2.26	7.97	01/01/2011
NCREIF ODCE Index (AWA) (Net)				3.68	7.09	7.09	4.60	5.62	8.60	5.34	0.34	9.00	
Difference				-2.41	-10.61	-10.61	-5.59	-3.79	-1.43	-	-2.60	-1.03	
UBS Trumbull Properties (CF)	203,423,045	3.60	-	1.28	-3.51	-3.51	-0.95	1.66	5.72	4.46	-2.26	5.07	07/01/2005
NCREIF ODCE Index (AWA) (Net)				3.68	7.09	7.09	4.60	5.62	8.60	5.34	0.34	6.09	
Difference				-2.40	-10.60	-10.60	-5.55	-3.96	-2.88	-0.88	-2.60	-1.02	
Private Infrastructure/Land	41,129,193	0.73	3.00	2.17	-	-	-	-	-	-	-	2.80	08/01/2020
NCREIF Farmland Index (TR)				1.47	4.97	4.97	4.82	5.51	10.24	11.12	3.08	4.97	
Difference				0.70	-	-	-	-	-	-	-	-2.17	
Cash Equivalents	7,711,604	0.14	0.00	-0.05	0.01	0.01	0.44	0.29	0.16	0.91	0.37	1.18	07/01/2005
ICE BofAML 3 Mo US T-Bill Index				0.00	0.09	0.09	1.34	1.17	0.63	1.08	0.67	1.26	
Difference				-0.05	-0.08	-0.08	-0.90	-0.88	-0.47	-0.17	-0.30	-0.08	

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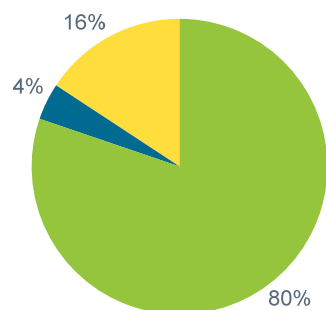
Asset Allocation by Theme



Thematic Analysis - July 1, 2005 to June 30, 2021



Asset Allocation by Liquidity



Liquidity Rating

75

Correlation Matrix - 10 Years

	A	B	C	D
A	1.00			
B	0.70	1.00		
C	-0.26	-0.39	1.00	
D	0.62	0.79	-0.11	1.00

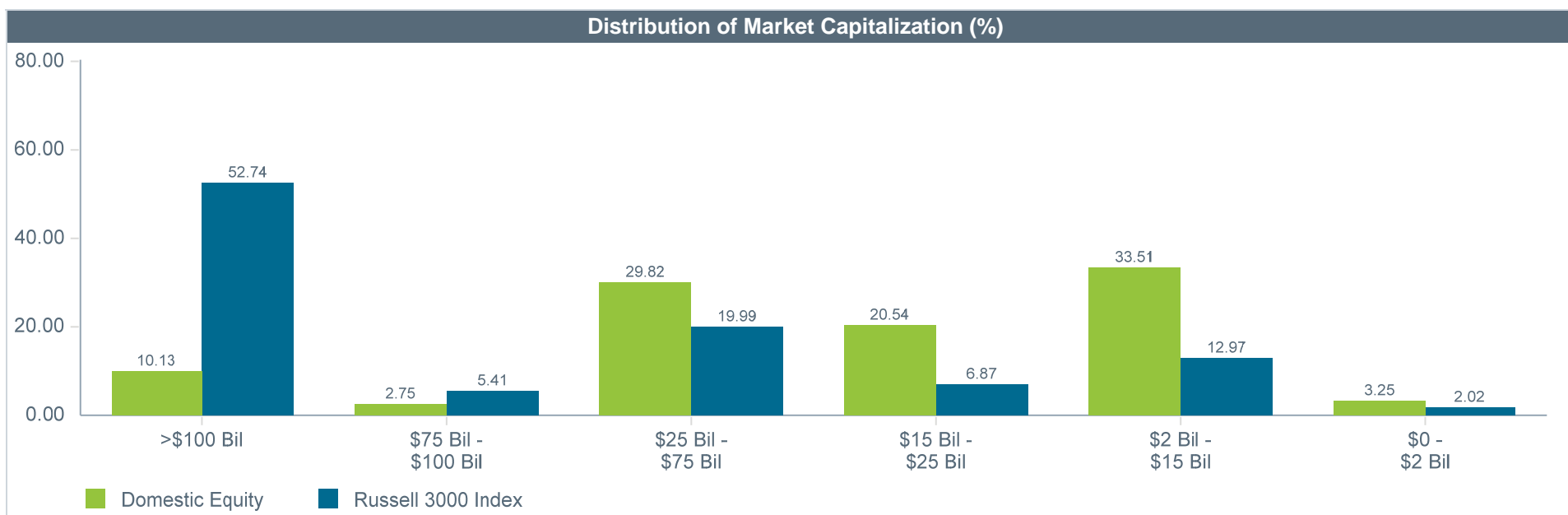
A = HFRI EH: Equity Market Neutral Index (Alpha)
 B = MSCI ACW Index (USD) (Gross) (Capital Appreciation)
 C = Bloomberg US Gov't Bond Index (Capital Preservation)
 D = Real Return Custom Index (Inflation)

Vermont Pension Investment Committee
Domestic Equity vs. Russell 3000 Index
Portfolio Characteristics

As of June 30, 2021

Top Ten Equity Holdings				
	Portfolio Weight (%)	Benchmark Weight (%)	Active Weight (%)	Quarterly Return (%)
Medallia Inc	0.90	0.01	0.89	21.01
Integra LifeSciences Holdings Corp	0.89	0.01	0.88	-1.23
AMETEK Inc	0.85	0.07	0.78	4.67
Fortive Corp	0.84	0.05	0.79	-1.18
Steris Plc	0.82	0.05	0.77	8.53
Advance Auto Parts Inc.	0.78	0.03	0.75	12.37
Waters Corp	0.77	0.05	0.72	21.62
Asana Inc	0.75	0.01	0.74	117.04
Everest Re Group Ltd	0.73	0.02	0.71	2.31
Generac Holdings Inc	0.73	0.06	0.67	26.78
% of Portfolio	8.06	0.36	7.70	

Portfolio Characteristics		
	Portfolio	Benchmark
Wtd. Avg. Mkt. Cap (\$M)	52,315	441,345
Median Mkt. Cap (\$M)	25,410	2,653
Price/Earnings Ratio	26.08	26.20
Price/Book Ratio	3.71	4.48
5 Yr. EPS Growth Rate (%)	13.55	21.08
Current Yield (%)	1.20	1.28
Beta (5 Years, Monthly)	1.03	1.00
Number of Securities	603	3,009

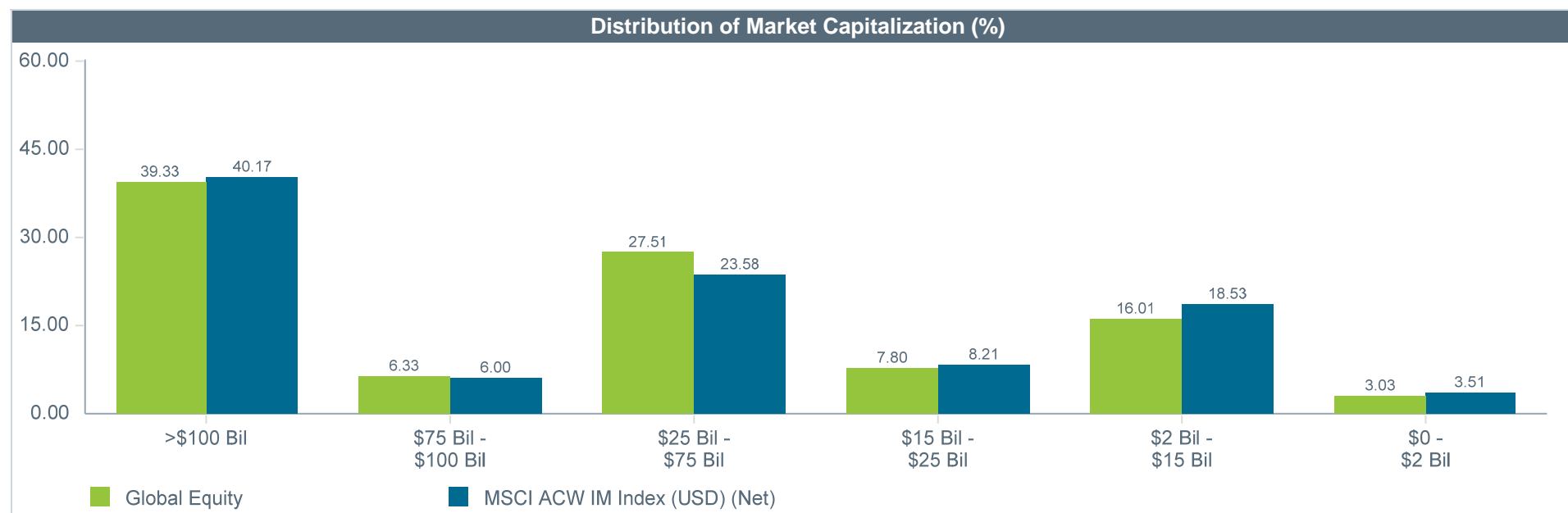


Vermont Pension Investment Committee
Global Equity vs. MSCI ACW IM Index (USD) (Net)
Portfolio Characteristics

As of June 30, 2021

Top Ten Equity Holdings				
	Portfolio Weight (%)	Benchmark Weight (%)	Active Weight (%)	Quarterly Return (%)
Apple Inc	2.61	3.02	-0.41	12.31
Microsoft Corp	2.54	2.55	-0.01	15.17
Amazon.com Inc	1.67	1.93	-0.26	11.19
Alphabet Inc	1.21	0.96	0.25	18.39
Facebook Inc	0.95	1.10	-0.15	18.06
Alphabet Inc	0.84	0.97	-0.13	21.16
Technic Industries Co Ltd	0.73	0.03	0.70	2.77
Advanced Micro Devices Inc	0.69	0.15	0.54	19.66
Danaher Corp	0.64	0.23	0.41	19.32
Astrazeneca PLC	0.63	0.21	0.42	23.54
% of Portfolio	12.51	11.15	1.36	

Portfolio Characteristics		
	Portfolio	Benchmark
Wtd. Avg. Mkt. Cap (\$M)	278,019	294,924
Median Mkt. Cap (\$M)	2,318	2,277
Price/Earnings Ratio	23.35	22.47
Price/Book Ratio	3.76	3.59
5 Yr. EPS Growth Rate (%)	16.63	16.28
Current Yield (%)	1.62	1.74
Beta (3 Years, Monthly)	0.98	1.00
Number of Securities	9,229	9,247

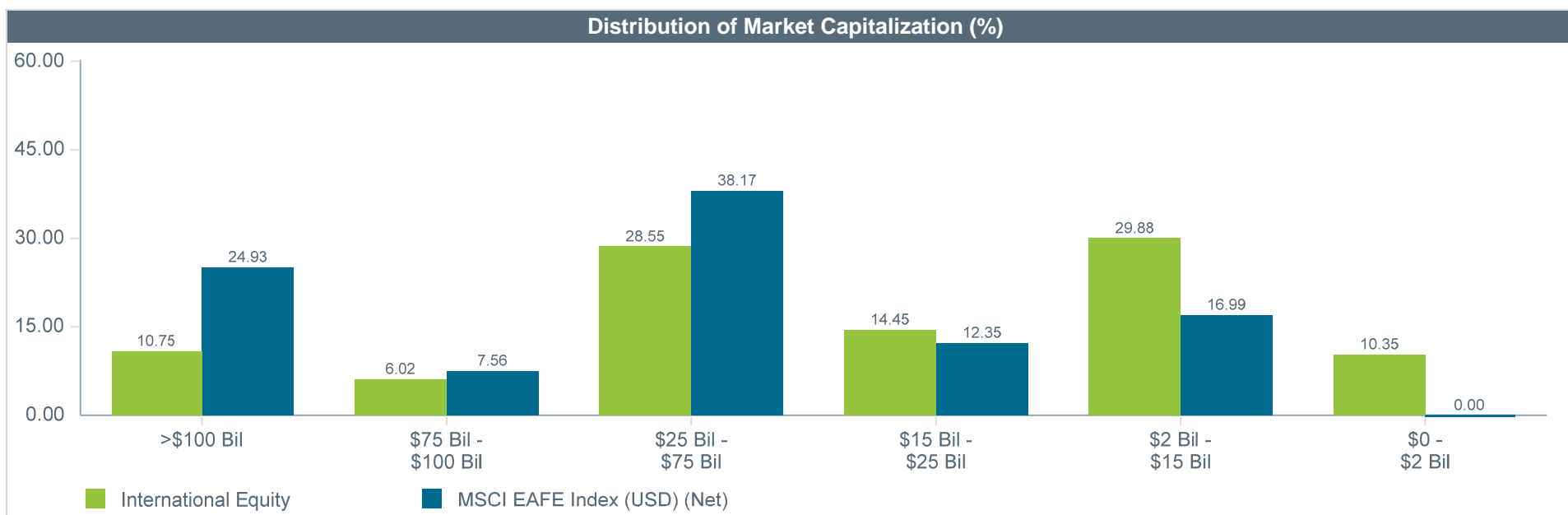


Vermont Pension Investment Committee
International Equity vs. MSCI EAFE Index (USD) (Net)
Portfolio Characteristics

As of June 30, 2021

Top Ten Equity Holdings				
	Portfolio Weight (%)	Benchmark Weight (%)	Active Weight (%)	Quarterly Return (%)
Roche Holding AG	1.95	1.57	0.38	18.16
ASML Holding NV	1.68	1.70	-0.02	15.39
Fujitsu Ltd	1.62	0.22	1.40	29.34
Kingfisher PLC	1.44	0.06	1.38	20.88
Novartis AG	1.38	1.20	0.18	8.10
Glaxosmithkline PLC	1.19	0.58	0.61	15.21
Deutsche Post AG	1.18	0.40	0.78	29.39
Fujifilm Holdings Corp	1.17	0.16	1.01	24.75
Banco Santander SA	1.11	0.39	0.72	15.07
Lloyds Banking Group PLC	1.11	0.27	0.84	14.68
% of Portfolio	13.83	6.55	7.28	

Portfolio Characteristics		
	Portfolio	Benchmark
Wtd. Avg. Mkt. Cap (\$M)	49,085	78,526
Median Mkt. Cap (\$M)	1,271	14,310
Price/Earnings Ratio	15.48	20.00
Price/Book Ratio	2.39	2.66
5 Yr. EPS Growth Rate (%)	17.91	7.06
Current Yield (%)	2.91	2.56
Beta (5 Years, Monthly)	1.03	1.00
Number of Securities	606	843



Vermont Pension Investment Committee
Total Equity
Country/Region Allocation

As of June 30, 2021

	Total Equity	MSCI ACW IM Index (USD) (Net)		Total Equity	MSCI ACW IM Index (USD) (Net)
Canada	2.66	3.04	China	2.66	4.07
United States	53.11	55.94	India	0.87	1.39
Australia	1.93	1.96	Indonesia	0.09	0.15
Hong Kong	1.77	1.10	Korea	1.65	1.76
New Zealand	0.13	0.11	Malaysia	0.12	0.19
Singapore	0.35	0.34	Pakistan	0.00	0.01
Pacific ex Japan	4.18	3.50	Philippines	0.05	0.08
Japan	7.27	6.32	Taiwan	1.37	1.90
Austria	0.13	0.09	Thailand	0.14	0.23
Belgium	0.19	0.26	EM Asia	6.96	9.77
Bermuda	0.31	0.14	Czech Republic	0.01	0.01
Denmark	1.20	0.65	Greece	0.02	0.03
Finland	0.40	0.36	Hungary	0.02	0.03
France	2.27	2.54	Poland	0.06	0.09
Germany	2.53	2.37	Russia	0.25	0.32
Ireland	1.10	1.08	Turkey	0.03	0.05
Italy	0.73	0.59	EM Europe	0.38	0.53
Netherlands	2.19	1.59	Argentina	0.06	0.10
Norway	0.21	0.23	Brazil	0.64	0.71
Portugal	0.03	0.04	Cayman Islands	0.01	0.01
Spain	0.99	0.63	Chile	0.04	0.06
Sweden	1.95	1.09	Colombia	0.01	0.02
Switzerland	3.54	2.67	Mexico	0.14	0.22
Europe ex UK	17.79	14.33	Peru	0.00	0.00
United Kingdom	5.55	4.10	EM Latin America	0.91	1.13
Israel	0.36	0.27	Egypt	0.01	0.01
Middle East	0.36	0.27	Qatar	0.05	0.08
Developed Markets	90.92	87.51	Saudi Arabia	0.12	0.18
			South Africa	0.36	0.50
			United Arab Emirates	0.06	0.10
			EM Mid East+Africa	0.60	0.87
			Emerging Markets	8.85	12.30

Vermont Pension Investment Committee
Total Equity
Country/Region Allocation

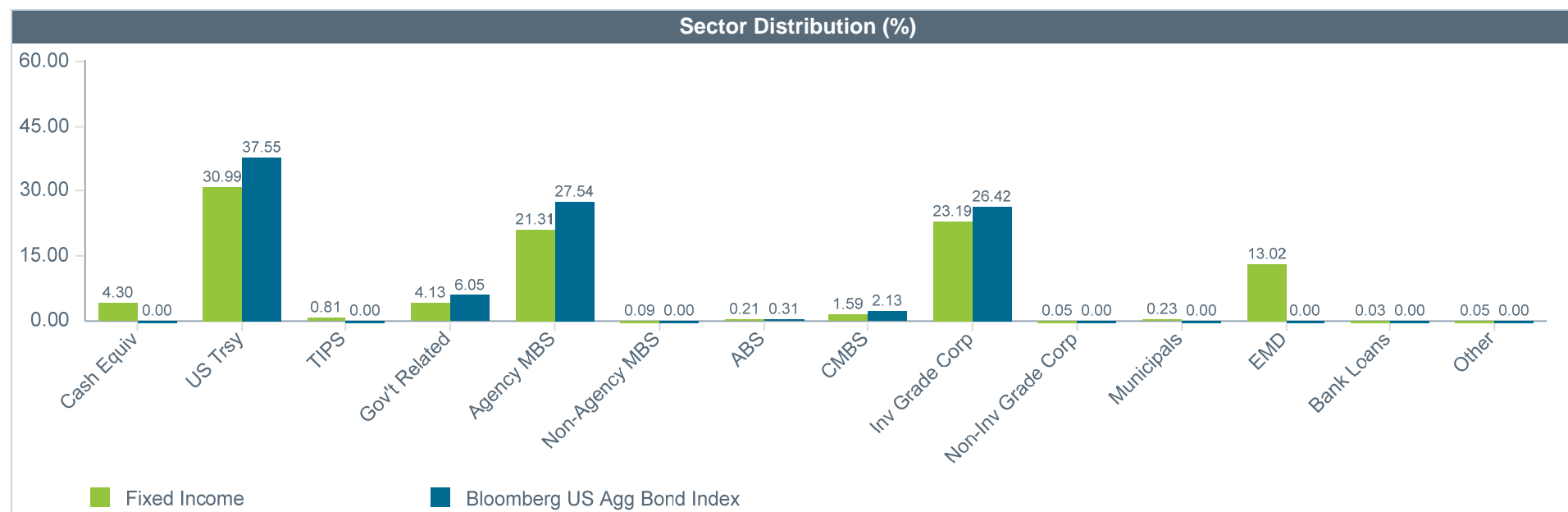
As of June 30, 2021

	Total Equity	MSCI ACW IM Index (USD) (Net)
Kazakhstan	0.00	0.00
Kuwait	0.04	0.07
Oman	0.08	0.13
Frontier Markets	0.12	0.20
Other	0.11	0.00
Total	100.00	100.00

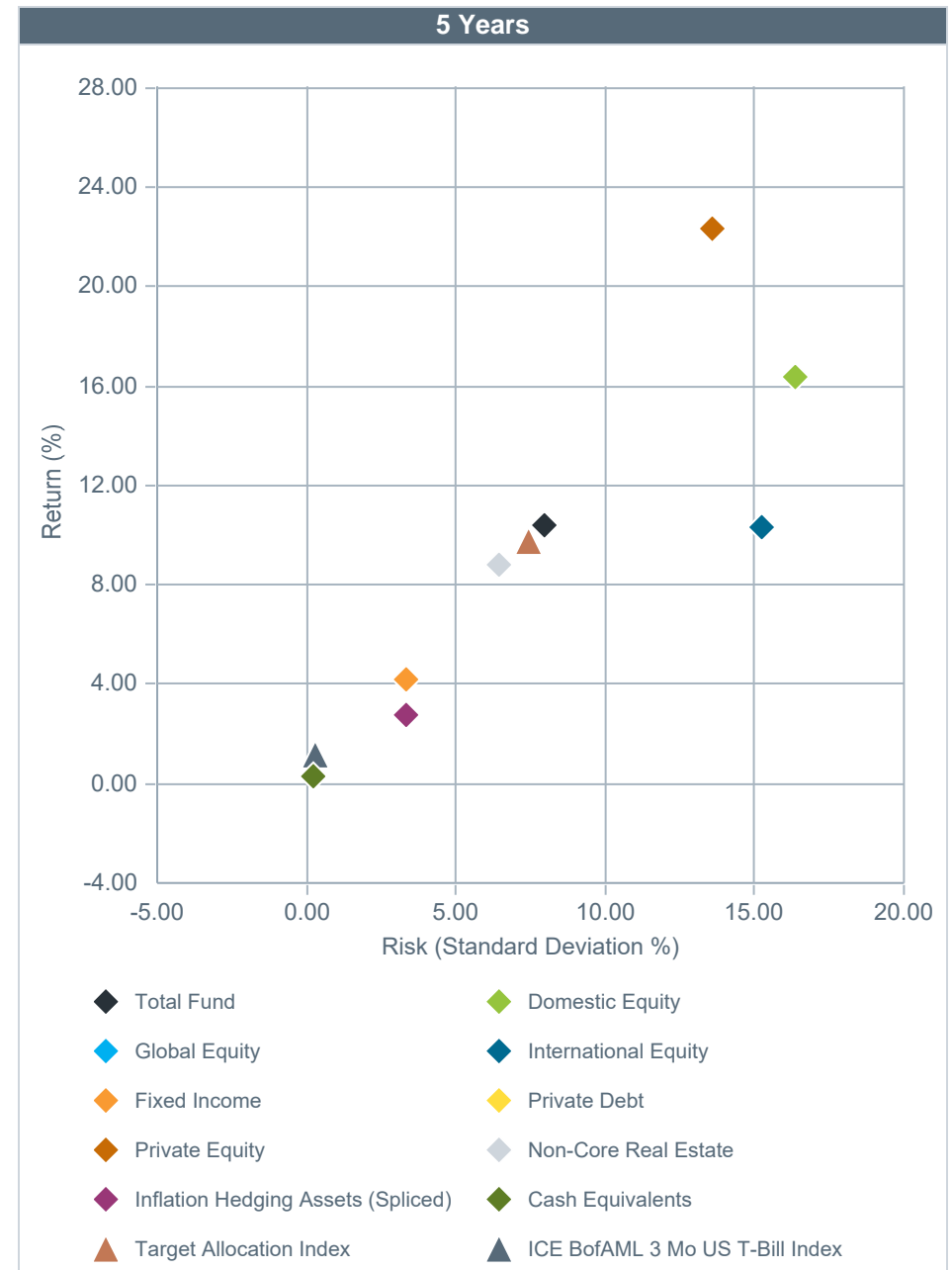
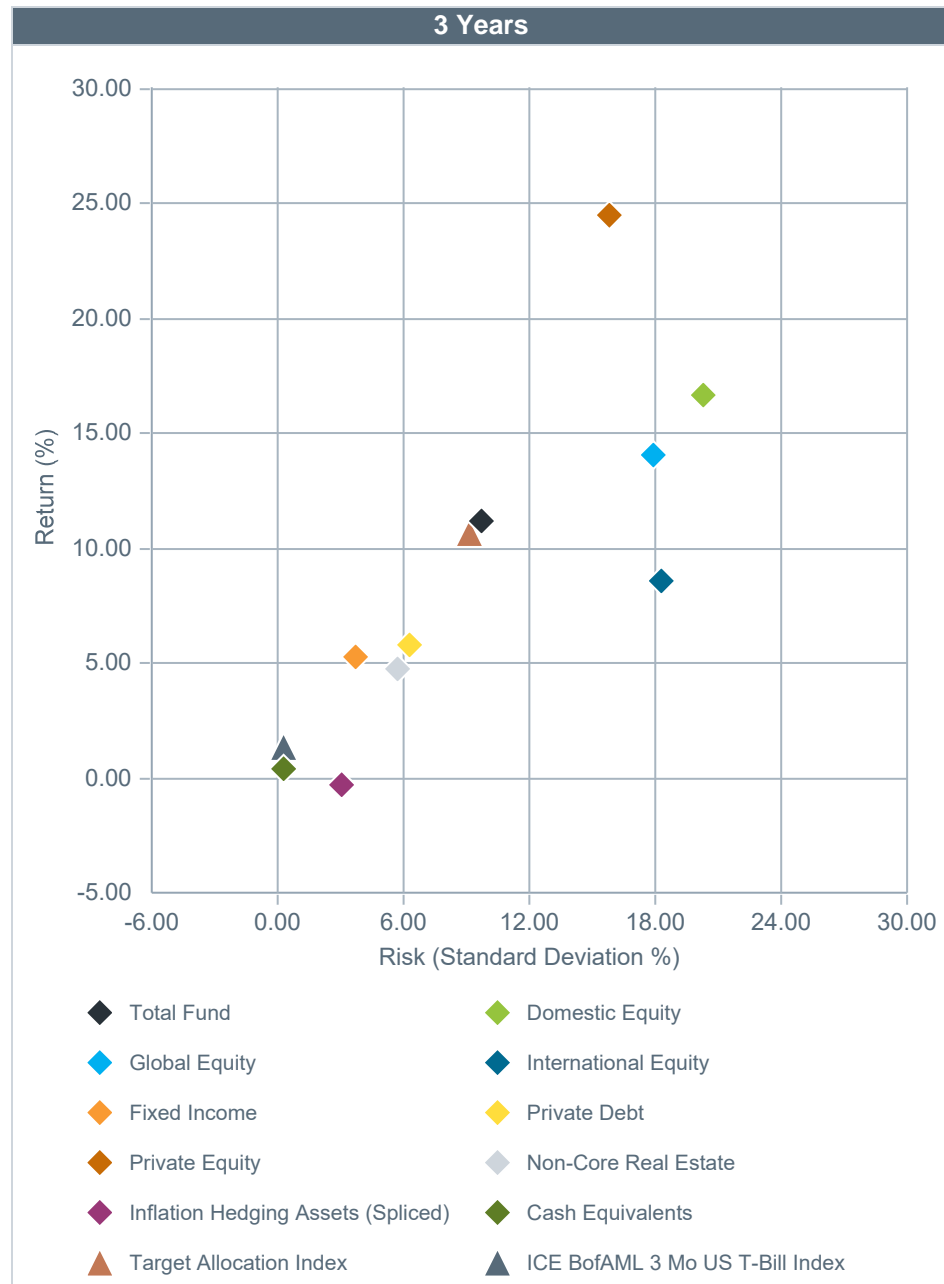
Vermont Pension Investment Committee
Fixed Income vs. Bloomberg US Agg Bond Index
Portfolio Characteristics

As of June 30, 2021

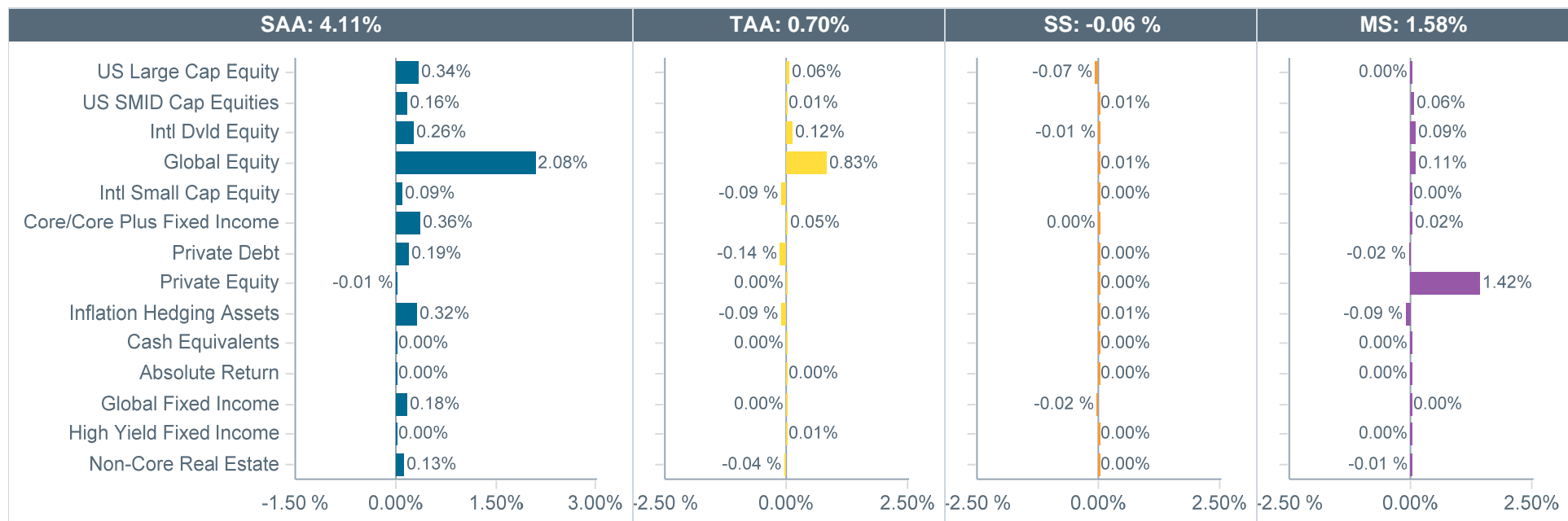
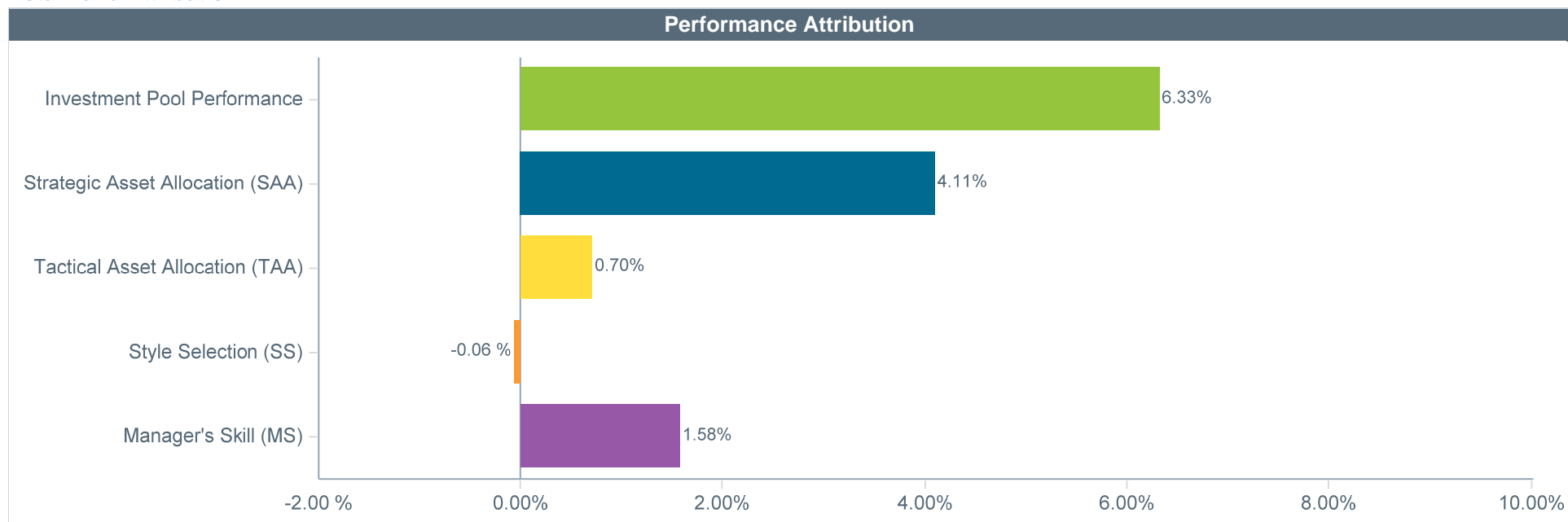
Portfolio Characteristics		
	Portfolio	Benchmark
Effective Duration	6.61	6.58
Convexity	0.42	0.28
Avg. Maturity	8.86	8.53
Avg. Quality	Aa3	Aa1/Aa2
Yield To Maturity (%)	1.96	1.51
Coupon Rate (%)	2.75	2.55



Allocation to other consists of Euros/Yankees. Portfolio characteristics for Blackrock US Agg (CF) is proxied using benchmark statistics. PIMCO Unconstrained is excluded from calculations due to fund liquidation.



Performance shown is net of fees. Calculation is based on monthly periodicity. Funds or composites with less history than the specified time period will not appear in the chart.



Performance shown is net of fees. Calculation is based on monthly. Private Asset market values, performance and benchmarks are valued quarterly and shown as of most recently available quarter end, adjusted for subsequent cash flows. RVK cautions that the interpretation of time-weighted data on non-marketable investments, such as Private Equity, is imperfect at best and can potentially be misleading. See Glossary for additional information regarding the Total Fund Attribution - IDP calculation.

General Comments

- Through this reporting period, Vermont Pension Investment Committee has committed a total of \$1,205,000,000 to 27 non-marketable alternative investments.
- The average age of active investments (based upon vintage year and weighted by commitment) was 3.16 years.
- A total of \$581,174,330 has been called or otherwise contributed to date.
- Distributions have totaled \$174,496,616 since plan inception.
- The residual estimated value of interests in these partnerships/investments is \$649,304,854.
- Since inception net performance for the investments are as follows:
 - Annualized since-inception estimated Internal Rate of Return (IRR) of 18.78%.
 - Were an investment into the benchmark index (MSCI ACW IM Index (USD) (Net)) ("Index IRR") made with the identical cash-flow pattern, the resulting return would be equal to 14.21% indicating roughly 456 basis points of annualized out-performance.
 - For every \$1 paid into the portfolio, \$1.42 has been returned as a distribution or is held in residual value (multiple on invested capital = 1.42x).

Private Credit - Direct Lending

- Private Credit - Direct Lending funds account for 21.99% of commitments, 23.41% of contributed funds, 17.68% of distributed funds, and 18.89% of reported residual value.
- Pooled portfolio since inception performance is as follows:
 - Annualized since-inception IRR of 6.42%
 - MSCI ACW IM Index (USD) (Net) IRR of 13.90%
 - A multiple on invested capital of 1.13x.

Private Credit - Distressed/Special Situations

- Private Credit - Distressed/Special Situations funds account for 4.15% of commitments, 4.03% of contributed funds, 0.00% of distributed funds, and 3.94% of reported residual value.
- Pooled portfolio since inception performance is as follows:
 - Annualized since-inception IRR - Not Material
 - MSCI ACW IM Index (USD) (Net) IRR - Not Material
 - A multiple on invested capital of 1.09x.

Private Equity - Buyout

- Private Equity - Buyout funds account for 21.33% of commitments, 18.06% of contributed funds, 18.11% of distributed funds, and 21.57% of reported residual value.
- Pooled portfolio since inception performance is as follows:
 - Annualized since-inception IRR of 26.73%
 - MSCI ACW IM Index (USD) (Net) IRR of 16.57%
 - A multiple on invested capital of 1.64x.

Private Equity - Fund of Funds

- Private Equity - Fund of Funds funds account for 5.31% of commitments, 4.32% of contributed funds, 3.41% of distributed funds, and 5.30% of reported residual value.
- Pooled portfolio since inception performance is as follows:
 - Annualized since-inception IRR of 26.36%
 - MSCI ACW IM Index (USD) (Net) IRR of 14.50%
 - A multiple on invested capital of 1.61x.

Private Equity - Natural Resources

- Private Equity - Natural Resources funds account for 10.79% of commitments, 6.73% of contributed funds, 0.11% of distributed funds, and 6.10% of reported residual value.
- Pooled portfolio since inception performance is as follows:
 - Annualized since-inception IRR of 4.57%
 - MSCI ACW IM Index (USD) (Net) IRR of 35.59%
 - A multiple on invested capital of 1.02x.

Private Equity - Non-US Private Equity

- Private Equity - Non-US Private Equity funds account for 1.24% of commitments, 2.12% of contributed funds, 2.19% of distributed funds, and 3.11% of reported residual value.
- Pooled portfolio since inception performance is as follows:
 - Annualized since-inception IRR of 22.50%
 - MSCI ACW IM Index (USD) (Net) IRR of 12.88%
 - A multiple on invested capital of 1.95x.

Private Equity - Secondaries

- Private Equity - Secondaries funds account for 13.69% of commitments, 13.34% of contributed funds, 29.93% of distributed funds, and 11.27% of reported residual value.
- Pooled portfolio since inception performance is as follows:
 - Annualized since-inception IRR of 26.31%
 - MSCI ACW IM Index (USD) (Net) IRR of 12.17%
 - A multiple on invested capital of 1.62x.

Private Equity - Venture

- Private Equity - Venture funds account for 5.73% of commitments, 7.34% of contributed funds, 10.23% of distributed funds, and 12.37% of reported residual value.
- Pooled portfolio since inception performance is as follows:
 - Annualized since-inception IRR of 30.61%
 - MSCI ACW IM Index (USD) (Net) IRR of 12.50%
 - A multiple on invested capital of 2.30x.

Real Estate - Opportunistic

- Real Estate - Opportunistic funds account for 12.86% of commitments, 18.37% of contributed funds, 17.43% of distributed funds, and 15.43% of reported residual value.
- Pooled portfolio since inception performance is as follows:
 - Annualized since-inception IRR of 8.35%
 - MSCI ACW IM Index (USD) (Net) IRR of 12.34%
 - A multiple on invested capital of 1.22x.

Real Estate - Value Added

- Real Estate - Value Added funds account for 2.90% of commitments, 2.29% of contributed funds, 0.89% of distributed funds, and 2.01% of reported residual value.
- Pooled portfolio since inception performance is as follows:
 - Annualized since-inception IRR of 12.56%
 - MSCI ACW IM Index (USD) (Net) IRR of 39.60%
 - A multiple on invested capital of 1.10x.

Vermont Pension Investment Committee
Alternative Investment Private Equity Fund Performance Listing

As of March 31, 2021

Fund Name	Vintage	Asset Class	Commitment (\$)	Paid In Capital (\$)	Distributions (\$)	Valuation (\$)	Fund IRR (%)	Quartile	Index IRR (%)	Fund Multiple
HarbourVest Partners IX - Buyout, LP	2011	Private Equity - Buyout	24,000,000	20,507,188	20,554,246	21,337,975	19.68	1st	9.66	2.04
HarbourVest Partners IX - Credit Opportunities Fund, LP	2011	Private Equity - Fund of Funds	4,000,000	3,210,265	2,593,788	2,394,668	12.83	2nd	10.85	1.55
HarbourVest Partners IX - Venture, LP	2011	Private Equity - Venture	12,000,000	11,437,671	13,268,511	22,579,495	24.93	1st	8.97	3.13
Dover Street VIII, LP (HarbourVest)	2012	Private Equity - Secondaries	25,000,000	23,000,000	29,736,297	9,388,820	20.64	2nd	8.62	1.70
HarbourVest International Private Equity Partners VII Partnership, LP	2014	Private Equity - Non-US Private Equity	15,000,000	12,300,000	3,828,657	20,179,136	22.50	1st	12.88	1.95
HarbourVest International Private Equity Partners VIII Partnership, LP	2014	Private Equity - Fund of Funds	60,000,000	21,900,000	3,363,763	32,021,562	35.36	1st	16.44	1.62
HarbourVest Partners X - Buyout, LP	2015	Private Equity - Buyout	45,500,000	26,165,287	8,681,449	35,566,575	27.53	1st	15.01	1.69
HarbourVest Partners X - Venture, LP	2015	Private Equity - Venture	19,500,000	15,650,422	3,703,130	33,919,169	39.39	1st	13.33	2.40
Dover Street IX, LP (HarbourVest)	2016	Private Equity - Secondaries	40,000,000	32,000,000	19,051,438	35,050,204	30.66	1st	13.37	1.69
Dover Street X, LP (HarbourVest)	2018	Private Equity - Secondaries	100,000,000	22,500,000	3,447,500	28,723,913	82.18	1st	29.31	1.43
HarbourVest Partners XI - Buyout Fund, LP	2018	Private Equity - Buyout	75,000,000	20,250,000	1,933,518	28,605,711	58.96	1st	34.95	1.51
HarbourVest Partners XI - Micro Buyout Fund, LP	2018	Private Equity - Buyout	12,500,000	2,812,500	217,237	4,368,448	84.50	1st	44.77	1.63
HarbourVest Partners Co-Investment Fund V, LP	2019	Private Equity - Buyout	25,000,000	17,500,000	0	28,923,220	73.98	N/A	30.84	1.65
HarbourVest Partners XI - Venture Fund, LP	2019	Private Equity - Venture	37,500,000	15,562,500	881,737	23,828,510	76.61	N/A	33.69	1.59
Nuveen Global Farmland Fund, LP	2019	Private Equity - Natural Resources	100,000,000	33,617,210	198,844	34,531,421	N/M	N/A	N/M	1.03
Pontifax Global Food and Agriculture Technology Fund II, LP	2019	Private Equity - Natural Resources	30,000,000	5,472,802	0	5,102,260	-11.69	N/A	21.61	0.93
Siguler Guff Small Buyout Opportunities Fund IV	2019	Private Equity - Buyout	50,000,000	14,300,000	210,095	17,674,518	39.30	N/A	56.08	1.25

Certain valuations (marked with a **) are preliminary estimates of valuation as of the date of reporting and reflect the estimated impact of subsequent net cash contributions/distributions. These figures may be used in calculations contained in this report. Index IRR represents the dollar-weighted returns calculated using the MSCI ACWI IM Index (USD) (Net) assuming an index investment with the same cash flow timing. IRRs are shown only for investments with one year or more of cash flows and for which an accurate IRR could be calculated. Applicable IRRs are marked with 'N/M' for not material. Fund IRR is the annualized since-inception net internal rate for the indicated fund or composite. Fund Multiple is the since inception sum of distributions and valuation divided by paid in capital. Quartile data is based on information provided by Preqin.



Vermont Pension Investment Committee
Alternative Investment Private Equity Fund Performance Listing

As of March 31, 2021

Fund Name	Vintage	Asset Class	Commitment (\$)	Paid In Capital (\$)	Distributions (\$)	Valuation (\$)	Fund IRR (%)	Quartile	Index IRR (%)	Fund Multiple
NB Strategic Co-Investment Partners IV LP	2020	Private Equity - Buyout	25,000,000	3,429,241	0	3,603,918	N/M	N/A	N/M	1.05
			700,000,000	301,615,087	111,670,210	387,799,523	27.01		14.57	1.66

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Vermont Pension Investment Committee
Alternative Investment Real Estate Fund Performance Listing

As of March 31, 2021

Fund Name	Vintage	Asset Class	Commitment (\$)	Paid In Capital (\$)	Distributions (\$)	Valuation (\$)	Fund IRR (%)	Quartile	Index IRR (%)	Fund Multiple
Siguler Guff Distressed Real Estate Opportunities Fund II	2013	Real Estate - Opportunistic	40,000,000	35,272,308	23,348,050	26,030,649	8.39	4th	7.00	1.40
Siguler Guff DREOF II Co-Investment Fund	2016	Real Estate - Opportunistic	15,000,000	12,669,146	6,164,010	9,657,441	6.77	4th	5.09	1.25
Blue Vista Real Estate Partners V	2018	Real Estate - Value Added	35,000,000	13,300,000	1,559,406	13,077,927	12.56	2nd	3.40	1.10
Brookfield Strategic Real Estate Partners III	2019	Real Estate - Opportunistic	100,000,000	58,830,100	908,272	64,486,631	9.43	N/A	2.84	1.11
			190,000,000	120,071,555	31,979,738	113,252,648	8.48		5.70	1.21

Certain valuations (marked with a "**") are preliminary estimates of valuation as of the date of reporting and reflect the estimated impact of subsequent net cash contributions/distributions. These figures may be used in calculations contained in this report. Index IRR represents the dollar-weighted returns calculated using the NCREIF ODCE Index (AWA)(Net) assuming an index investment with the same cash flow timing. IRRs are shown only for investments with one year or more of cash flows and for which an accurate IRR could be calculated. Applicable IRRs are marked with 'N/M' for not material. Fund IRR is the annualized since-inception net internal rate for the indicated fund or composite. Fund Multiple is the since inception sum of distributions and valuation divided by paid in capital. Quartile data is based on information provided by Prequin.



Vermont Pension Investment Committee
Alternative Investment Private Credit Fund Performance Listing

As of March 31, 2021

Fund Name	Vintage	Asset Class	Commitment (\$)	Paid In Capital (\$)	Distributions (\$)	Valuation (\$)	Fund IRR (%)	Quartile	Index IRR (%)	Fund Multiple
Benefit Street Partners Senior Secured Opportunities Fund	2016	Private Credit - Direct Lending	70,000,000	70,000,000	17,933,696	64,574,755	6.06	4th	4.49	1.18
(Arcmont) Direct Lending Fund III (USD-L) SLP	2018	Private Credit - Direct Lending	70,000,000	37,079,635	12,912,972	29,266,937	9.84	3rd	3.87	1.14
Benefit Street Partners Senior Secured Opportunities Fund II (Levered US)	2019	Private Credit - Direct Lending	75,000,000	12,741,635	0	11,716,697	-15.75	N/A	10.88	0.92
AG Direct Lending Fund IV, LP	2020	Private Credit - Direct Lending	50,000,000	16,250,000	0	17,100,617	N/M	N/A	N/M	1.05
Kennedy Lewis Capital Partners Master Fund II, LP	2020	Private Credit - Distressed/Special Situations	50,000,000	23,416,418	0	25,593,677	N/M	N/A	N/M	1.09
			315,000,000	159,487,688	30,846,668	148,252,683	6.97		4.90	1.12

Certain valuations (marked with a "**") are preliminary estimates of valuation as of the date of reporting and reflect the estimated impact of subsequent net cash contributions/distributions. These figures may be used in calculations contained in this report. Index IRR represents the dollar-weighted returns calculated using the CS Lvg'd Loan Index assuming an index investment with the same cash flow timing. IRRs are shown only for investments with one year or more of cash flows and for which an accurate IRR could be calculated. Applicable IRRs are marked with 'N/M' for not material. Fund IRR is the annualized since-inception net internal rate for the indicated fund or composite. Fund Multiple is the since inception sum of distributions and valuation divided by paid in capital. Quartile data is based on information provided by Preqin.



Average Commitment-weighted Active Investment Age (in years): 3.39

Vintage Year	Commitment (\$)	Paid In Capital (\$)	Distributions (\$)	Valuation (\$)	Vintage Year IRR (%)	Index IRR (%)	Vintage Year Multiple	Cumulative Multiple
2011	40,000,000	35,155,124	36,416,545	46,312,138	21.49	9.50	2.35	2.35
2012	25,000,000	23,000,000	29,736,297	9,388,820	20.64	8.62	1.70	2.10
2014	75,000,000	34,200,000	7,192,420	52,200,698	27.19	14.31	1.74	1.96
2015	65,000,000	41,815,709	12,384,579	69,485,744	32.87	14.30	1.96	1.96
2016	40,000,000	32,000,000	19,051,438	35,050,204	30.66	13.37	1.69	1.91
2018	187,500,000	45,562,500	5,598,255	61,698,072	69.02	33.49	1.48	1.82
2019	242,500,000	86,452,512	1,290,676	110,059,929	48.67	37.30	1.29	1.66
2020	25,000,000	3,429,241	0	3,603,918	N/M	N/M	1.05	1.66
TOTAL	700,000,000	301,615,087	111,670,210	387,799,523	27.01	14.57		1.66

Index IRR represents the dollar-weighted returns calculated using the MSCI ACW IM Index (USD) (Net) assuming an index investment with the same cash flow timing. IRRs are shown only for investments with one year or more of cash flows and for which an accurate IRR could be calculated. Applicable IRRs are marked with 'N/M' for not material. Vintage Year IRR is the annualized since-inception net internal rate for the indicated fund or composite. This report may contain valuations for investments that are preliminary estimates of valuation as of the date of reporting which reflect the estimated impact of subsequent net cash contributions/distributions. These figures may be used in calculations contained in this report. Vintage Year Multiple is the since inception sum of distributions and valuation divided by paid in capital. Cumulative Multiple is the since inception sum of distributions and valuation divided by paid in capital for all investments through the indicated vintage year.



Average Commitment-weighted Active Investment Age (in years): 3.73

Vintage Year	Commitment (\$)	Paid In Capital (\$)	Distributions (\$)	Valuation (\$)	Vintage Year IRR (%)	Index IRR (%)	Vintage Year Multiple	Cumulative Multiple
2013	40,000,000	35,272,308	23,348,050	26,030,649	8.39	7.00	1.40	1.40
2016	15,000,000	12,669,146	6,164,010	9,657,441	6.77	5.09	1.25	1.36
2018	35,000,000	13,300,000	1,559,406	13,077,927	12.56	3.40	1.10	1.30
2019	100,000,000	58,830,100	908,272	64,486,631	9.43	2.84	1.11	1.21
TOTAL	190,000,000	120,071,555	31,979,738	113,252,648	8.48	5.70		1.21

Index IRR represents the dollar-weighted returns calculated using the NCREIF ODCE Index (AWA)(Net) assuming an index investment with the same cash flow timing. IRRs are shown only for investments with one year or more of cash flows and for which an accurate IRR could be calculated. Applicable IRRs are marked with 'N/M' for not material. Vintage Year IRR is the annualized since-inception net internal rate for the indicated fund or composite. This report may contain valuations for investments that are preliminary estimates of valuation as of the date of reporting which reflect the estimated impact of subsequent net cash contributions/distributions. These figures may be used in calculations contained in this report. Vintage Year Multiple is the since inception sum of distributions and valuation divided by paid in capital. Cumulative Multiple is the since inception sum of distributions and valuation divided by paid in capital for all investments through the indicated vintage year.



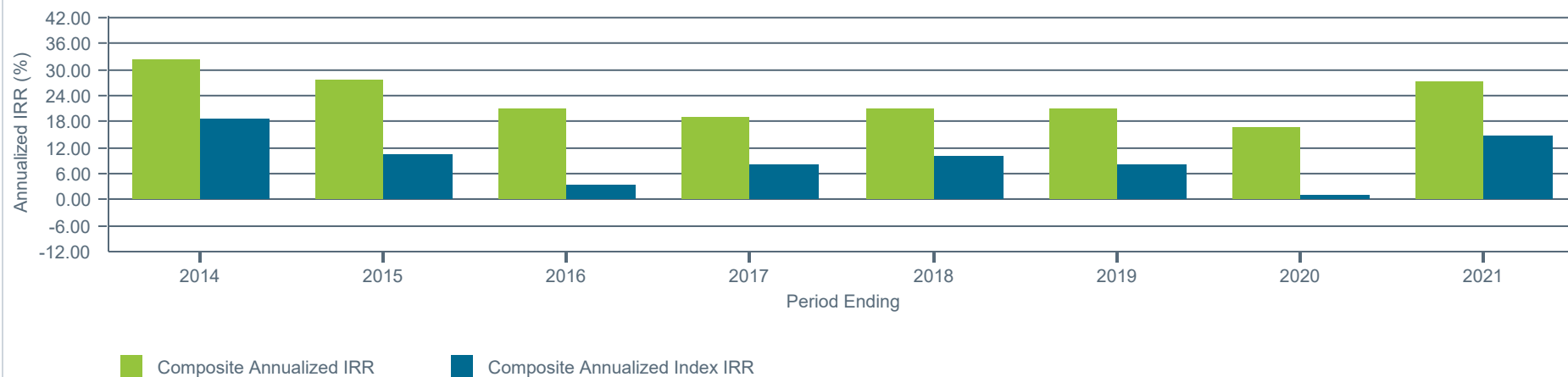
Average Commitment-weighted Active Investment Age (in years): 2.32

Vintage Year	Commitment (\$)	Paid In Capital (\$)	Distributions (\$)	Valuation (\$)	Vintage Year IRR (%)	Index IRR (%)	Vintage Year Multiple	Cumulative Multiple
2016	70,000,000	70,000,000	17,933,696	64,574,755	6.06	4.49	1.18	1.18
2018	70,000,000	37,079,635	12,912,972	29,266,937	9.84	3.87	1.14	1.16
2019	75,000,000	12,741,635	0	11,716,697	-15.75	10.88	0.92	1.14
2020	100,000,000	39,666,418	0	42,694,294	N/M	N/M	1.08	1.12
TOTAL	315,000,000	159,487,688	30,846,668	148,252,683	6.97	4.90		1.12

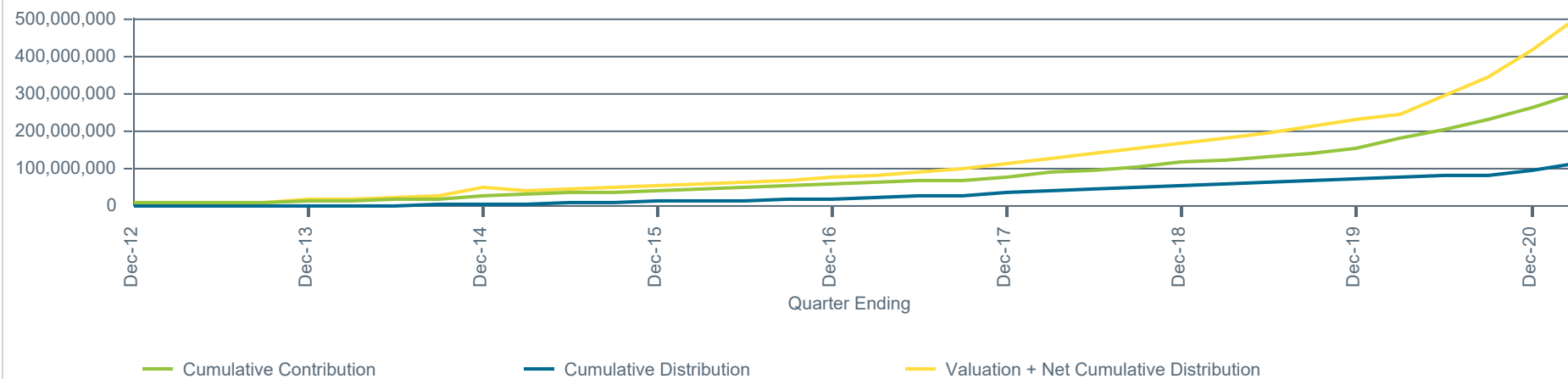
Index IRR represents the dollar-weighted returns calculated using the CS Lvg'd Loan Index assuming an index investment with the same cash flow timing. IRRs are shown only for investments with one year or more of cash flows and for which an accurate IRR could be calculated. Applicable IRRs are marked with 'N/M' for not material. Vintage Year IRR is the annualized since-inception net internal rate for the indicated fund or composite. This report may contain valuations for investments that are preliminary estimates of valuation as of the date of reporting which reflect the estimated impact of subsequent net cash contributions/distributions. These figures may be used in calculations contained in this report. Vintage Year Multiple is the since inception sum of distributions and valuation divided by paid in capital. Cumulative Multiple is the since inception sum of distributions and valuation divided by paid in capital for all investments through the indicated vintage year.



Since Inception Annualized Composite IRR

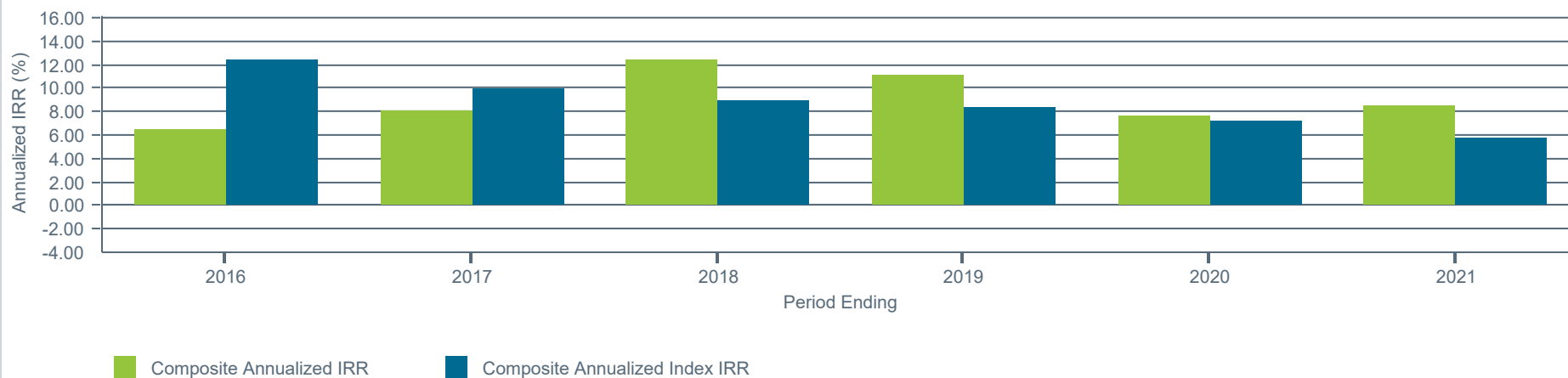


Since Inception Cash Flow (\$)

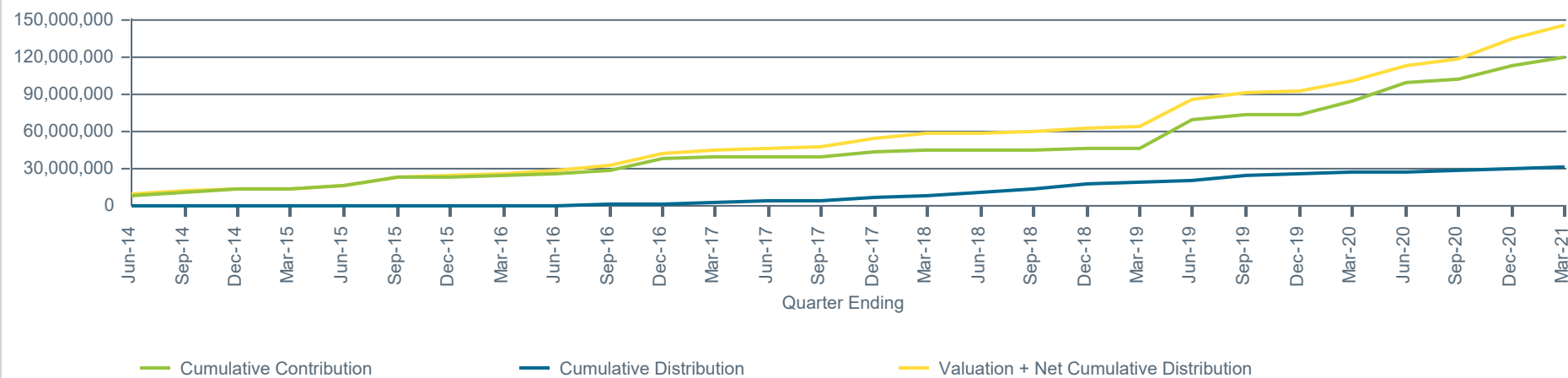


Index IRR represents the dollar-weighted returns calculated using the MSCI ACW IM Index (USD) (Net) assuming an index investment with the same cash flow timing. This report may contain valuations for investments that are preliminary estimates of valuation as of the date of reporting which reflect the estimated impact of subsequent net cash contributions/distributions. These figures may be used in calculations contained in this report. IRRs are shown only for investments with one year or more of cash flows and for which an accurate IRR could be calculated.

Since Inception Annualized Composite IRR

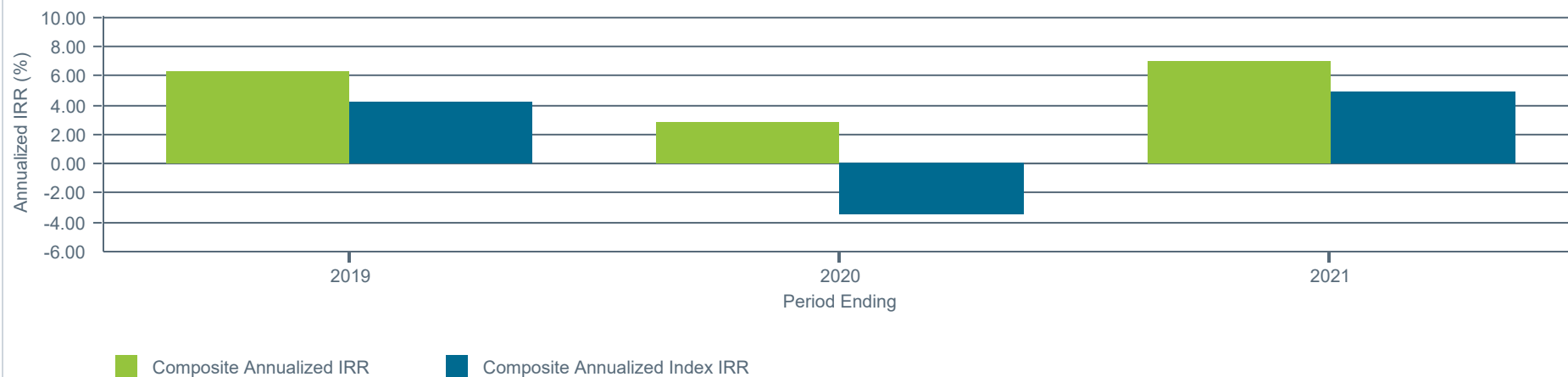


Since Inception Cash Flow (\$)

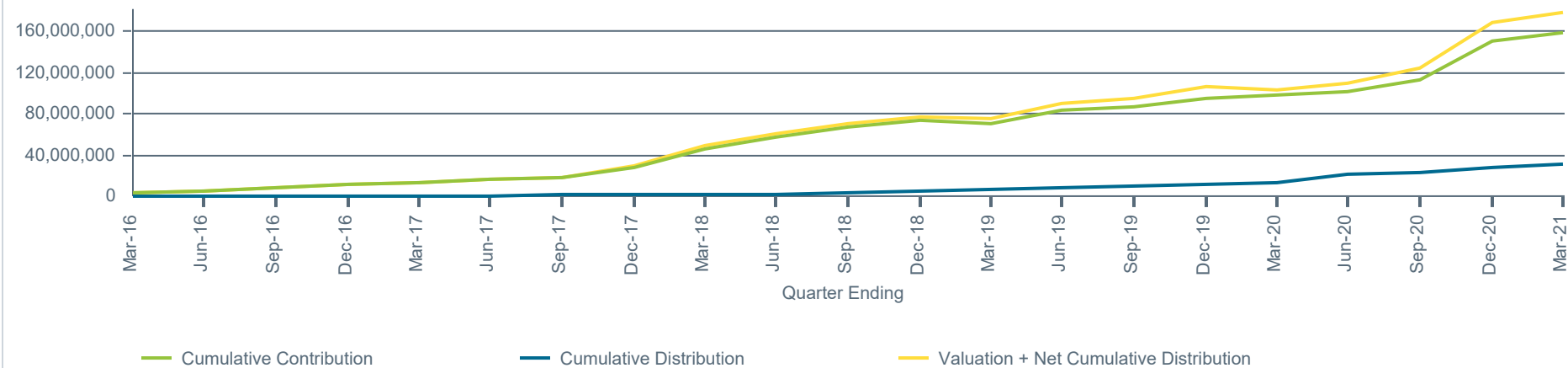


Index IRR represents the dollar-weighted returns calculated using the NCREIF ODCE Index (AWA)(Net) assuming an index investment with the same cash flow timing. This report may contain valuations for investments that are preliminary estimates of valuation as of the date of reporting which reflect the estimated impact of subsequent net cash contributions/distributions. These figures may be used in calculations contained in this report. IRRs are shown only for investments with one year or more of cash flows and for which an accurate IRR could be calculated.

Since Inception Annualized Composite IRR



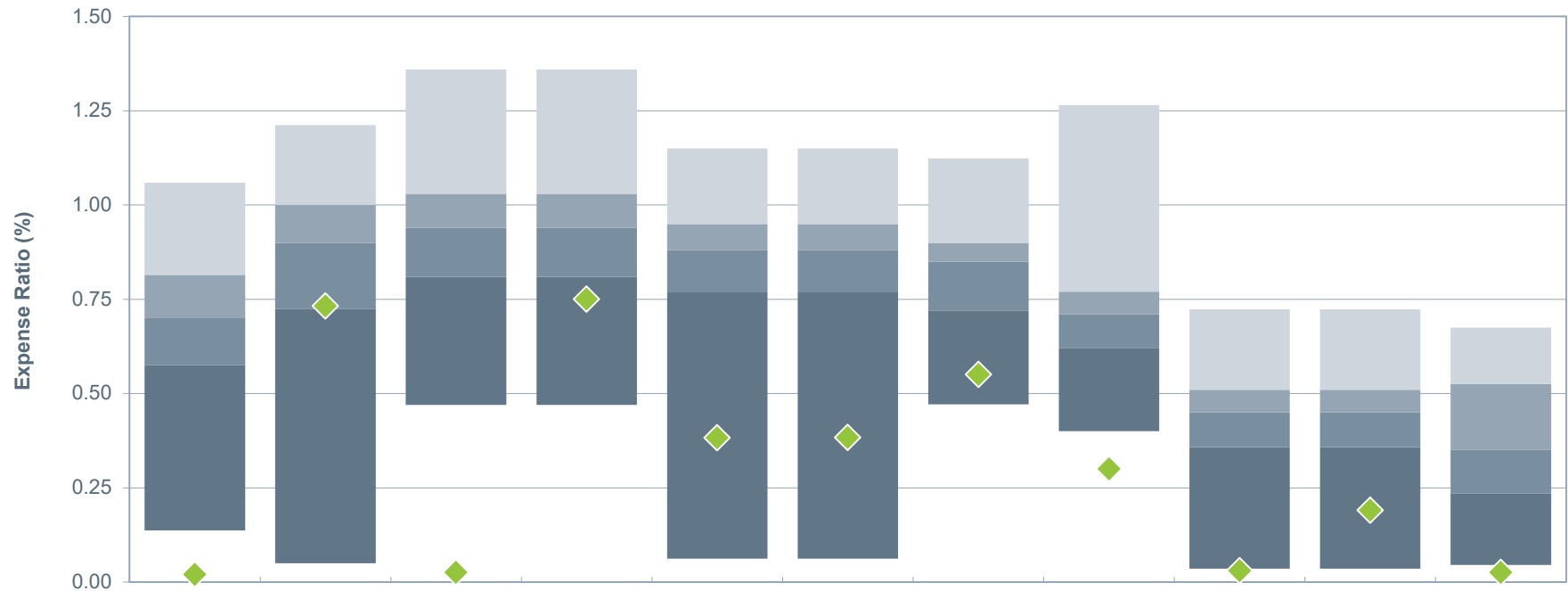
Since Inception Cash Flow (\$)



Index IRR represents the dollar-weighted returns calculated using the CS Lvg'd Loan Index assuming an index investment with the same cash flow timing. This report may contain valuations for investments that are preliminary estimates of valuation as of the date of reporting which reflect the estimated impact of subsequent net cash contributions/distributions. These figures may be used in calculations contained in this report. IRRs are shown only for investments with one year or more of cash flows and for which an accurate IRR could be calculated.

Vermont Pension Investment Committee
Fund Fees Peer Group Analysis

As of June 30, 2021



Fund	Blackrock S&P 500 (Eq Wtd) (CF)	Champlain US Mid Cap Core (SA)	BlackRock MSCI ACW IMI (CF)	Artisan Global Opp (CF)	Acadian Int'l All Cap (SA)	Mondrian Int'l Equity (SA)	Wellington Opp EMD (CF)	PIMCO Liquidation (SA)	BlackRock US Agg (CF)	PIMCO Core (SA)	BlackRock TIPS (CF)
Peer Group	U.S. Large Cap Equity (MF)	U.S. SMID Cap Equity (MF)	Global Equity (MF)	Global Equity (MF)	All EAFE (MF)	All EAFE (MF)	Emerging Markets Debt (MF)	U.S. High Yield Bonds (MF)	U.S. Broad Market Core Fixed Income (MF)	U.S. Broad Market Core Fixed Income (MF)	U.S. TIPS (MF)
◆ Fund Expense Ratio	0.02	0.73	0.03	0.75	0.38	0.38	0.55	0.30	0.03	0.19	0.03
Median Expense Ratio	0.70	0.90	0.94	0.94	0.88	0.88	0.85	0.71	0.45	0.45	0.35
Percentile Rank	2	26	1	18	12	12	6	3	5	16	4
Population	435	135	341	341	153	153	74	174	132	132	51

Fund Expense Ratios are intuitively ranked (i.e., a lower expense ratio yields a better percentile rank than a higher expense ratio).
The fee peer groups consist of only institutional share classes.

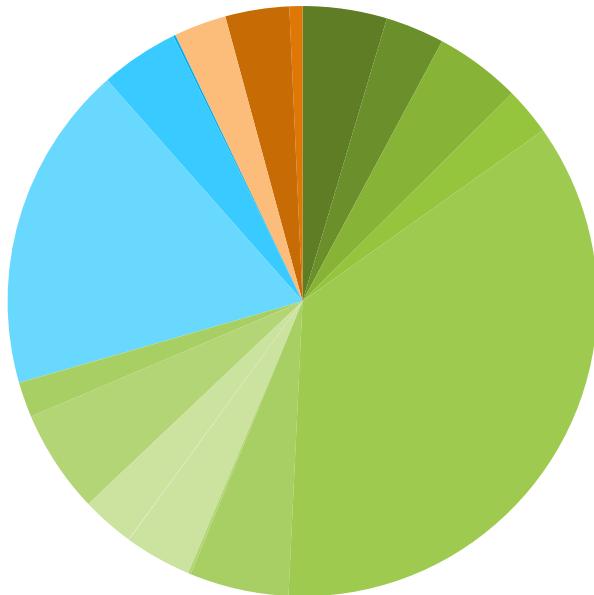
VMERS



Vermont Municipal Employees' Retirement System
Asset Allocation By Manager

As of June 30, 2021

June 30, 2021 : \$901,438,968



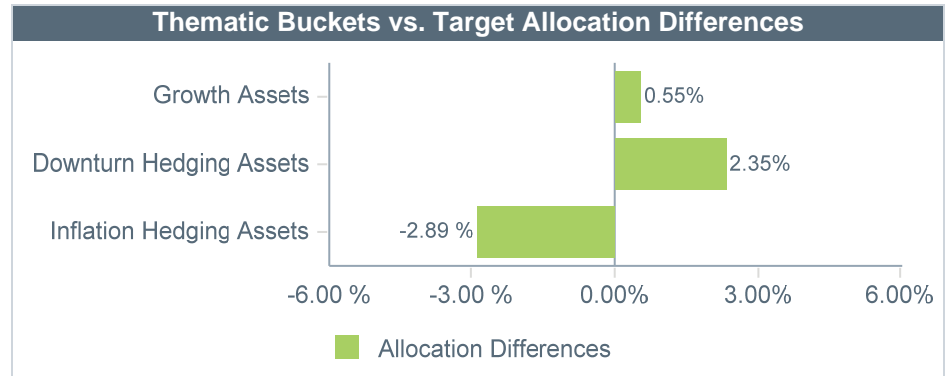
	Market Value (\$)	Allocation (%)
Blackrock S&P 500 (EqI Wtd) (CF)	41,603,275	4.62
Champlain US Mid Cap Core (SA)	29,134,925	3.23
SSgA Russell 2000 Growth (Ex Tobacco) (SA)	3,294	0.00
Acadian International All Cap (SA)	42,579,284	4.72
Mondrian International (SA)	23,465,937	2.60
BlackRock MSCI ACW IMI (CF)	320,764,377	35.58
Artisan Global Opportunities (CF)	48,943,878	5.43
PIMCO Liquidation (SA)	1,376,369	0.15
Wellington Opportunistic EMD (CF)	33,092,863	3.67
PIMCO Unconstrained (SA)	350,350	0.04
Private Debt	26,048,006	2.89
Private Equity	51,080,042	5.67
Non-Core Real Estate	17,348,521	1.92
Pinnacle Natural Resources (CF)	143,898	0.02
BlackRock US Agg (CF)	161,618,560	17.93
PIMCO Core (SA)	38,845,205	4.31
Vermont Cash (SA)	981,640	0.11
BlackRock TIPS (CF)	26,003,614	2.88
UBS Trumbull Properties (CF)	31,604,681	3.51
Private Infrastructure/Land	6,450,079	0.72
Real Estate Cash (CF)	168	0.00

Allocations shown may not sum up to 100% exactly due to rounding. Market values for SSgA Russell 2000 Growth (SA), Pinnacle Natural Resources (CF) and PIMCO Unconstrained (SA) represent residual assets after liquidation. During 06/2021, Blackrock Transition was liquidated.

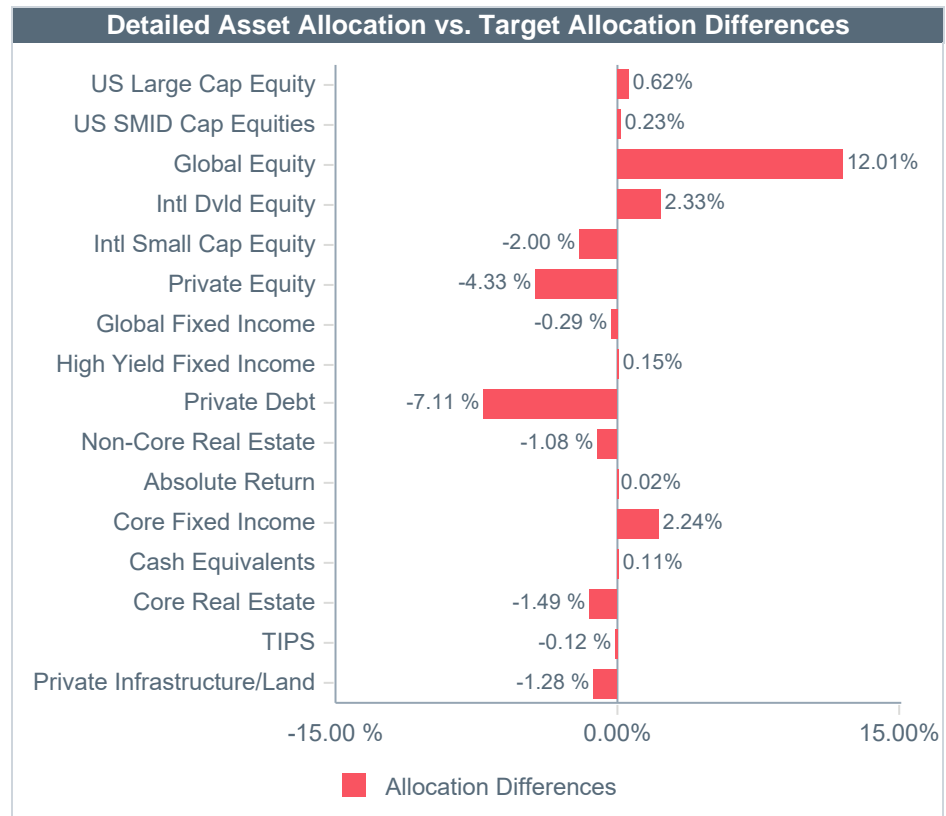
Vermont Municipal Employees' Retirement System
Total Fund
Asset Allocation vs. Target Allocation

As of June 30, 2021

Thematic Buckets vs. Target Allocation			
	Market Value (\$)	Allocation (%)	Target (%)
Growth Assets	635,935,021	70.55	70.00
Downturn Hedging Assets	201,445,405	22.35	20.00
Inflation Hedging Assets	64,058,542	7.11	10.00
Total Fund	901,438,968	100.00	100.00



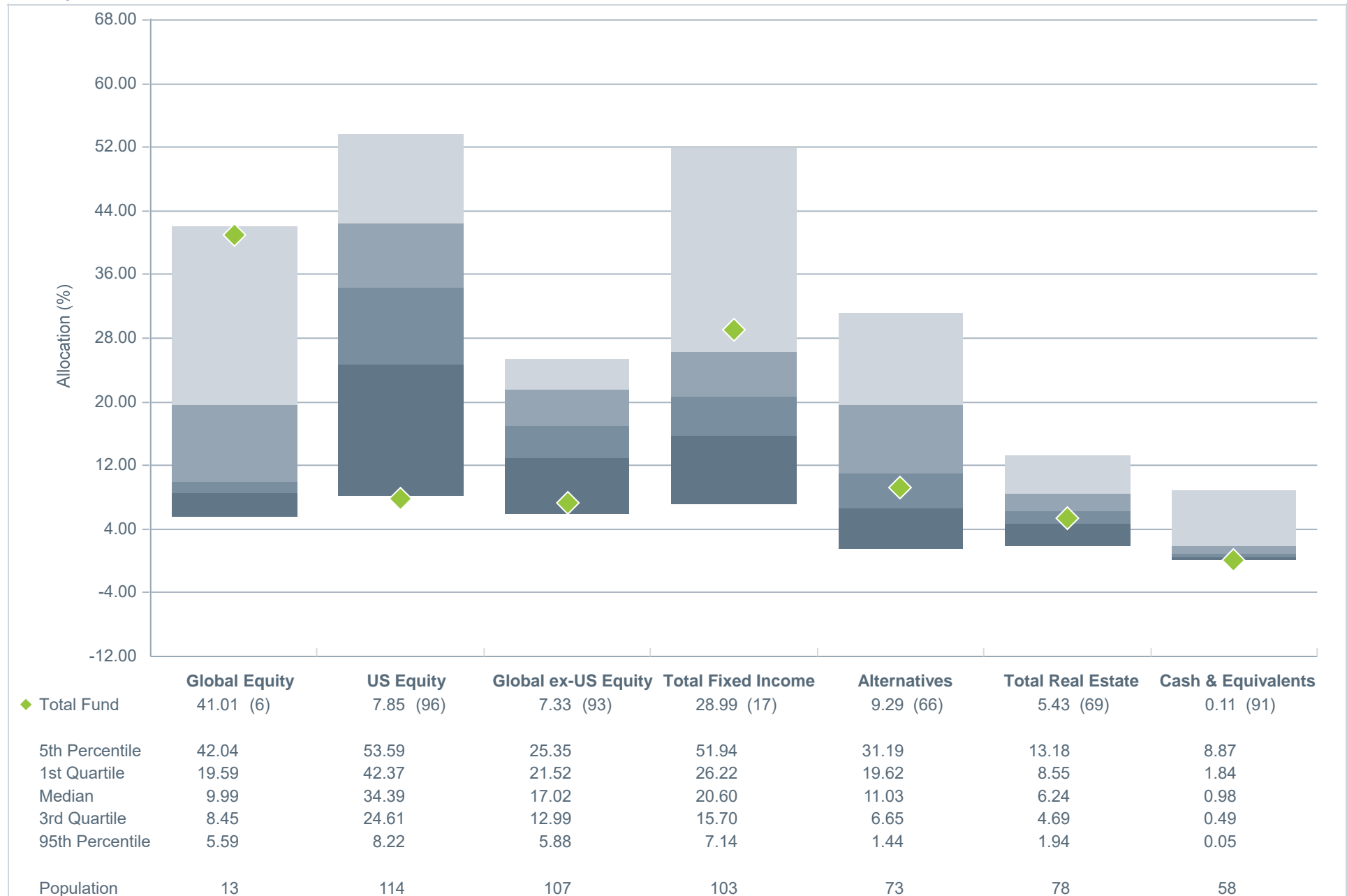
Detailed Asset Allocation vs. Target Allocation			
	Market Value (\$)	Allocation (%)	Target (%)
US Large Cap Equity	41,603,275	4.62	4.00
US SMID Cap Equities	29,138,220	3.23	3.00
Global Equity	369,708,255	41.01	29.00
Intl Dvld Equity	66,045,221	7.33	5.00
Intl Small Cap Equity	-	0.00	2.00
Private Equity	51,080,042	5.67	10.00
Global Fixed Income	33,443,213	3.71	4.00
High Yield Fixed Income	1,376,369	0.15	0.00
Private Debt	26,048,006	2.89	10.00
Non-Core Real Estate	17,348,521	1.92	3.00
Absolute Return	143,898	0.02	0.00
Core Fixed Income	200,463,765	22.24	20.00
Cash Equivalents	981,640	0.11	0.00
Core Real Estate	31,604,849	3.51	5.00
TIPS	26,003,614	2.88	3.00
Private Infrastructure/Land	6,450,079	0.72	2.00
Total Fund	901,438,968	100.00	100.00



Allocations shown may not sum up to 100% exactly due to rounding.

Vermont Municipal Employees' Retirement System
All Public Plans (\$500M to \$5B) (Custom PG)
Plan Sponsor TF Asset Allocation

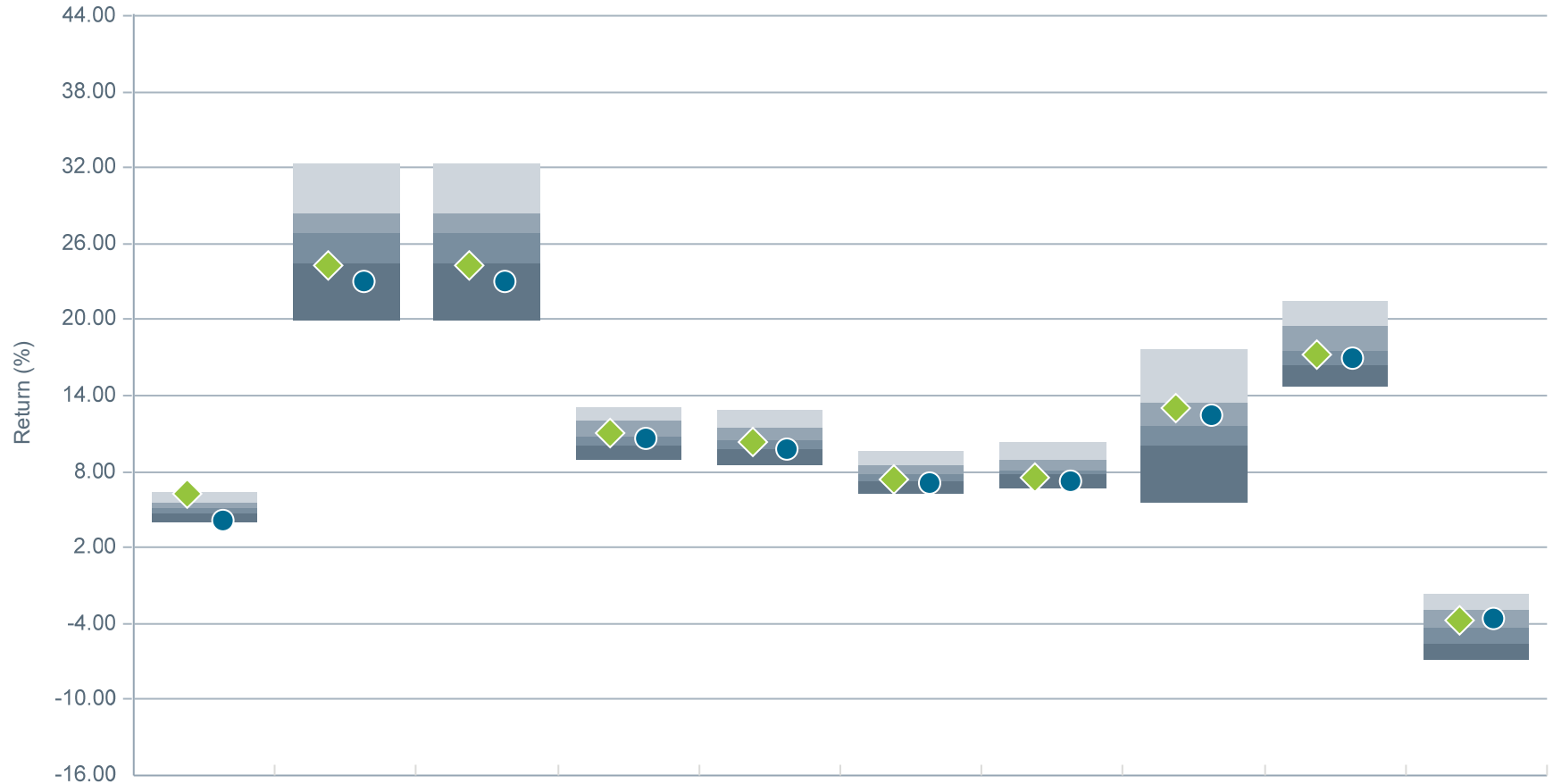
As of June 30, 2021



Parentheses contain percentile ranks. Total Fixed Income includes TIPS.

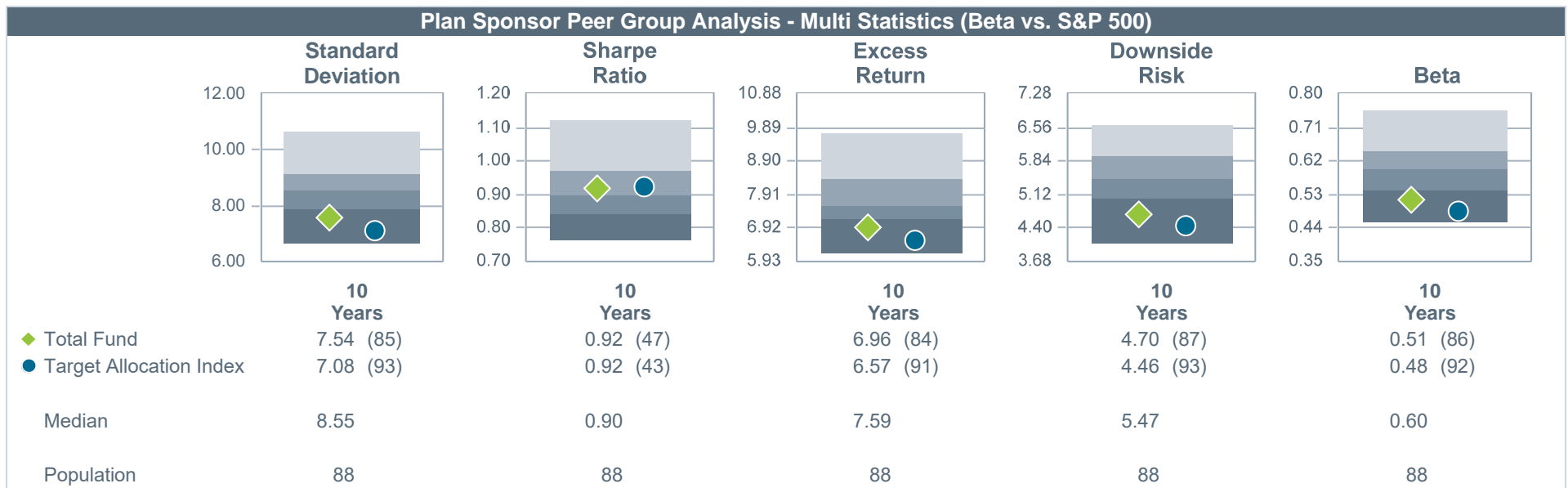
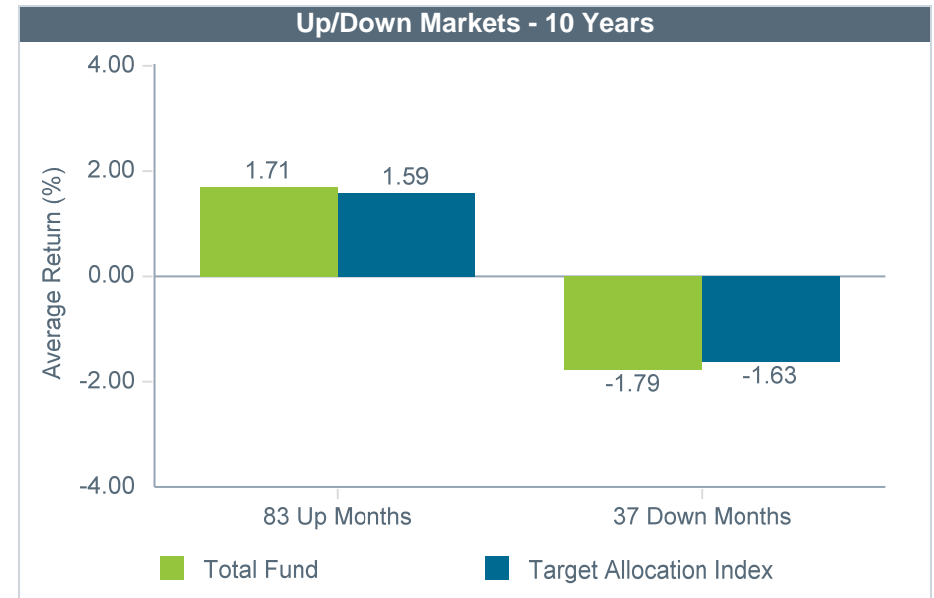
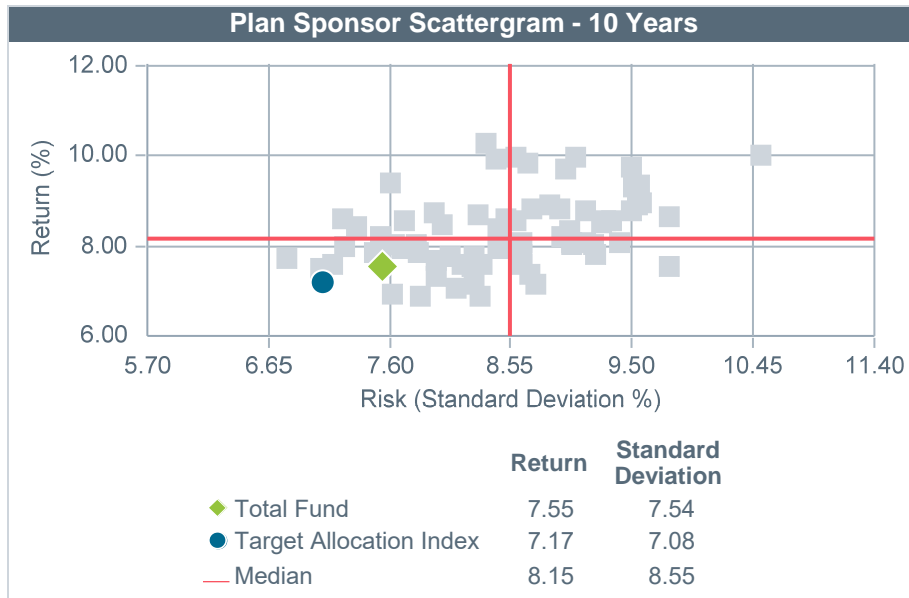
Vermont Municipal Employees' Retirement System
All Public Plans (\$500M to \$5B) (Custom PG)
Plan Sponsor Peer Group Analysis

As of June 30, 2021



	QTD	FYTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018
◆ Total Fund	6.23 (9)	24.32 (76)	24.32 (76)	10.98 (44)	10.32 (60)	7.33 (73)	7.55 (83)	12.95 (38)	17.19 (61)	-3.71 (36)
● Target Allocation Index	4.11 (93)	22.95 (89)	22.95 (89)	10.67 (54)	9.78 (77)	7.13 (81)	7.17 (89)	12.51 (43)	16.91 (69)	-3.63 (36)
5th Percentile	6.40	32.31	32.31	12.99	12.82	9.67	10.31	17.65	21.46	-1.65
1st Quartile	5.58	28.37	28.37	11.98	11.52	8.47	8.93	13.43	19.51	-2.96
Median	5.19	26.75	26.75	10.82	10.49	7.75	8.15	11.67	17.51	-4.29
3rd Quartile	4.64	24.41	24.41	10.04	9.80	7.26	7.75	10.05	16.35	-5.57
95th Percentile	3.94	19.96	19.96	8.88	8.46	6.19	6.63	5.58	14.65	-6.82
Population	112	111	111	104	101	98	88	128	115	76

Performance shown is net of fees. Parentheses contain percentile ranks.



Performance shown is net of fees. Calculation is based on monthly periodicity. Parentheses contain percentile ranks.

Vermont Municipal Employees' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation		Performance (%)									Inception Date
	Market Value (\$)	Actual (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	
Total Fund	901,438,968	100.00	6.23	24.32	24.32	10.98	10.32	7.55	6.54	12.95	6.81	07/01/2005
Target Allocation Index			4.11	22.95	22.95	10.67	9.78	7.17	6.44	12.51	6.66	
Difference			2.12	1.37	1.37	0.31	0.54	0.38	0.10	0.44	0.15	
Actual Allocation Index			4.78	23.51	23.51	10.11	9.63	7.05	6.37	11.38	6.58	
Difference			1.45	0.81	0.81	0.87	0.69	0.50	0.17	1.57	0.23	
Growth Assets	635,935,021	70.55	8.10	-	-	-	-	-	-	-	26.57	09/01/2020
MSCI ACW IM Index (USD) (Net)			7.18	40.94	40.94	14.24	14.55	9.90	7.74	16.25	26.33	
Difference			0.92	-	-	-	-	-	-	-	0.24	
Downturn Hedging Assets	201,445,405	22.35	1.90	-	-	-	-	-	-	-	-0.83	09/01/2020
Bloomberg US Agg Bond Index			1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	-1.00	
Difference			0.07	-	-	-	-	-	-	-	0.17	
Inflation Hedging Assets	64,058,542	7.11	2.17	-	-	-	-	-	-	-	0.78	09/01/2020
Consumer Price Index+2.5%			3.21	8.03	8.03	5.11	4.99	4.42	4.51	3.90	6.70	
Difference			-1.04	-	-	-	-	-	-	-	-5.92	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Manager inception dates shown represent the first full month of available performance. Fiscal year ends 6/30. Please see addendum for custom benchmark definitions. Private Asset market values and performance are lagged to match custodian reported net asset values. Accordingly, fund reported performance will lag benchmark reported performance.

Vermont Municipal Employees' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
Total Fund	901,438,968	100.00	100.00	6.23	24.32	24.32	10.98	10.32	7.55	6.54	12.95	6.81	07/01/2005
Target Allocation Index				4.11	22.95	22.95	10.67	9.78	7.17	6.44	12.51	6.66	
Difference				2.12	1.37	1.37	0.31	0.54	0.38	0.10	0.44	0.15	
Actual Allocation Index				4.78	23.51	23.51	10.11	9.63	7.05	6.37	11.38	6.58	
Difference				1.45	0.81	0.81	0.87	0.69	0.50	0.17	1.57	0.23	
All Public Plans (\$500M to \$5B)				5.19	26.75	26.75	10.82	10.49	8.15	6.97	11.67	7.06	
Rank				9	76	76	44	60	83	78	38	73	
Domestic Equity	70,741,495	7.85	7.00	7.22	48.91	48.91	16.67	16.39	13.90	-	19.18	13.96	01/01/2011
Russell 3000 Index				8.24	44.16	44.16	18.73	17.89	14.70	10.78	20.89	14.62	
Difference				-1.02	4.75	4.75	-2.06	-1.50	-0.80	-	-1.71	-0.66	
US Large Cap Equity	41,603,275	4.62	4.00	6.85	50.66	50.66	15.19	15.44	13.66	10.47	13.03	10.62	07/01/2005
S&P 500 Index (Cap Wtd)				8.55	40.79	40.79	18.67	17.65	14.84	10.73	18.40	10.60	
Difference				-1.70	9.87	9.87	-3.48	-2.21	-1.18	-0.26	-5.37	0.02	
Blackrock S&P 500 (Eq Wtd) (CF)	41,603,275	4.62	-	6.85	50.66	50.66	-	-	-	-	13.03	20.80	07/01/2019
S&P 500 Index (Eq Wtd)				6.90	50.71	50.71	16.41	15.68	13.76	10.98	12.83	20.75	
Difference				-0.05	-0.05	-0.05	-	-	-	-	0.20	0.05	
IM U.S. Large Cap Equity (MF) Median				8.22	40.68	40.68	18.02	17.10	13.73	10.14	18.34	22.80	
Rank				68	7	7	-	-	-	-	64	59	
US SMID Cap Equities	29,138,220	3.23	3.00	7.77	46.21	46.21	18.07	17.81	14.24	11.14	27.32	11.08	07/01/2005
Russell 2500 Index				5.44	57.79	57.79	15.24	16.35	12.86	10.25	19.99	10.45	
Difference				2.33	-11.58	-11.58	2.83	1.46	1.38	0.89	7.33	0.63	
Champlain US Mid Cap Core (SA)	29,134,925	3.23	-	7.76	46.20	46.20	18.06	18.68	15.06	-	27.32	16.16	10/01/2009
Custom SMID Cap Equity Index				5.90	59.50	59.50	14.28	16.43	12.75	10.18	19.99	14.24	
Difference				1.86	-13.30	-13.30	3.78	2.25	2.31	-	7.33	1.92	
IM U.S. SMID Cap Equity (MF) Median				4.87	52.55	52.55	14.63	16.05	12.41	10.31	20.27	13.98	
Rank				7	76	76	34	35	19	-	41	26	
Global Equity	369,708,255	41.01	29.00	7.48	41.32	41.32	14.26	-	-	-	20.39	9.45	02/01/2018
MSCI ACW IM Index (USD) (Net)				7.18	40.94	40.94	14.24	14.55	9.90	7.74	16.25	10.63	
Difference				0.30	0.38	0.38	0.02	-	-	-	4.14	-1.18	

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Vermont Municipal Employees' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
BlackRock MSCI ACW IMI (CF)	320,764,377	35.58	-	7.27	41.54	41.54	-	-	-	-	16.77	19.93	07/01/2019
MSCI ACW IM Index (USD) (Net)				7.18	40.94	40.94	14.24	14.55	9.90	7.74	16.25	19.41	
Difference				0.09	0.60	0.60	-	-	-	-	0.52	0.52	
IM Global Equity (MF) Median				6.95	39.41	39.41	13.96	13.31	9.73	7.52	15.21	19.06	
Rank				45	42	42	-	-	-	-	44	46	
Artisan Global Opportunities (CF)	48,943,878	5.43	-	8.93	35.04	35.04	21.47	-	-	-	40.50	21.47	07/01/2018
MSCI ACW Index (USD) (Net)				7.39	39.26	39.26	14.57	14.61	9.90	7.60	16.25	14.57	
Difference				1.54	-4.22	-4.22	6.90	-	-	-	24.25	6.90	
IM Global Equity (MF) Median				6.95	39.41	39.41	13.96	13.31	9.73	7.52	15.21	13.96	
Rank				20	67	67	12	-	-	-	14	12	
International Equity	66,045,221	7.33	7.00	6.32	39.30	39.30	8.57	10.35	5.90	-	4.89	6.10	01/01/2011
MSCI EAFE Index (USD) (Net)				5.17	32.35	32.35	8.27	10.28	5.89	4.40	7.82	6.09	
Difference				1.15	6.95	6.95	0.30	0.07	0.01	-	-2.93	0.01	
Acadian International All Cap (SA)	42,579,284	4.72	-	7.06	42.32	42.32	9.40	13.40	8.41	5.49	12.37	6.75	11/01/2005
MSCI EAFE IM Index (USD) (Net)				5.04	33.57	33.57	8.28	10.53	6.22	4.69	8.47	5.61	
Difference				2.02	8.75	8.75	1.12	2.87	2.19	0.80	3.90	1.14	
IM All EAFE (MF) Median				5.17	32.88	32.88	8.19	9.89	5.69	4.34	8.17	5.26	
Rank				11	7	7	33	8	9	23	33	15	
Mondrian International (SA)	23,465,937	2.60	-	5.00	34.11	34.11	5.85	7.55	5.14	4.27	-4.01	5.40	07/01/2005
MSCI EAFE Index (USD) (Net)				5.17	32.35	32.35	8.27	10.28	5.89	4.40	7.82	5.66	
Difference				-0.17	1.76	1.76	-2.42	-2.73	-0.75	-0.13	-11.83	-0.26	
IM All EAFE (MF) Median				5.17	32.88	32.88	8.19	9.89	5.69	4.34	8.17	5.59	
Rank				58	40	40	77	85	65	53	98	58	
Fixed Income	235,283,348	26.10	24.00	2.20	1.28	1.28	5.24	4.18	4.20	-	8.14	4.41	01/01/2011
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	3.49	
Difference				0.37	1.62	1.62	-0.10	1.15	0.81	-	0.63	0.92	
Core Fixed Income	200,463,765	22.24	20.00	1.91	-	-	-	-	-	-	-	-0.83	09/01/2020
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	-1.00	
Difference				0.08	-	-	-	-	-	-	-	0.17	

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Vermont Municipal Employees' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
BlackRock US Agg (CF)	161,618,560	17.93	-	1.84	-0.31	-0.31	-	-	-	-	7.54	4.38	06/01/2019
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	4.56	
Difference				0.01	0.03	0.03	-	-	-	-	0.03	-0.18	
IM U.S. Broad Mkt Core FI (MF)				1.93	1.25	1.25	5.62	3.31	3.51	4.41	8.19	5.10	
Rank				60	88	88	-	-	-	-	71	81	
PIMCO Core (SA)	38,845,205	4.31	-	2.19	-	-	-	-	-	-	-	-0.23	09/01/2020
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	-1.00	
Difference				0.36	-	-	-	-	-	-	-	0.77	
IM U.S. Broad Mkt Core FI (MF)				1.93	1.25	1.25	5.62	3.31	3.51	4.41	8.19	0.11	
Rank				20	-	-	-	-	-	-	-	63	
Emerging Markets Debt	33,092,863	3.67	4.00	3.97	-	-	-	-	-	-	-	2.84	09/01/2020
JPM Emg Mkts Bond Gbl Index (USD)				3.93	6.81	6.81	6.48	4.44	5.34	6.74	5.88	2.70	
Difference				0.04	-	-	-	-	-	-	-	0.14	
Wellington Opportunistic EMD (CF)	33,092,863	3.67	-	3.97	7.37	7.37	6.83	5.44	5.76	-	7.69	6.51	12/01/2009
JPM Emg Mkts Bond Gbl Index (USD)				3.93	6.81	6.81	6.48	4.44	5.34	6.74	5.88	6.11	
Difference				0.04	0.56	0.56	0.35	1.00	0.42	-	1.81	0.40	
IM Emerging Markets Debt (MF) Median				3.71	9.08	9.08	6.15	4.67	4.32	5.83	5.57	5.22	
Rank				34	90	90	27	20	3	-	15	4	
High Yield Fixed Income	1,376,369	0.15	0.00	2.36	20.27	20.27	4.07	5.19	5.40	6.35	3.21	6.29	06/01/2006
Bloomberg US Corp Hi Yld Index				2.74	15.37	15.37	7.45	7.48	6.66	7.53	7.11	7.46	
Difference				-0.38	4.90	4.90	-3.38	-2.29	-1.26	-1.18	-3.90	-1.17	
PIMCO Liquidation (SA)	1,376,369	0.15	-	2.36	20.27	20.27	-	-	-	-	3.27	3.93	08/01/2018
Bloomberg US Corp Hi Yld Index				2.74	15.37	15.37	7.45	7.48	6.66	7.53	7.11	7.27	
Difference				-0.38	4.90	4.90	-	-	-	-	-3.84	-3.34	
IM U.S. High Yield Bonds (MF) Median				2.59	14.69	14.69	6.43	6.39	5.54	6.22	5.28	6.23	
Rank				67	9	9	-	-	-	-	81	95	
Private Debt	26,048,006	2.89	10.00	1.35	16.27	16.27	5.98	-	-	-	2.43	6.31	01/01/2018
CS Lvg'd Loan Index+2% (Spliced)				1.95	12.98	12.98	4.81	5.24	4.51	4.72	3.12	4.74	
Difference				-0.60	3.29	3.29	1.17	-	-	-	-0.69	1.57	

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Vermont Municipal Employees' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

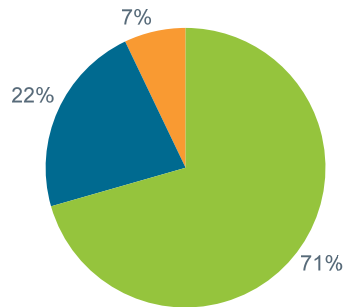
	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
Private Equity	51,080,042	5.67	10.00	26.99	59.04	59.04	24.42	22.50	-	-	17.35	19.91	01/01/2013
Cambridge US Prvt Eq Index				0.00	35.55	35.55	15.67	16.57	13.90	12.71	21.32	14.69	
Difference				26.99	23.49	23.49	8.75	5.93	-	-	-3.97	5.22	
Non-Core Real Estate	17,348,521	1.92	3.00	3.76	8.98	8.98	4.73	8.85	-	-	-1.92	9.15	09/01/2014
NCREIF ODCE Index+2% (Spliced)				4.19	8.70	8.70	5.94	6.39	8.92	7.07	1.60	8.11	
Difference				-0.43	0.28	0.28	-1.21	2.46	-	-	-3.52	1.04	
Inflation Hedging Assets (Spliced)	64,058,542	7.11	10.00	2.17	-2.26	-2.26	-0.28	3.01	7.45	-	-2.75	8.23	01/01/2011
CPI+2.5% (Spliced)				3.21	6.70	6.70	5.28	6.00	8.72	6.93	0.75	9.03	
Difference				-1.04	-8.96	-8.96	-5.56	-2.99	-1.27	-	-3.50	-0.80	
TIPS	26,003,614	2.88	2.00	3.24	-	-	-	-	-	-	-	2.98	09/01/2020
Bloomberg US Trsy US TIPS Index				3.25	6.51	6.51	6.53	4.17	3.40	4.56	10.99	3.00	
Difference				-0.01	-	-	-	-	-	-	-	-0.02	
BlackRock TIPS (CF)	26,003,614	2.88	-	3.24	6.49	6.49	6.46	4.12	3.33	-	10.98	3.74	12/01/2009
Bloomberg US Trsy US TIPS Index				3.25	6.51	6.51	6.53	4.17	3.40	4.56	10.99	3.78	
Difference				-0.01	-0.02	-0.02	-0.07	-0.05	-0.07	-	-0.01	-0.04	
IM U.S. TIPS (MF) Median				2.71	6.51	6.51	5.76	3.72	2.70	3.87	9.64	3.14	
Rank				20	52	52	21	29	13	-	26	11	
Core Real Estate	31,604,849	3.51	5.00	1.28	-3.51	-3.51	-0.98	1.84	6.89	-	-2.26	7.70	01/01/2011
NCREIF ODCE Index (AWA) (Net)				3.68	7.09	7.09	4.60	5.62	8.60	5.34	0.34	9.00	
Difference				-2.40	-10.60	-10.60	-5.58	-3.78	-1.71	-	-2.60	-1.30	
UBS Trumbull Properties (CF)	31,604,681	3.51	-	1.28	-3.51	-3.51	-0.95	1.66	5.36	4.22	-2.26	4.84	07/01/2005
NCREIF ODCE Index (AWA) (Net)				3.68	7.09	7.09	4.60	5.62	8.60	5.34	0.34	6.09	
Difference				-2.40	-10.60	-10.60	-5.55	-3.96	-3.24	-1.12	-2.60	-1.25	
Private Infrastructure/Land	6,450,079	0.72	3.00	2.17	-	-	-	-	-	-	-	2.80	08/01/2020
NCREIF Farmland Index (TR)				1.47	4.97	4.97	4.82	5.51	10.24	11.12	3.08	4.97	
Difference				0.70	-	-	-	-	-	-	-	-2.17	
Cash Equivalents	981,640	0.11	0.00	-0.06	0.00	0.00	0.36	0.24	0.13	-	0.37	0.14	01/01/2011
ICE BofAML 3 Mo US T-Bill Index				0.00	0.09	0.09	1.34	1.17	0.63	1.08	0.67	0.61	
Difference				-0.06	-0.09	-0.09	-0.98	-0.93	-0.50	-	-0.30	-0.47	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Manager inception dates shown represent the first full month of available performance. Fiscal year ends 6/30. Please see addendum for custom benchmark definitions. Private Asset market values and performance are lagged to match custodian reported net asset values. Accordingly, fund reported performance will lag benchmark reported performance. Negative cash performance is due to a valuation decline in the Blackrock Transition account during its liquidation.

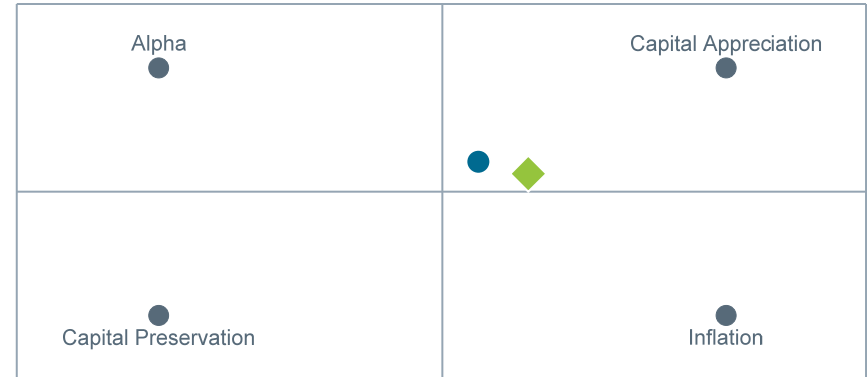
Vermont Municipal Employees' Retirement System
Total Fund Thematic and Liquidity Analysis

As of June 30, 2021

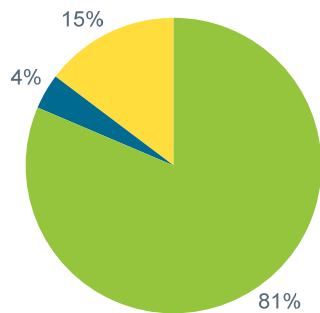
Asset Allocation by Theme



Thematic Analysis - July 1, 2005 to June 30, 2021



Asset Allocation by Liquidity



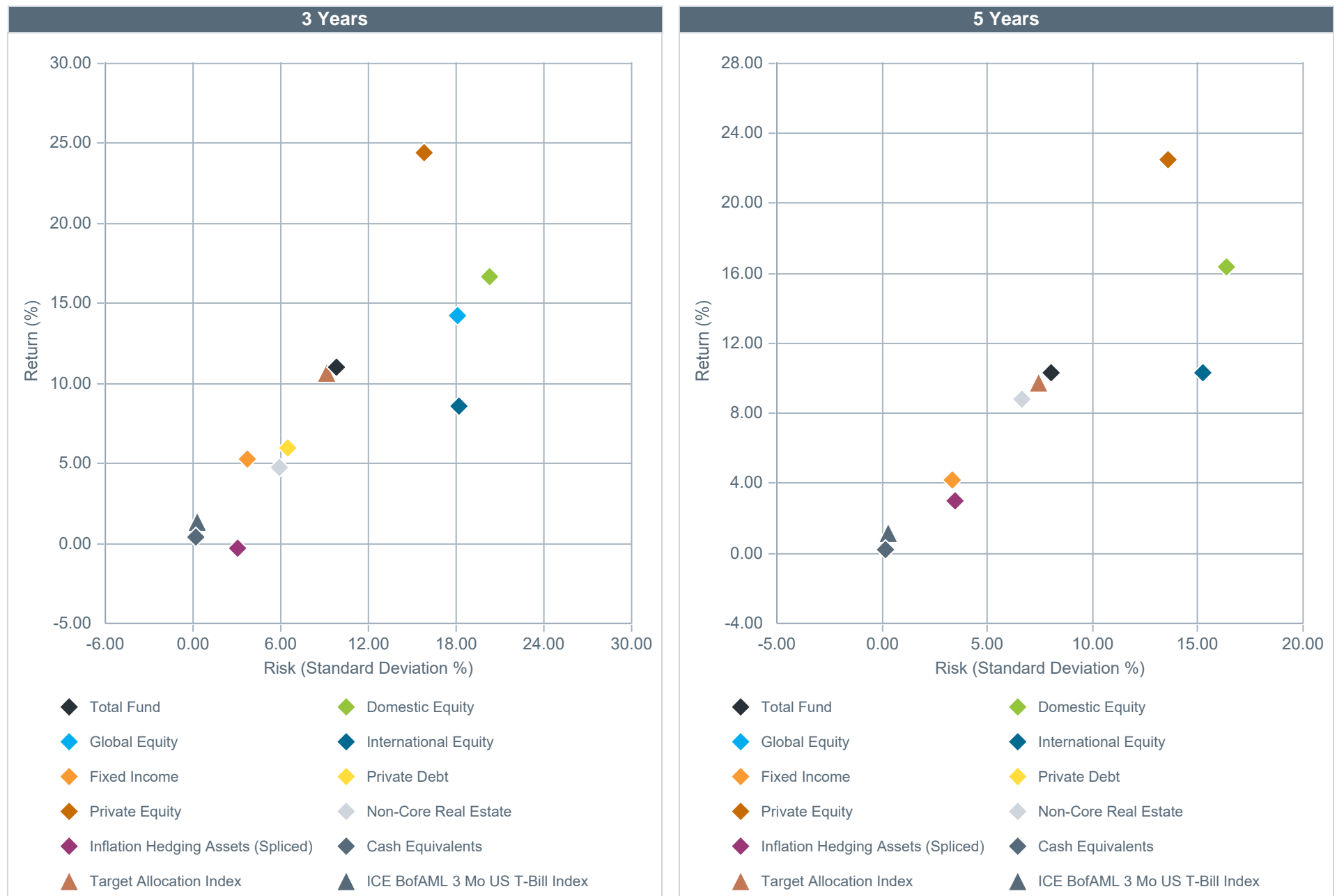
Liquidity Rating

75

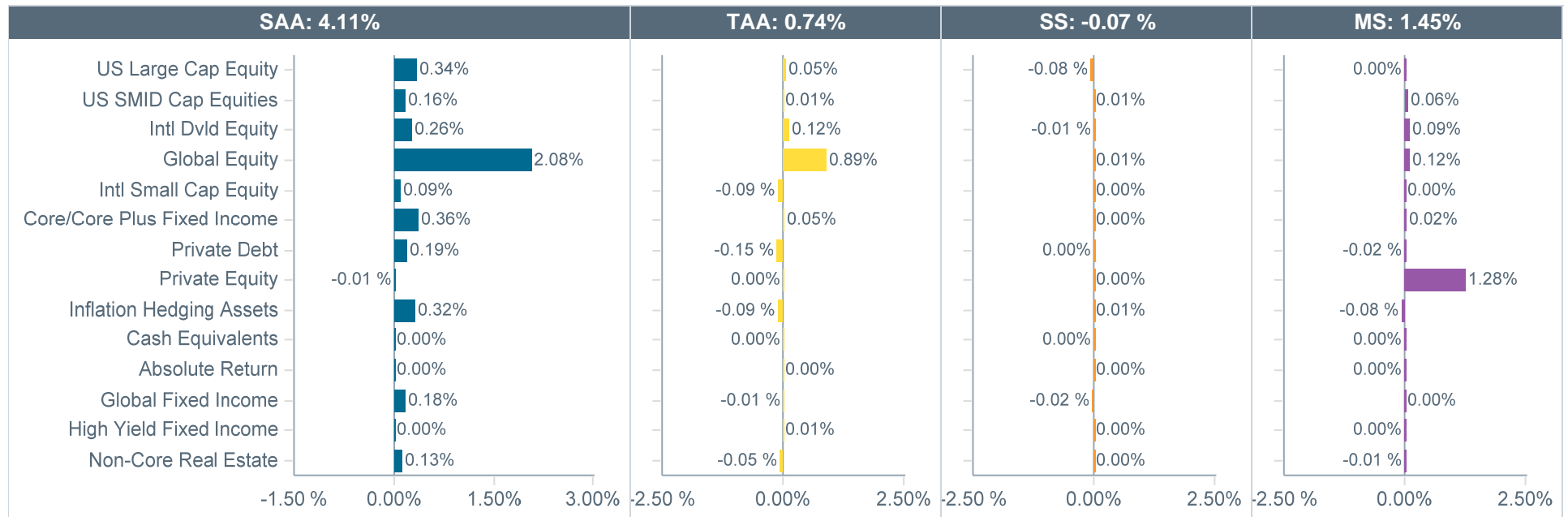
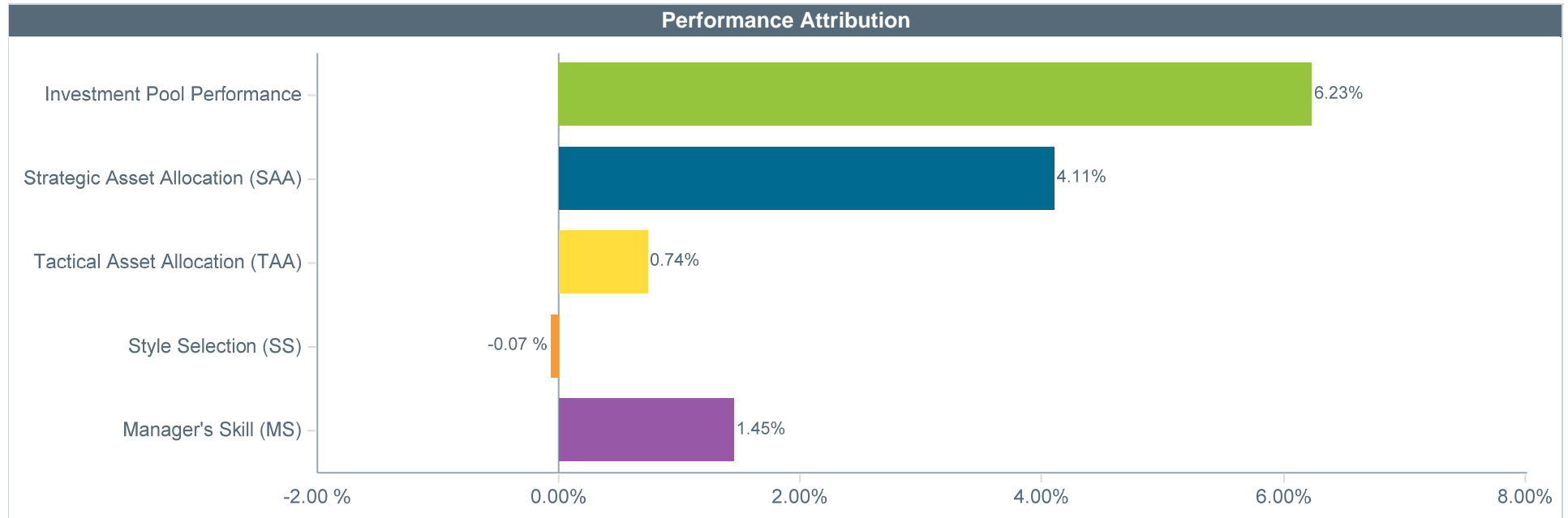
Correlation Matrix - 10 Years

	A	B	C	D
A	1.00			
B	0.70	1.00		
C	-0.26	-0.39	1.00	
D	0.62	0.79	-0.11	1.00
A	=	HFRI EH: Equity Market Neutral Index (Alpha)		
B	=	MSCI ACW Index (USD) (Gross) (Capital Appreciation)		
C	=	Bloomberg US Gov't Bond Index (Capital Preservation)		
D	=	Real Return Custom Index (Inflation)		

Asset Allocation by Theme is based on dedicated manager allocations; as such, thematic allocations are approximations. The RVK Liquidity Rating is calculated using beginning of month investment weights applied to each corresponding asset class liquidity rating. Please see the Glossary for additional information regarding liquidity, thematic, and custom index descriptions. Allocations may not sum to 100% due to rounding.



Performance shown is net of fees. Calculation is based on monthly periodicity. Funds or composites with less history than the specified time period will not appear in the chart.



Performance shown is net of fees. Calculation is based on monthly. Private Asset market values, performance and benchmarks are valued quarterly and shown as of most recently available quarter end, adjusted for subsequent cash flows. RVK cautions that the interpretation of time-weighted data on non-marketable investments, such as Private Equity, is imperfect at best and can potentially be misleading. See Glossary for additional information regarding the Total Fund Attribution - IDP calculation.

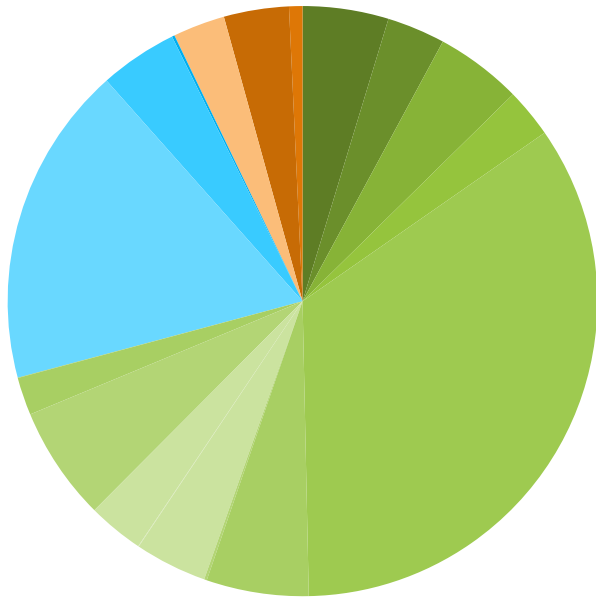
VSERS



Vermont State Employees' Retirement System
Asset Allocation By Manager

As of June 30, 2021

June 30, 2021 : \$2,379,377,332



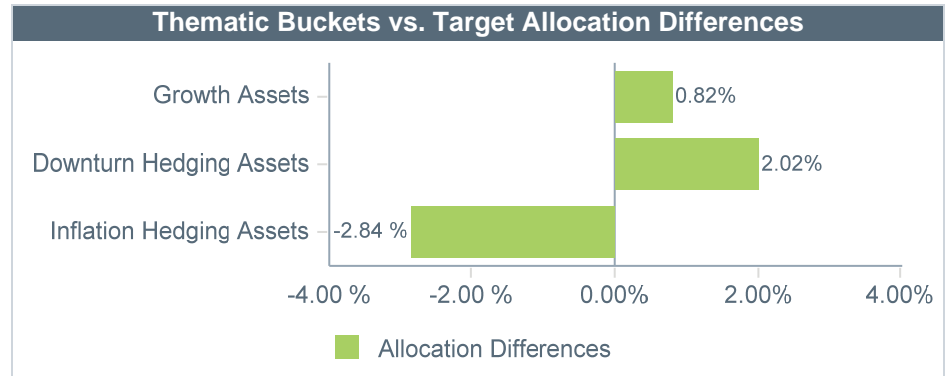
	Market Value (\$)	Allocation (%)
Blackrock S&P 500 (EqI Wtd) (CF)	111,962,371	4.71
Champlain US Mid Cap Core (SA)	75,820,232	3.19
SSgA Russell 2000 Growth (Ex Tobacco) (SA)	5,345	0.00
Acadian International All Cap (SA)	113,109,750	4.75
Mondrian International (SA)	63,866,782	2.68
BlackRock MSCI ACW IMI (CF)	816,766,993	34.33
Artisan Global Opportunities (CF)	133,374,431	5.61
PIMCO Liquidation (SA)	3,628,578	0.15
Wellington Opportunistic EMD (CF)	94,191,417	3.96
PIMCO Unconstrained (SA)	785,181	0.03
Private Debt	72,873,254	3.06
Private Equity	148,974,858	6.26
Non-Core Real Estate	49,342,201	2.07
Pinnacle Natural Resources (CF)	469,130	0.02
BlackRock US Agg (CF)	419,022,291	17.61
PIMCO Core (SA)	101,555,160	4.27
Vermont Cash (SA)	3,347,411	0.14
BlackRock TIPS (CF)	67,998,183	2.86
UBS Trumbull Properties (CF)	84,899,163	3.57
Private Infrastructure/Land	17,384,150	0.73
Real Estate Cash (CF)	451	0.00

Allocations shown may not sum up to 100% exactly due to rounding. Market values for SSgA Russell 2000 Growth (SA), Pinnacle Natural Resources (CF) and PIMCO Unconstrained (SA) represent residual assets after liquidation. During 06/2021, Blackrock Transition was liquidated.

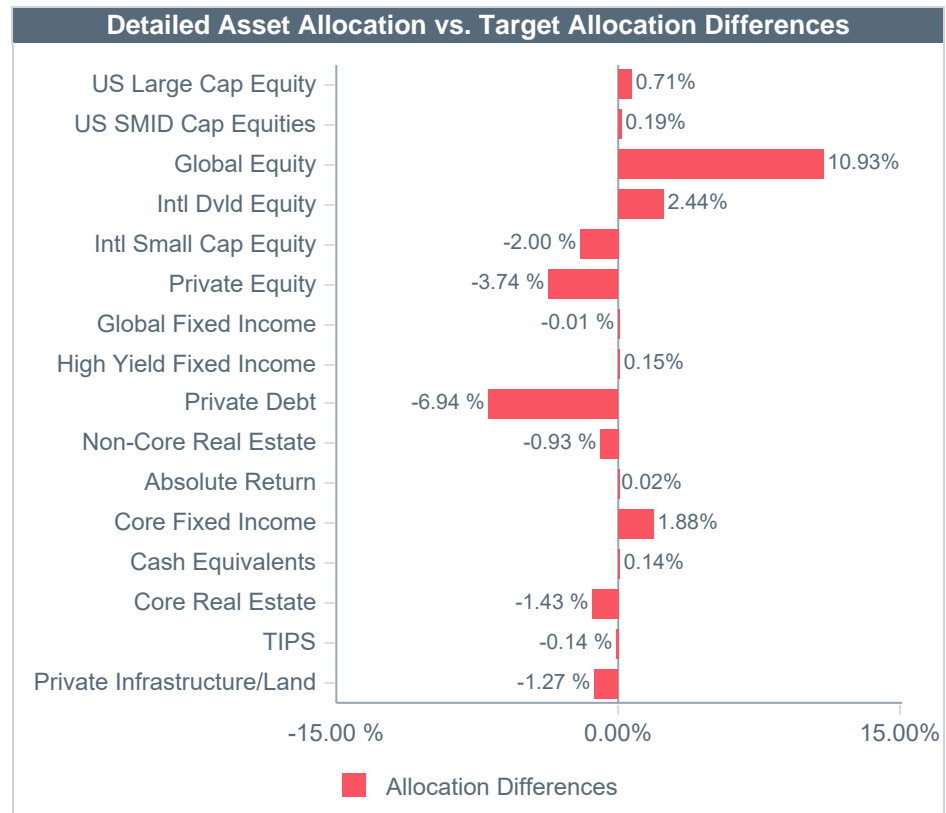
Vermont State Employees' Retirement System
Total Fund
Asset Allocation vs. Target Allocation

As of June 30, 2021

Thematic Buckets vs. Target Allocation			
	Market Value (\$)	Allocation (%)	Target (%)
Growth Assets	1,685,170,524	70.82	70.00
Downturn Hedging Assets	523,924,862	22.02	20.00
Inflation Hedging Assets	170,281,946	7.16	10.00
Total Fund	2,379,377,332	100.00	100.00



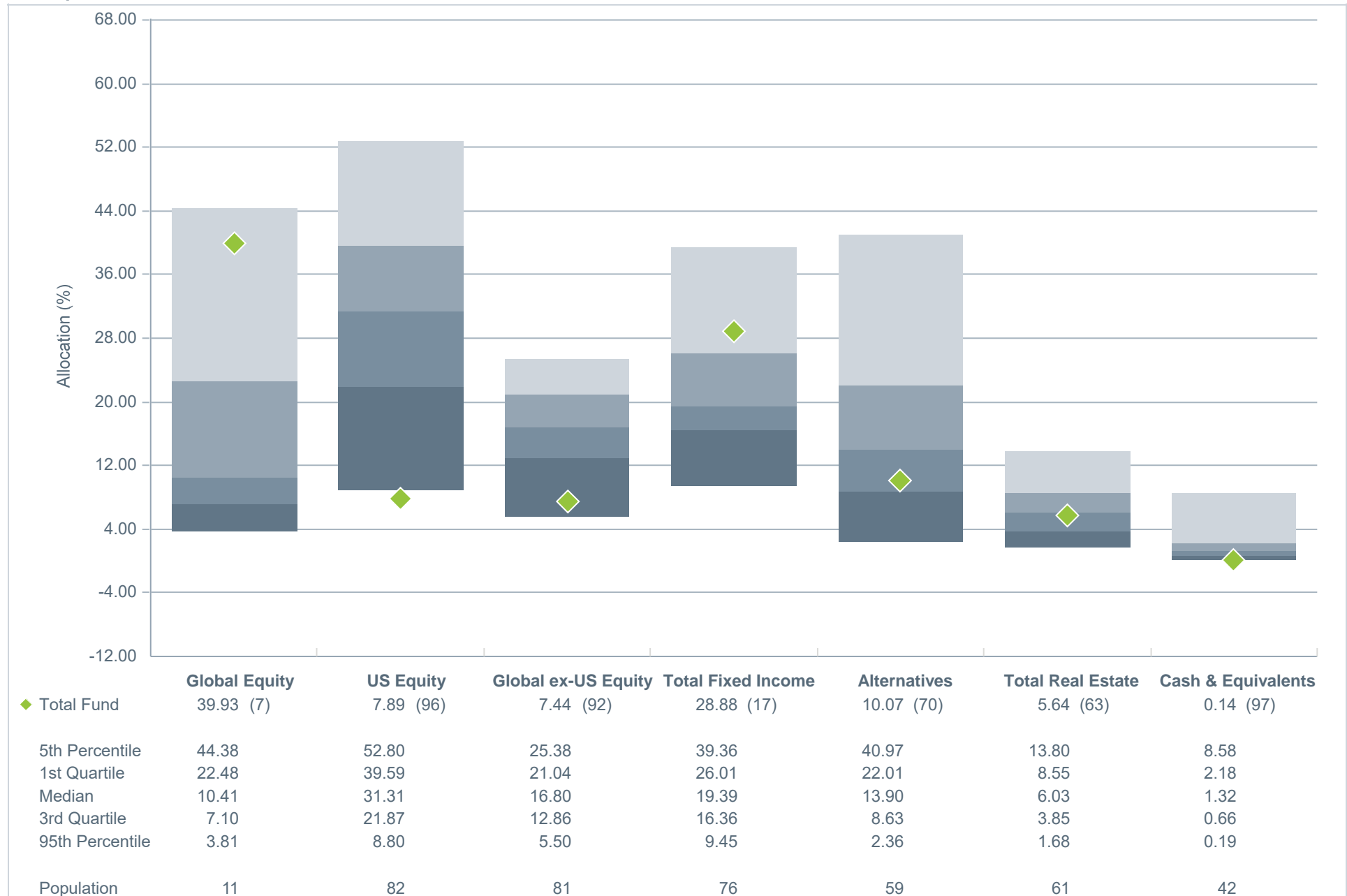
Detailed Asset Allocation vs. Target Allocation			
	Market Value (\$)	Allocation (%)	Target (%)
US Large Cap Equity	111,962,371	4.71	4.00
US SMID Cap Equities	75,825,577	3.19	3.00
Global Equity	950,141,424	39.93	29.00
Intl Dvld Equity	176,976,532	7.44	5.00
Intl Small Cap Equity	-	0.00	2.00
Private Equity	148,974,858	6.26	10.00
Global Fixed Income	94,976,598	3.99	4.00
High Yield Fixed Income	3,628,578	0.15	0.00
Private Debt	72,873,254	3.06	10.00
Non-Core Real Estate	49,342,201	2.07	3.00
Absolute Return	469,130	0.02	0.00
Core Fixed Income	520,577,451	21.88	20.00
Cash Equivalents	3,347,411	0.14	0.00
Core Real Estate	84,899,613	3.57	5.00
TIPS	67,998,183	2.86	3.00
Private Infrastructure/Land	17,384,150	0.73	2.00
Total Fund	2,379,377,332	100.00	100.00



Allocations shown may not sum up to 100% exactly due to rounding.

Vermont State Employees' Retirement System
All Public Plans (\$1B to \$10B; Median) (Custom PG)
Plan Sponsor TF Asset Allocation

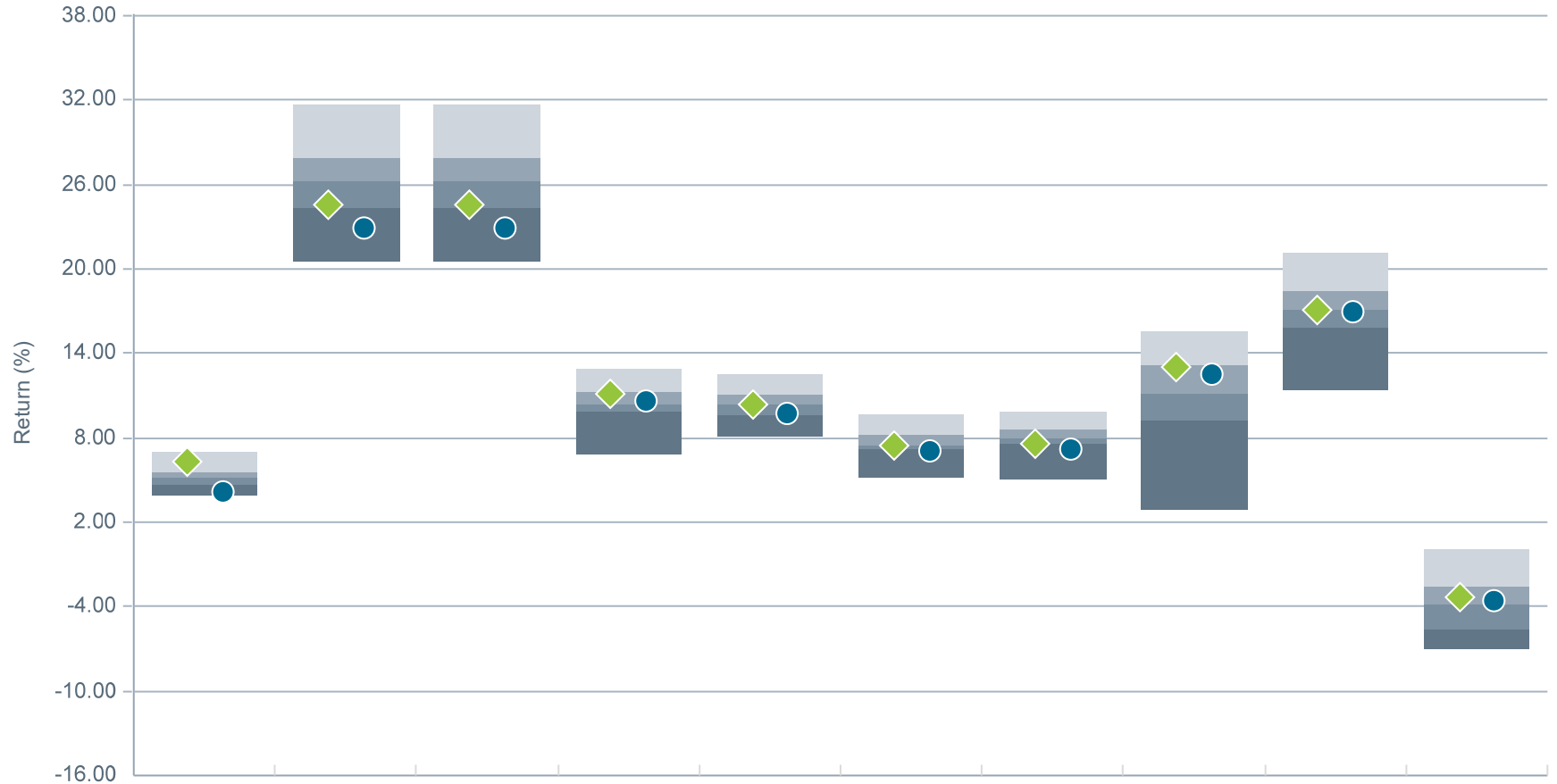
As of June 30, 2021



Parentheses contain percentile ranks. Total Fixed Income includes TIPS.

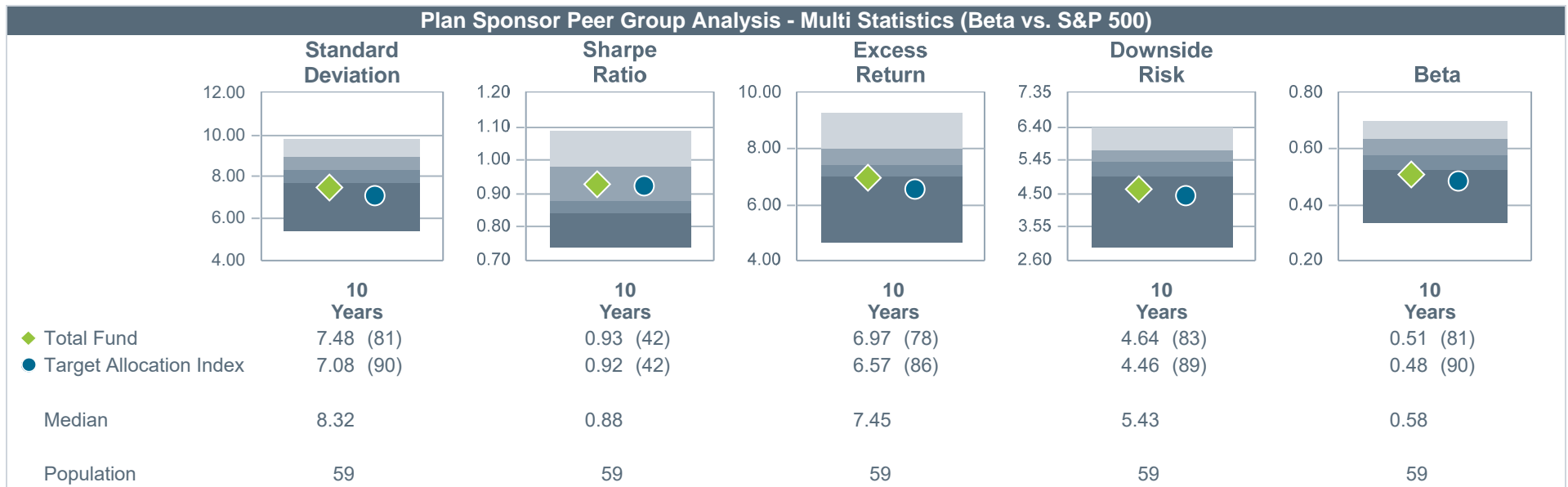
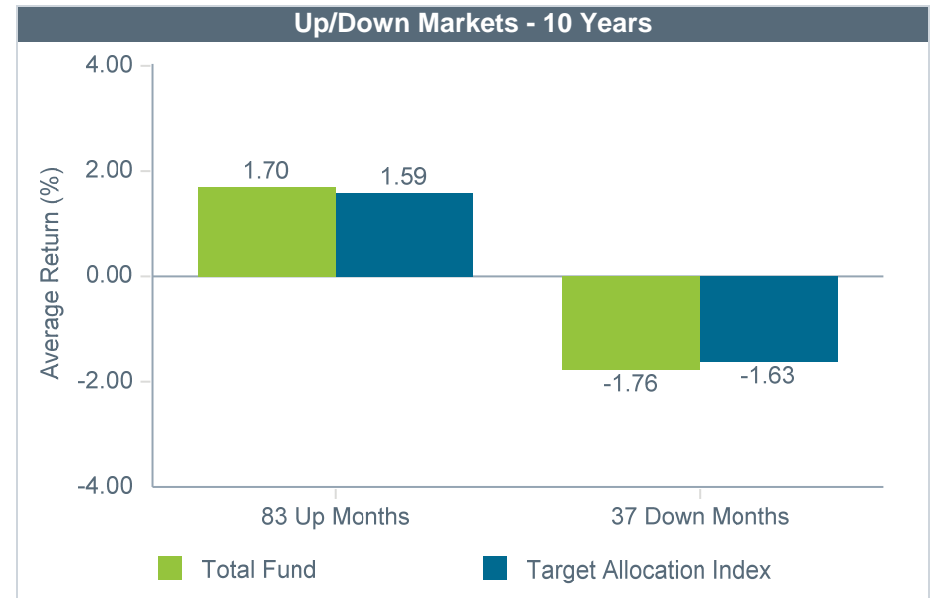
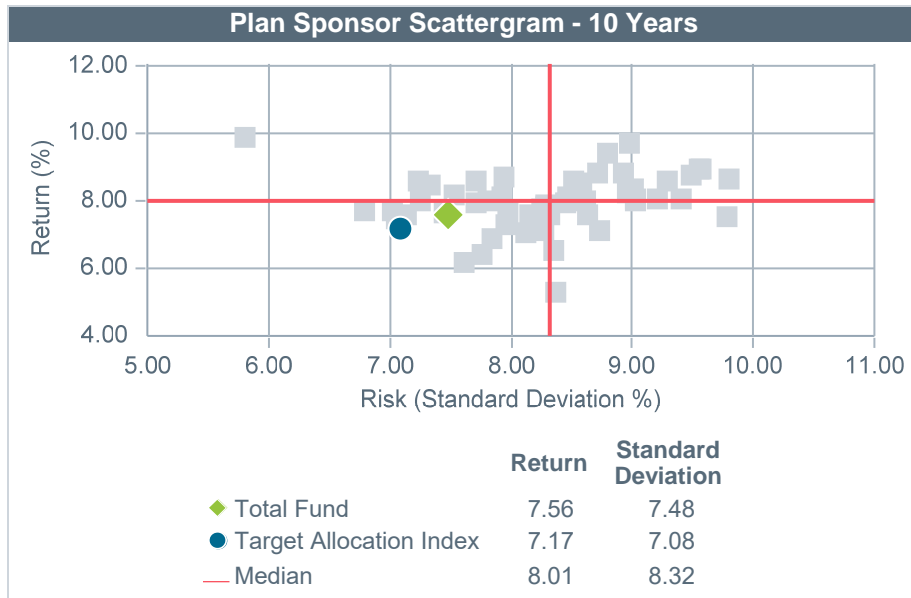
Vermont State Employees' Retirement System
All Public Plans (\$1B to \$10B) (Custom PG)
Plan Sponsor Peer Group Analysis

As of June 30, 2021



	QTD	FYTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018
◆ Total Fund	6.35 (8)	24.59 (71)	24.59 (71)	11.10 (28)	10.35 (52)	7.39 (59)	7.56 (77)	13.07 (28)	17.08 (53)	-3.38 (40)
● Target Allocation Index	4.11 (92)	22.95 (87)	22.95 (87)	10.67 (42)	9.78 (72)	7.13 (78)	7.17 (83)	12.51 (33)	16.91 (55)	-3.63 (46)
5th Percentile	6.91	31.72	31.72	12.93	12.57	9.61	9.91	15.51	21.17	0.16
1st Quartile	5.54	27.89	27.89	11.32	11.12	8.20	8.60	13.21	18.50	-2.61
Median	5.20	26.15	26.15	10.40	10.36	7.51	8.01	11.15	17.09	-3.88
3rd Quartile	4.65	24.31	24.31	9.81	9.66	7.16	7.57	9.26	15.77	-5.62
95th Percentile	3.84	20.55	20.55	6.76	8.14	5.14	5.04	2.85	11.38	-6.95
Population	72	71	71	66	65	63	59	88	78	54

Performance shown is net of fees. Parentheses contain percentile ranks.



Performance shown is net of fees. Calculation is based on monthly periodicity. Parentheses contain percentile ranks.

Vermont State Employees' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation		Performance (%)									
	Market Value (\$)	Actual (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
Total Fund	2,379,377,332	100.00	6.35	24.59	24.59	11.10	10.35	7.56	6.52	13.07	6.74	07/01/2005
Target Allocation Index			4.11	22.95	22.95	10.67	9.78	7.17	6.44	12.51	6.66	
Difference			2.24	1.64	1.64	0.43	0.57	0.39	0.08	0.56	0.08	
Actual Allocation Index			4.75	23.86	23.86	10.22	9.67	7.01	6.30	11.59	6.52	
Difference			1.60	0.73	0.73	0.88	0.68	0.55	0.22	1.48	0.22	
Growth Assets	1,685,170,524	70.82	8.23	-	-	-	-	-	-	-	26.45	09/01/2020
MSCI ACW IM Index (USD) (Net)			7.18	40.94	40.94	14.24	14.55	9.90	7.74	16.25	26.33	
Difference			1.05	-	-	-	-	-	-	-	0.12	
Downturn Hedging Assets	523,924,862	22.02	1.90	-	-	-	-	-	-	-	-0.83	09/01/2020
Bloomberg US Agg Bond Index			1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	-1.00	
Difference			0.07	-	-	-	-	-	-	-	0.17	
Inflation Hedging Assets	170,281,946	7.16	2.16	-	-	-	-	-	-	-	0.79	09/01/2020
Consumer Price Index+2.5%			3.21	8.03	8.03	5.11	4.99	4.42	4.51	3.90	6.70	
Difference			-1.05	-	-	-	-	-	-	-	-5.91	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Manager inception dates shown represent the first full month of available performance. Fiscal year ends 6/30. Please see addendum for custom benchmark definitions. Private Asset market values and performance are lagged to match custodian reported net asset values. Accordingly, fund reported performance will lag benchmark reported performance.

Vermont State Employees' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
Total Fund	2,379,377,332	100.00	100.00	6.35	24.59	24.59	11.10	10.35	7.56	6.52	13.07	6.74	07/01/2005
Target Allocation Index				4.11	22.95	22.95	10.67	9.78	7.17	6.44	12.51	6.66	
Difference				2.24	1.64	1.64	0.43	0.57	0.39	0.08	0.56	0.08	
Actual Allocation Index				4.75	23.86	23.86	10.22	9.67	7.01	6.30	11.59	6.52	
Difference				1.60	0.73	0.73	0.88	0.68	0.55	0.22	1.48	0.22	
All Public Plans (\$1B to \$10B)				5.20	26.15	26.15	10.40	10.36	8.01	6.76	11.15	6.91	
Rank				8	71	71	28	52	77	67	28	64	
Domestic Equity	187,787,948	7.89	7.00	7.23	48.94	48.94	16.58	16.29	13.87	-	18.83	13.94	01/01/2011
Russell 3000 Index				8.24	44.16	44.16	18.73	17.89	14.70	10.78	20.89	14.62	
Difference				-1.01	4.78	4.78	-2.15	-1.60	-0.83	-	-2.06	-0.68	
US Large Cap Equity	111,962,371	4.71	4.00	6.85	50.66	50.66	15.19	15.43	13.67	10.47	13.03	10.43	07/01/2005
S&P 500 Index (Cap Wtd)				8.55	40.79	40.79	18.67	17.65	14.84	10.73	18.40	10.60	
Difference				-1.70	9.87	9.87	-3.48	-2.22	-1.17	-0.26	-5.37	-0.17	
Blackrock S&P 500 (EqI Wtd) (CF)	111,962,371	4.71	-	6.85	50.66	50.66	-	-	-	-	13.03	20.80	07/01/2019
S&P 500 Index (Eq Wtd)				6.90	50.71	50.71	16.41	15.68	13.76	10.98	12.83	20.75	
Difference				-0.05	-0.05	-0.05	-	-	-	-	0.20	0.05	
IM U.S. Large Cap Equity (MF) Median				8.22	40.68	40.68	18.02	17.10	13.73	10.14	18.34	22.80	
Rank				68	7	7	-	-	-	-	64	59	
US SMID Cap Equities	75,825,577	3.19	3.00	7.77	46.20	46.20	18.08	17.77	14.20	11.11	27.32	11.09	07/01/2005
Russell 2500 Index				5.44	57.79	57.79	15.24	16.35	12.86	10.25	19.99	10.45	
Difference				2.33	-11.59	-11.59	2.84	1.42	1.34	0.86	7.33	0.64	
Champlain US Mid Cap Core (SA)	75,820,232	3.19	-	7.76	46.20	46.20	18.08	18.67	15.05	-	27.32	16.15	10/01/2009
Custom SMID Cap Equity Index				5.90	59.50	59.50	14.28	16.43	12.75	10.18	19.99	14.24	
Difference				1.86	-13.30	-13.30	3.80	2.24	2.30	-	7.33	1.91	
IM U.S. SMID Cap Equity (MF) Median				4.87	52.55	52.55	14.63	16.05	12.41	10.31	20.27	13.98	
Rank				7	76	76	34	35	19	-	41	26	
Global Equity	950,141,424	39.93	29.00	7.49	40.58	40.58	14.12	-	-	-	19.96	9.34	02/01/2018
MSCI ACW IM Index (USD) (Net)				7.18	40.94	40.94	14.24	14.55	9.90	7.74	16.25	10.63	
Difference				0.31	-0.36	-0.36	-0.12	-	-	-	3.71	-1.29	

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Vermont State Employees' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
BlackRock MSCI ACW IMI (CF)	816,766,993	34.33	-	7.27	41.53	41.53	-	-	-	-	16.77	19.93	07/01/2019
MSCI ACW IM Index (USD) (Net)				7.18	40.94	40.94	14.24	14.55	9.90	7.74	16.25	19.41	
Difference				0.09	0.59	0.59	-	-	-	-	0.52	0.52	
IM Global Equity (MF) Median				6.95	39.41	39.41	13.96	13.31	9.73	7.52	15.21	19.06	
Rank				45	42	42	-	-	-	-	44	46	
Artisan Global Opportunities (CF)	133,374,431	5.61	-	8.93	35.04	35.04	21.47	-	-	-	40.50	21.47	07/01/2018
MSCI ACW Index (USD) (Net)				7.39	39.26	39.26	14.57	14.61	9.90	7.60	16.25	14.57	
Difference				1.54	-4.22	-4.22	6.90	-	-	-	24.25	6.90	
IM Global Equity (MF) Median				6.95	39.41	39.41	13.96	13.31	9.73	7.52	15.21	13.96	
Rank				20	67	67	12	-	-	-	14	12	
International Equity	176,976,532	7.44	7.00	6.31	39.25	39.25	8.50	10.28	5.84	-	4.62	6.04	01/01/2011
MSCI EAFE Index (USD) (Net)				5.17	32.35	32.35	8.27	10.28	5.89	4.40	7.82	6.09	
Difference				1.14	6.90	6.90	0.23	0.00	-0.05	-	-3.20	-0.05	
Acadian International All Cap (SA)	113,109,750	4.75	-	7.06	42.32	42.32	9.40	13.40	8.41	5.49	12.37	6.75	11/01/2005
MSCI EAFE IM Index (USD) (Net)				5.04	33.57	33.57	8.28	10.53	6.22	4.69	8.47	5.61	
Difference				2.02	8.75	8.75	1.12	2.87	2.19	0.80	3.90	1.14	
IM All EAFE (MF) Median				5.17	32.88	32.88	8.19	9.89	5.69	4.34	8.17	5.26	
Rank				11	7	7	33	8	9	23	33	15	
Mondrian International (SA)	63,866,782	2.68	-	5.00	34.11	34.11	5.84	7.54	5.14	4.27	-4.01	5.40	07/01/2005
MSCI EAFE Index (USD) (Net)				5.17	32.35	32.35	8.27	10.28	5.89	4.40	7.82	5.66	
Difference				-0.17	1.76	1.76	-2.43	-2.74	-0.75	-0.13	-11.83	-0.26	
IM All EAFE (MF) Median				5.17	32.88	32.88	8.19	9.89	5.69	4.34	8.17	5.59	
Rank				58	40	40	77	85	65	53	98	58	
Fixed Income	619,182,627	26.02	24.00	2.22	1.35	1.35	5.25	4.18	4.20	-	8.14	4.41	01/01/2011
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	3.49	
Difference				0.39	1.69	1.69	-0.09	1.15	0.81	-	0.63	0.92	
Core Fixed Income	520,577,451	21.88	20.00	1.91	-	-	-	-	-	-	-	-0.83	09/01/2020
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	-1.00	
Difference				0.08	-	-	-	-	-	-	-	0.17	

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Vermont State Employees' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
BlackRock US Agg (CF)	419,022,291	17.61	-	1.84	-0.31	-0.31	-	-	-	-	7.54	4.38	06/01/2019
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	4.56	
Difference				0.01	0.03	0.03	-	-	-	-	0.03	-0.18	
IM U.S. Broad Mkt Core FI (MF)				1.93	1.25	1.25	5.62	3.31	3.51	4.41	8.19	5.10	
Rank				60	88	88	-	-	-	-	71	81	
PIMCO Core (SA)	101,555,160	4.27	-	2.19	-	-	-	-	-	-	-	-0.23	09/01/2020
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	-1.00	
Difference				0.36	-	-	-	-	-	-	-	0.77	
IM U.S. Broad Mkt Core FI (MF)				1.93	1.25	1.25	5.62	3.31	3.51	4.41	8.19	0.11	
Rank				20	-	-	-	-	-	-	-	63	
Emerging Markets Debt	94,191,417	3.96	4.00	3.97	-	-	-	-	-	-	-	2.84	09/01/2020
JPM Emg Mkts Bond Gbl Index (USD)				3.93	6.81	6.81	6.48	4.44	5.34	6.74	5.88	2.70	
Difference				0.04	-	-	-	-	-	-	-	0.14	
Wellington Opportunistic EMD (CF)	94,191,417	3.96	-	3.97	7.37	7.37	6.83	5.44	5.76	-	7.69	6.51	12/01/2009
JPM Emg Mkts Bond Gbl Index (USD)				3.93	6.81	6.81	6.48	4.44	5.34	6.74	5.88	6.11	
Difference				0.04	0.56	0.56	0.35	1.00	0.42	-	1.81	0.40	
IM Emerging Markets Debt (MF) Median				3.71	9.08	9.08	6.15	4.67	4.32	5.83	5.57	5.22	
Rank				34	90	90	27	20	3	-	15	4	
High Yield Fixed Income	3,628,578	0.15	0.00	2.36	20.27	20.27	4.09	5.23	5.42	6.37	3.27	6.31	06/01/2006
Bloomberg US Corp Hi Yld Index				2.74	15.37	15.37	7.45	7.48	6.66	7.53	7.11	7.46	
Difference				-0.38	4.90	4.90	-3.36	-2.25	-1.24	-1.16	-3.84	-1.15	
PIMCO Liquidation (SA)	3,628,578	0.15	-	2.36	20.27	20.27	-	-	-	-	3.26	3.93	08/01/2018
Bloomberg US Corp Hi Yld Index				2.74	15.37	15.37	7.45	7.48	6.66	7.53	7.11	7.27	
Difference				-0.38	4.90	4.90	-	-	-	-	-3.85	-3.34	
IM U.S. High Yield Bonds (MF) Median				2.59	14.69	14.69	6.43	6.39	5.54	6.22	5.28	6.23	
Rank				67	9	9	-	-	-	-	81	95	
Private Debt	72,873,254	3.06	10.00	1.44	16.31	16.31	5.94	-	-	-	2.22	6.28	01/01/2018
CS Lvg'd Loan Index+2% (Spliced)				1.95	12.98	12.98	4.81	5.24	4.51	4.72	3.12	4.74	
Difference				-0.51	3.33	3.33	1.13	-	-	-	-0.90	1.54	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Manager inception dates shown represent the first full month of available performance. Fiscal year ends 6/30. Please see addendum for custom benchmark definitions. Private Asset market values and performance are lagged to match custodian reported net asset values. Accordingly, fund reported performance will lag benchmark reported performance. Negative cash performance is due to a valuation decline in the Blackrock Transition account during its liquidation.

Vermont State Employees' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

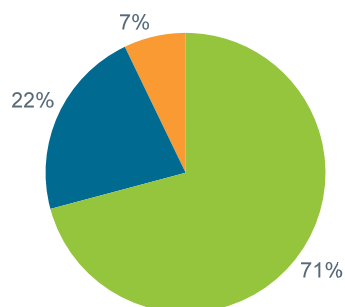
	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
Private Equity	148,974,858	6.26	10.00	27.52	59.55	59.55	24.56	22.46	-	-	17.25	19.59	01/01/2013
Cambridge US Prvt Eq Index				0.00	35.55	35.55	15.67	16.57	13.90	12.71	21.32	14.69	
Difference				27.52	24.00	24.00	8.89	5.89	-	-	-4.07	4.90	
Non-Core Real Estate	49,342,201	2.07	3.00	3.51	8.59	8.59	4.66	8.68	-	-	-1.80	9.21	09/01/2014
NCREIF ODCE Index+2% (Spliced)				4.19	8.70	8.70	5.94	6.39	8.92	7.07	1.60	8.11	
Difference				-0.68	-0.11	-0.11	-1.28	2.29	-	-	-3.40	1.10	
Inflation Hedging Assets (Spliced)	170,281,946	7.16	10.00	2.16	-2.39	-2.39	-0.32	2.79	7.67	-	-2.83	8.44	01/01/2011
CPI+2.5% (Spliced)				3.21	6.70	6.70	5.28	6.00	8.72	6.93	0.75	9.03	
Difference				-1.05	-9.09	-9.09	-5.60	-3.21	-1.05	-	-3.58	-0.59	
TIPS	67,998,183	2.86	2.00	3.24	-	-	-	-	-	-	-	2.98	09/01/2020
Bloomberg US Trsy US TIPS Index				3.25	6.51	6.51	6.53	4.17	3.40	4.56	10.99	3.00	
Difference				-0.01	-	-	-	-	-	-	-	-0.02	
BlackRock TIPS (CF)	67,998,183	2.86	-	3.24	6.49	6.49	6.45	4.12	3.33	-	10.96	3.74	12/01/2009
Bloomberg US Trsy US TIPS Index				3.25	6.51	6.51	6.53	4.17	3.40	4.56	10.99	3.78	
Difference				-0.01	-0.02	-0.02	-0.08	-0.05	-0.07	-	-0.03	-0.04	
IM U.S. TIPS (MF) Median				2.71	6.51	6.51	5.76	3.72	2.70	3.87	9.64	3.14	
Rank				20	52	52	21	29	13	-	26	11	
Core Real Estate	84,899,613	3.57	5.00	1.28	-3.51	-3.51	-0.99	1.83	7.23	-	-2.26	8.03	01/01/2011
NCREIF ODCE Index (AWA) (Net)				3.68	7.09	7.09	4.60	5.62	8.60	5.34	0.34	9.00	
Difference				-2.40	-10.60	-10.60	-5.59	-3.79	-1.37	-	-2.60	-0.97	
UBS Trumbull Properties (CF)	84,899,163	3.57	-	1.28	-3.51	-3.51	-0.95	1.66	5.72	4.46	-2.26	5.06	07/01/2005
NCREIF ODCE Index (AWA) (Net)				3.68	7.09	7.09	4.60	5.62	8.60	5.34	0.34	6.09	
Difference				-2.40	-10.60	-10.60	-5.55	-3.96	-2.88	-0.88	-2.60	-1.03	
Private Infrastructure/Land	17,384,150	0.73	3.00	2.17	-	-	-	-	-	-	-	2.80	08/01/2020
NCREIF Farmland Index (TR)				1.47	4.97	4.97	4.82	5.51	10.24	11.12	3.08	4.97	
Difference				0.70	-	-	-	-	-	-	-	-2.17	
Cash Equivalents	3,347,411	0.14	0.00	-0.07	-0.01	-0.01	0.40	0.27	0.15	-	0.37	0.15	01/01/2011
ICE BofAML 3 Mo US T-Bill Index				0.00	0.09	0.09	1.34	1.17	0.63	1.08	0.67	0.61	
Difference				-0.07	-0.10	-0.10	-0.94	-0.90	-0.48	-	-0.30	-0.46	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Manager inception dates shown represent the first full month of available performance. Fiscal year ends 6/30. Please see addendum for custom benchmark definitions. Private Asset market values and performance are lagged to match custodian reported net asset values. Accordingly, fund reported performance will lag benchmark reported performance. Negative cash performance is due to a valuation decline in the Blackrock Transition account during its liquidation.

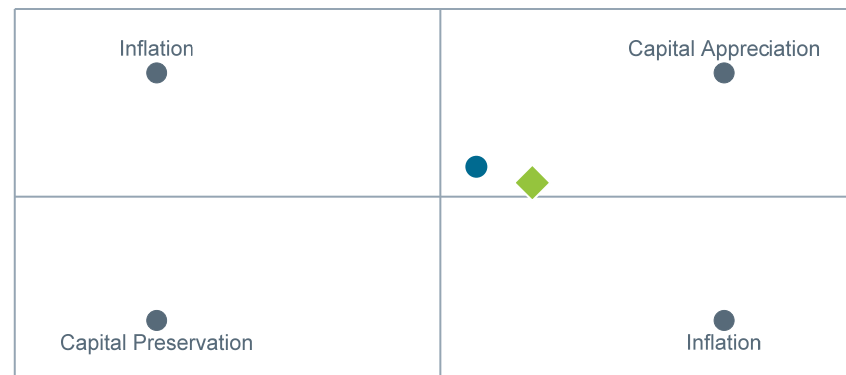
Vermont State Employees' Retirement System
Total Fund Thematic and Liquidity Analysis

As of June 30, 2021

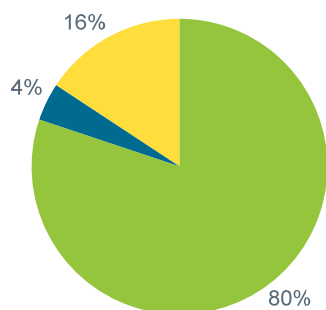
Asset Allocation by Theme



Thematic Analysis - July 1, 2005 to June 30, 2021



Asset Allocation by Liquidity



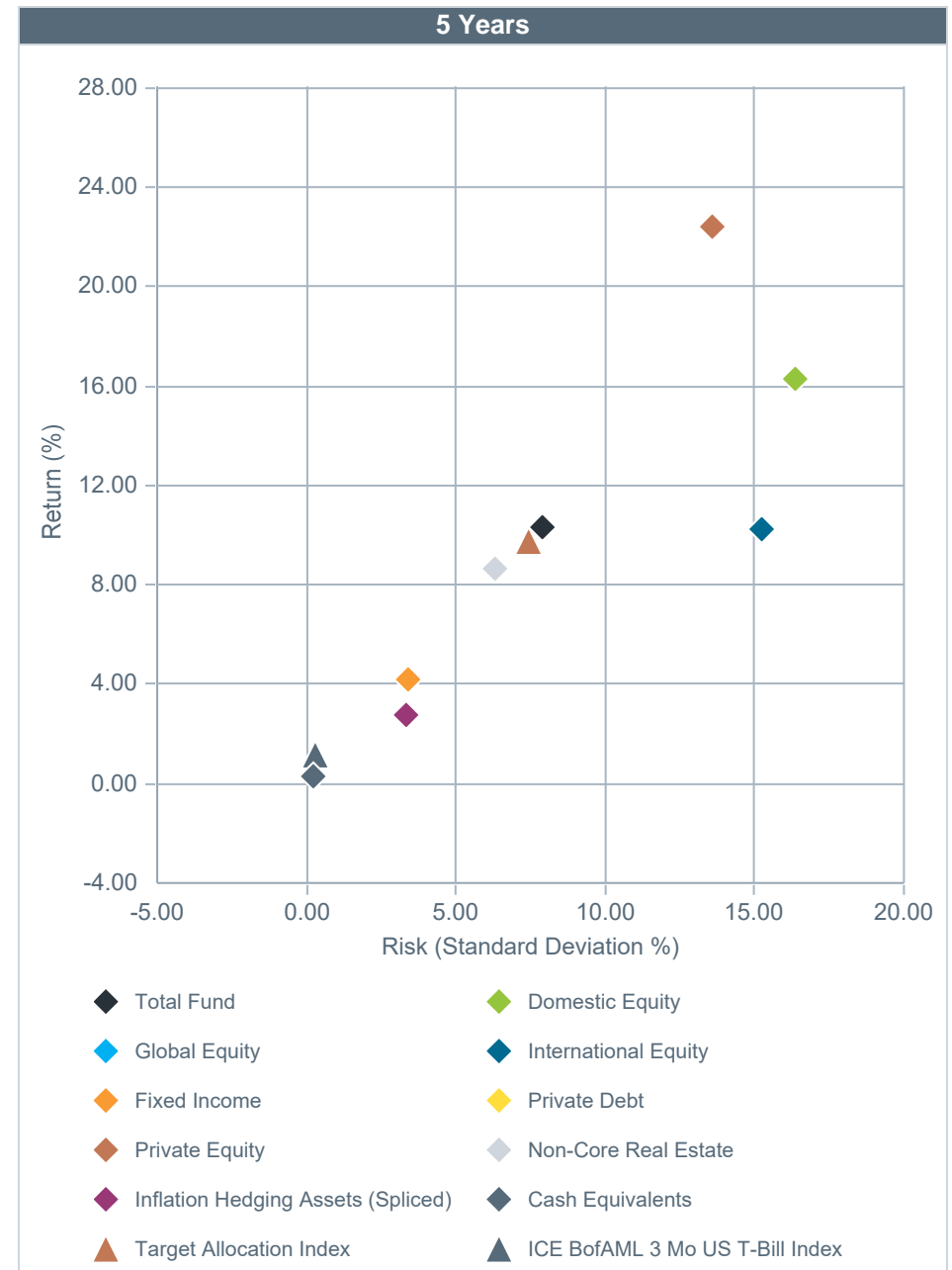
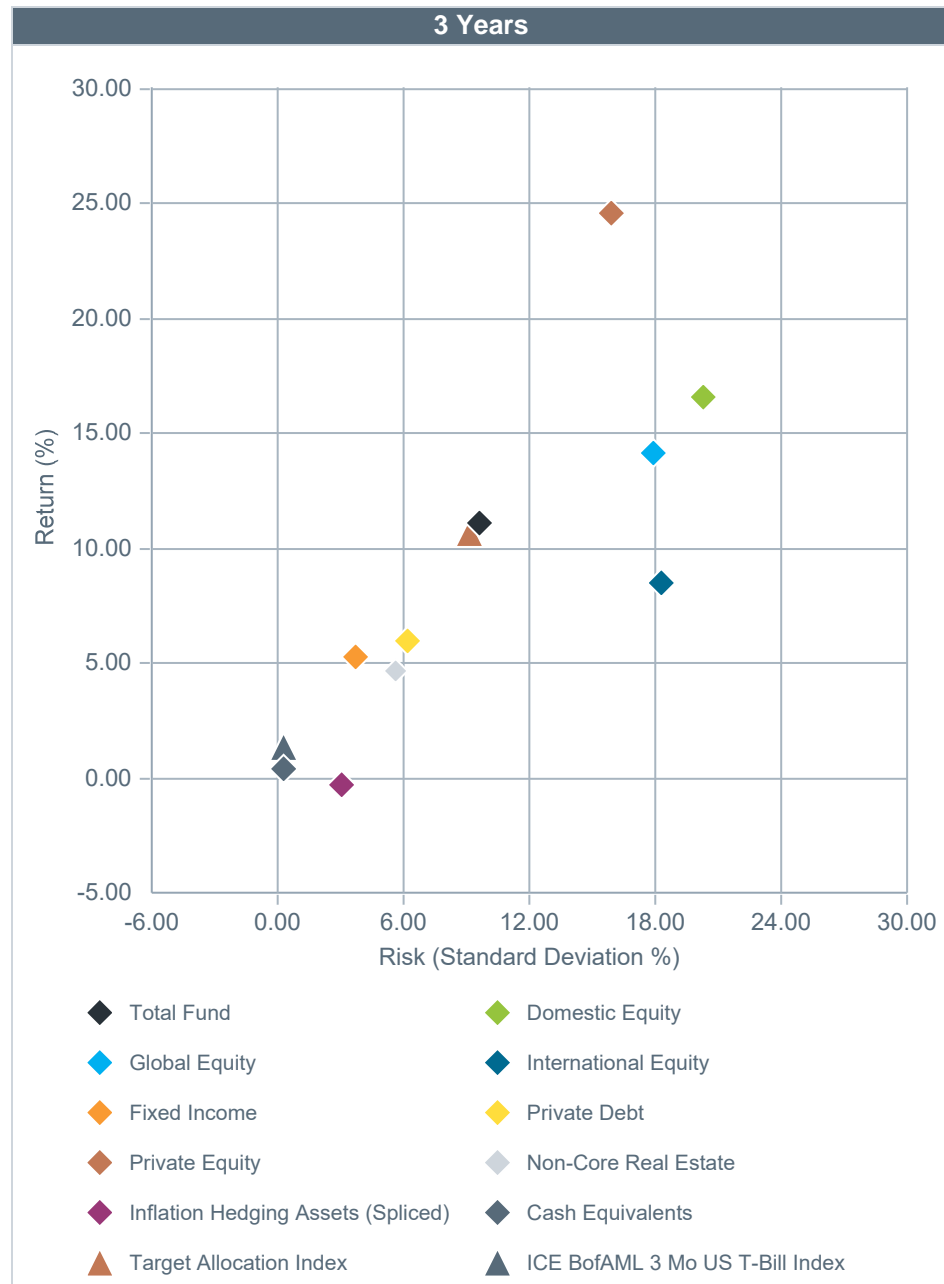
Liquidity Rating

75

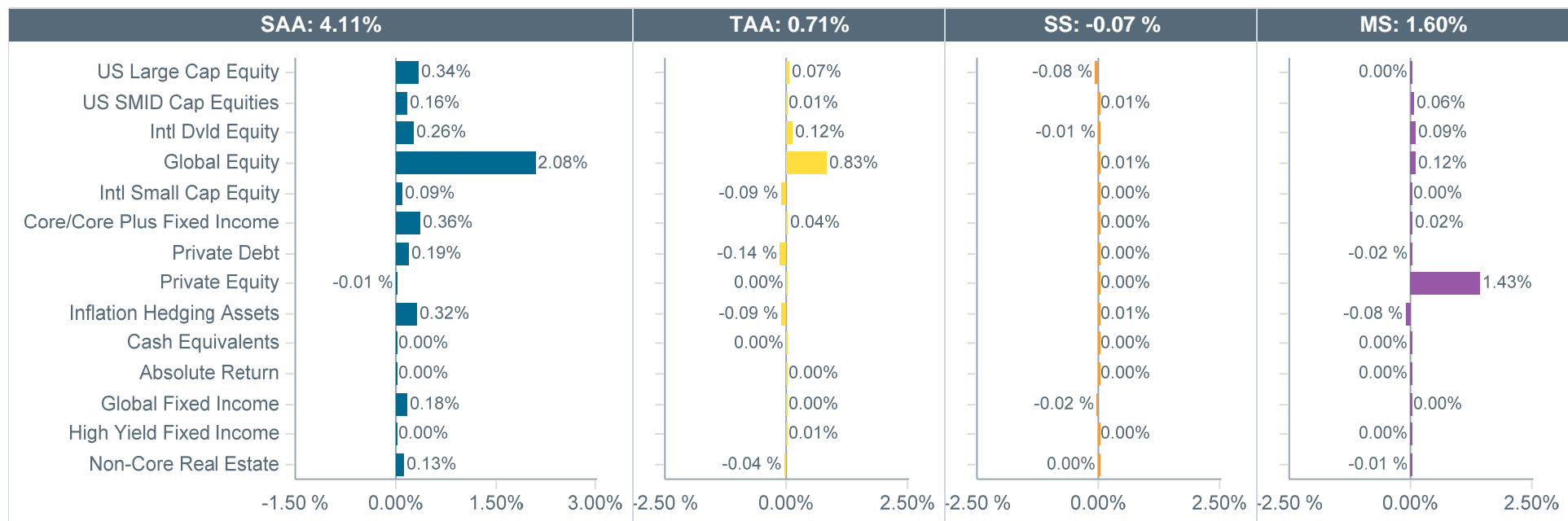
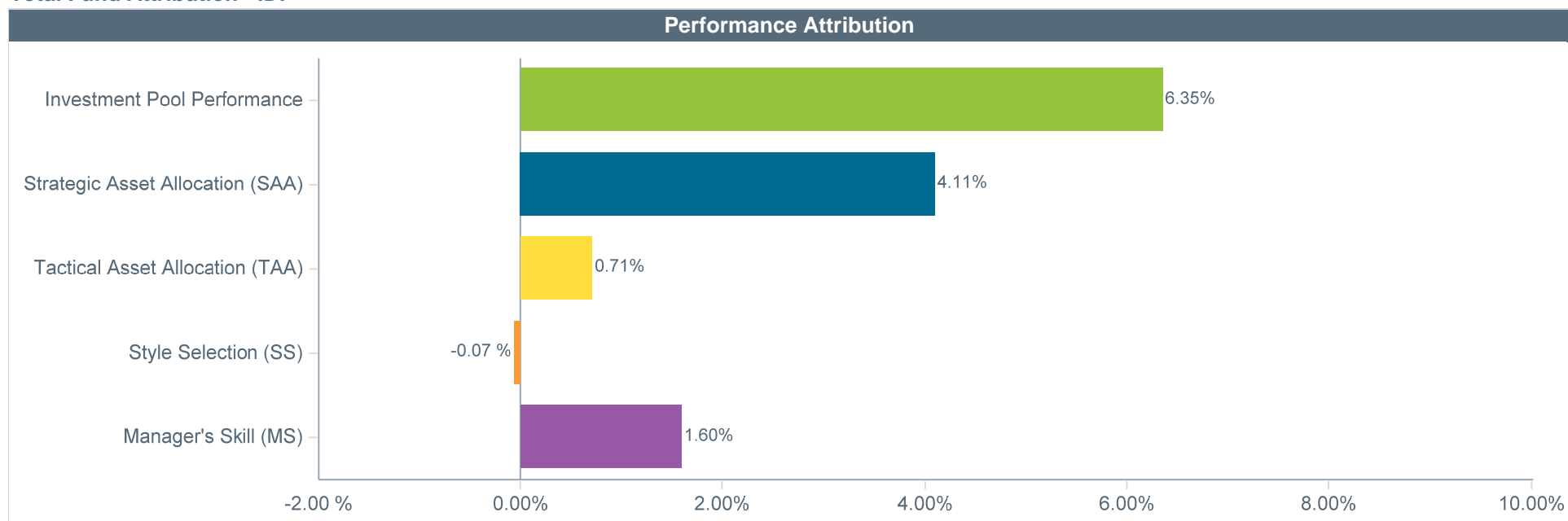
Correlation Matrix - 10 Years

	A	B	C	D
A	1.00			
B	0.70	1.00		
C	-0.26	-0.39	1.00	
D	0.62	0.79	-0.11	1.00
A	=	HFRI EH: Equity Market Neutral Index (Alpha)		
B	=	MSCI ACW Index (USD) (Gross) (Capital Appreciation)		
C	=	Bloomberg US Gov't Bond Index (Capital Preservation)		
D	=	Real Return Custom Index (Inflation)		

Asset Allocation by Theme is based on dedicated manager allocations; as such, thematic allocations are approximations. The RVK Liquidity Rating is calculated using beginning of month investment weights applied to each corresponding asset class liquidity rating. Please see the Glossary for additional information regarding liquidity, thematic, and custom index descriptions. Allocations may not sum to 100% due to rounding.



Performance shown is net of fees. Calculation is based on monthly periodicity. Funds or composites with less history than the specified time period will not appear in the chart.



Performance shown is net of fees. Calculation is based on monthly. Private Asset market values, performance and benchmarks are valued quarterly and shown as of most recently available quarter end, adjusted for subsequent cash flows. RVK cautions that the interpretation of time-weighted data on non-marketable investments, such as Private Equity, is imperfect at best and can potentially be misleading. See Glossary for additional information regarding the Total Fund Attribution - IDP calculation.

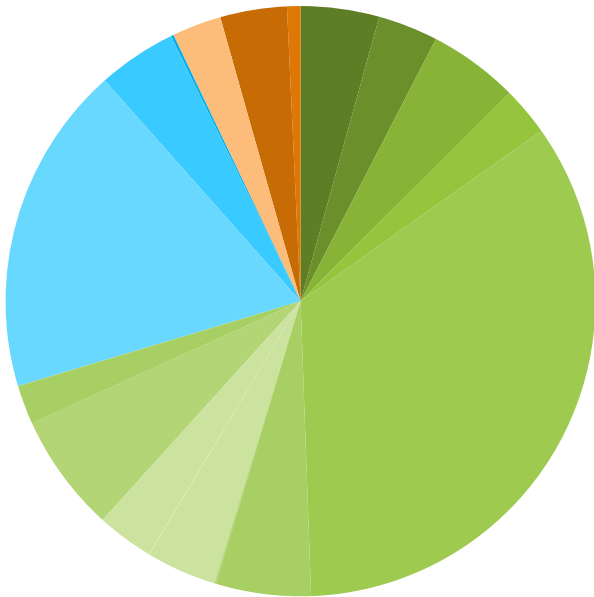
VSTRS



Vermont State Teachers' Retirement System
Asset Allocation By Manager

As of June 30, 2021

June 30, 2021 : \$2,376,547,595



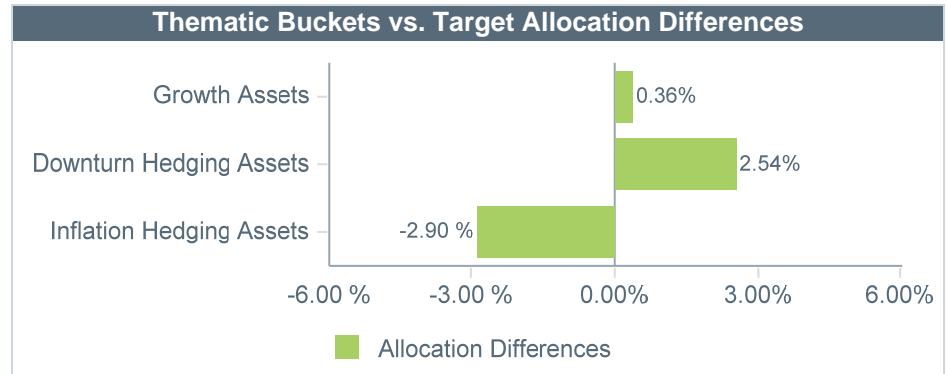
	Market Value (\$)	Allocation (%)
Blackrock S&P 500 (EqI Wtd) (CF)	102,302,730	4.30
Champlain US Mid Cap Core (SA)	78,049,547	3.28
SSgA Russell 2000 Growth (Ex Tobacco) (SA)	5,445	0.00
Acadian International All Cap (SA)	117,637,486	4.95
Mondrian International (SA)	63,361,069	2.67
BlackRock MSCI ACW IMI (CF)	813,388,483	34.23
Artisan Global Opportunities (CF)	123,524,859	5.20
PIMCO Liquidation (SA)	2,298,042	0.10
Wellington Opportunistic EMD (CF)	91,534,584	3.85
PIMCO Unconstrained (SA)	484,789	0.02
Private Debt	74,014,881	3.11
Private Equity	154,726,223	6.51
Non-Core Real Estate	50,361,759	2.12
Pinnacle Natural Resources (CF)	474,879	0.02
BlackRock US Agg (CF)	429,869,280	18.09
PIMCO Core (SA)	102,476,470	4.31
Vermont Cash (SA)	3,382,292	0.14
BlackRock TIPS (CF)	64,440,152	2.71
UBS Trumbull Properties (CF)	86,919,202	3.66
Private Infrastructure/Land	17,294,964	0.73
Real Estate Cash (CF)	461	0.00

Allocations shown may not sum up to 100% exactly due to rounding. Market values for SSgA Russell 2000 Growth (SA), Pinnacle Natural Resources (CF) and PIMCO Unconstrained (SA) represent residual assets after liquidation. During 06/2021, Blackrock Transition was liquidated.

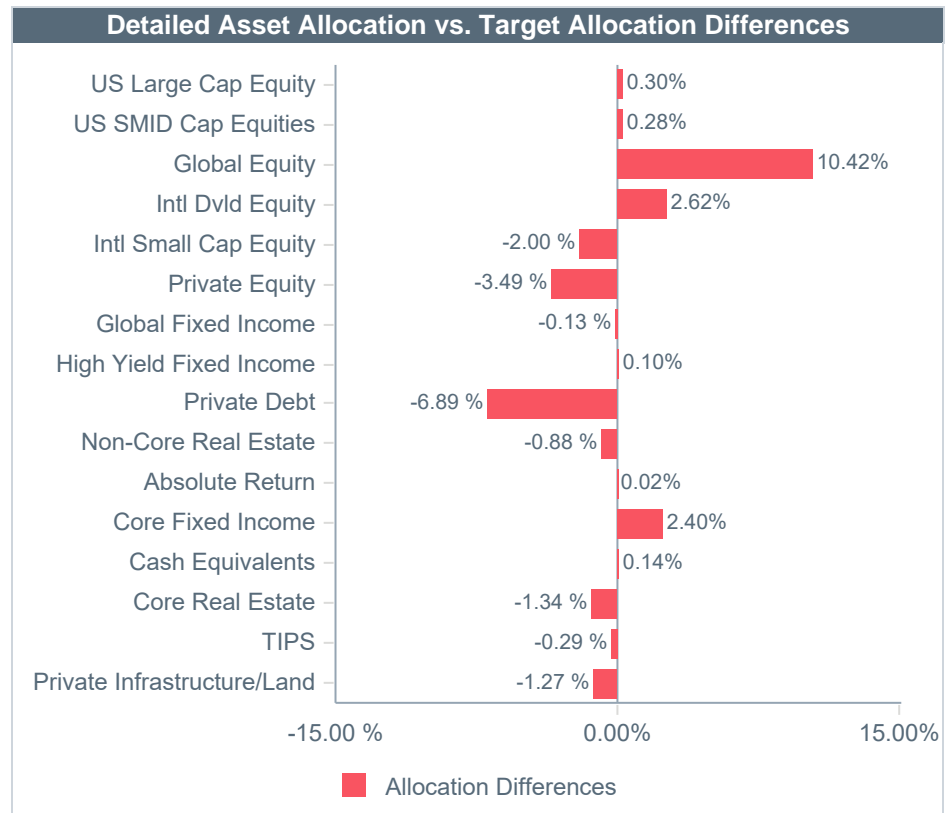
Vermont State Teachers' Retirement System
Total Fund
Asset Allocation vs. Target Allocation

As of June 30, 2021

Thematic Buckets vs. Target Allocation			
	Market Value (\$)	Allocation (%)	Target (%)
Growth Assets	1,672,164,774	70.36	70.00
Downturn Hedging Assets	535,728,041	22.54	20.00
Inflation Hedging Assets	168,654,780	7.10	10.00
Total Fund	2,376,547,595	100.00	100.00



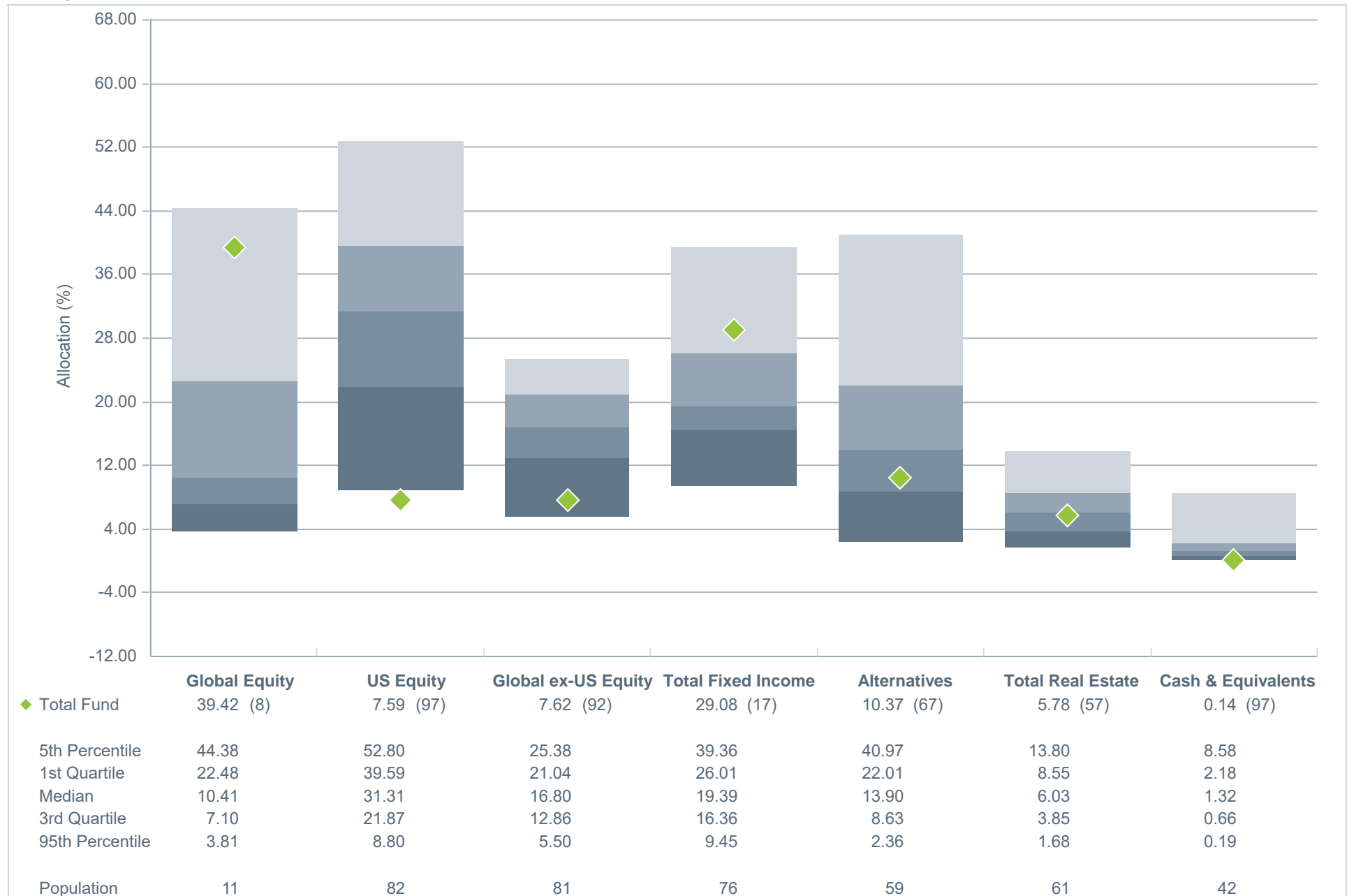
Detailed Asset Allocation vs. Target Allocation			
	Market Value (\$)	Allocation (%)	Target (%)
US Large Cap Equity	102,302,730	4.30	4.00
US SMID Cap Equities	78,054,992	3.28	3.00
Global Equity	936,913,342	39.42	29.00
Intl Dvld Equity	180,998,555	7.62	5.00
Intl Small Cap Equity	-	0.00	2.00
Private Equity	154,726,223	6.51	10.00
Global Fixed Income	92,019,373	3.87	4.00
High Yield Fixed Income	2,298,042	0.10	0.00
Private Debt	74,014,881	3.11	10.00
Non-Core Real Estate	50,361,759	2.12	3.00
Absolute Return	474,879	0.02	0.00
Core Fixed Income	532,345,750	22.40	20.00
Cash Equivalents	3,382,292	0.14	0.00
Core Real Estate	86,919,663	3.66	5.00
TIPS	64,440,152	2.71	3.00
Private Infrastructure/Land	17,294,964	0.73	2.00
Total Fund	2,376,547,595	100.00	100.00



Allocations shown may not sum up to 100% exactly due to rounding.

Vermont State Teachers' Retirement System
All Public Plans (\$1B to \$10B) (Custom PG)
Plan Sponsor TF Asset Allocation

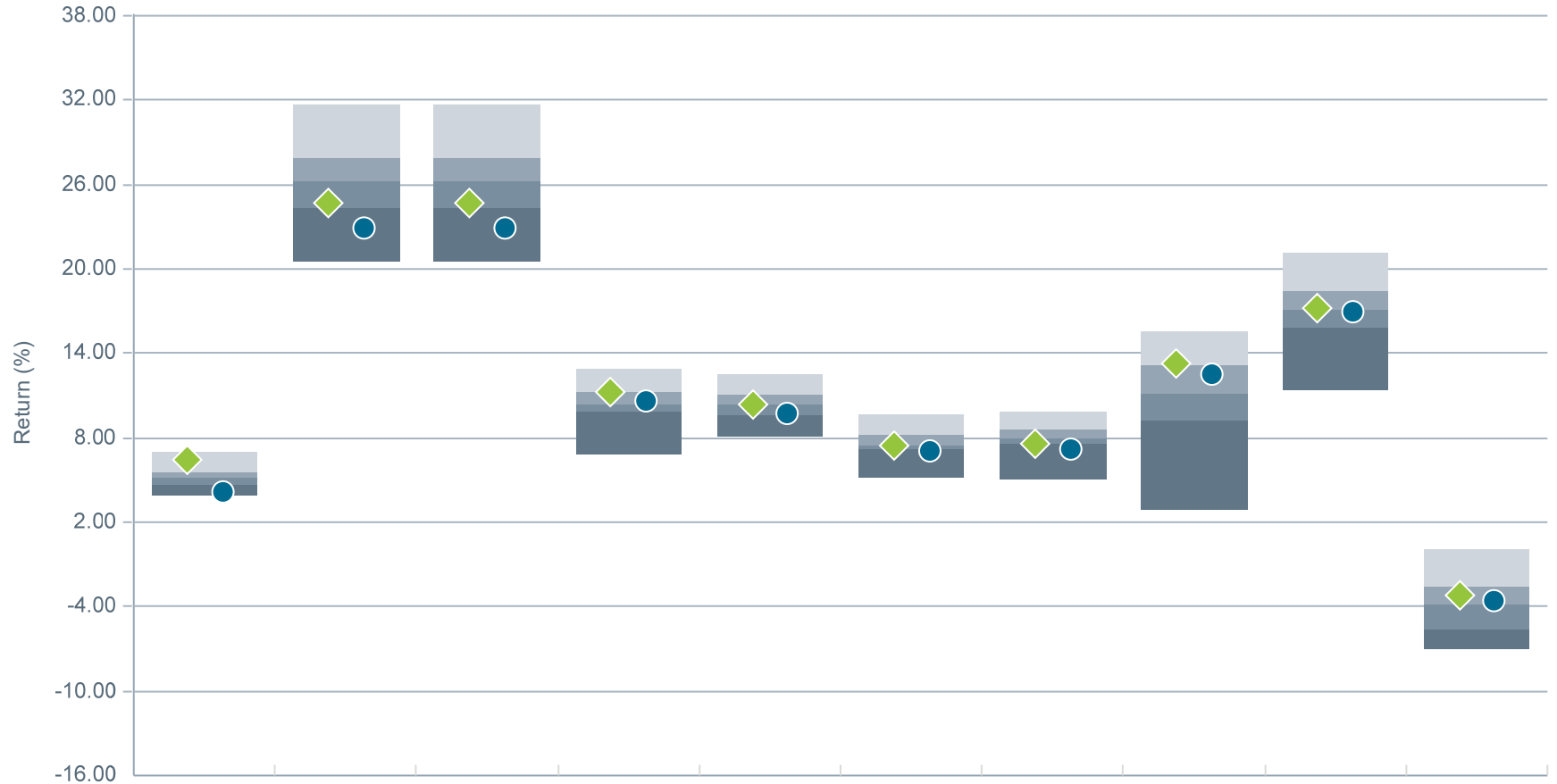
As of June 30, 2021



Parentheses contain percentile ranks. Total Fixed Income includes TIPS.

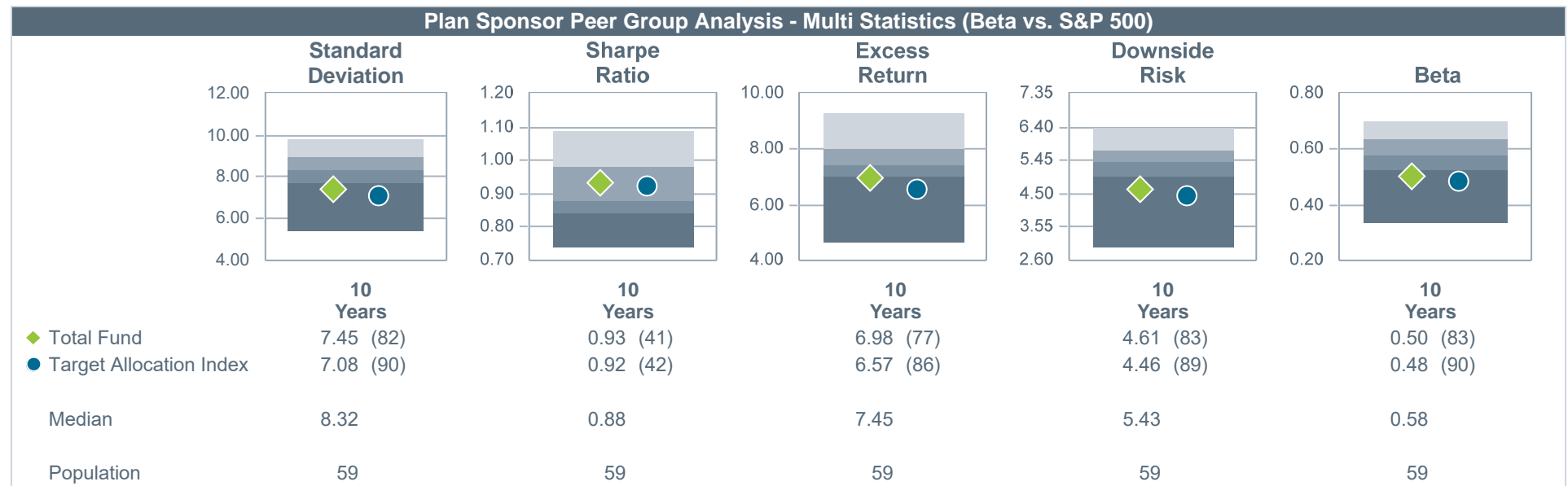
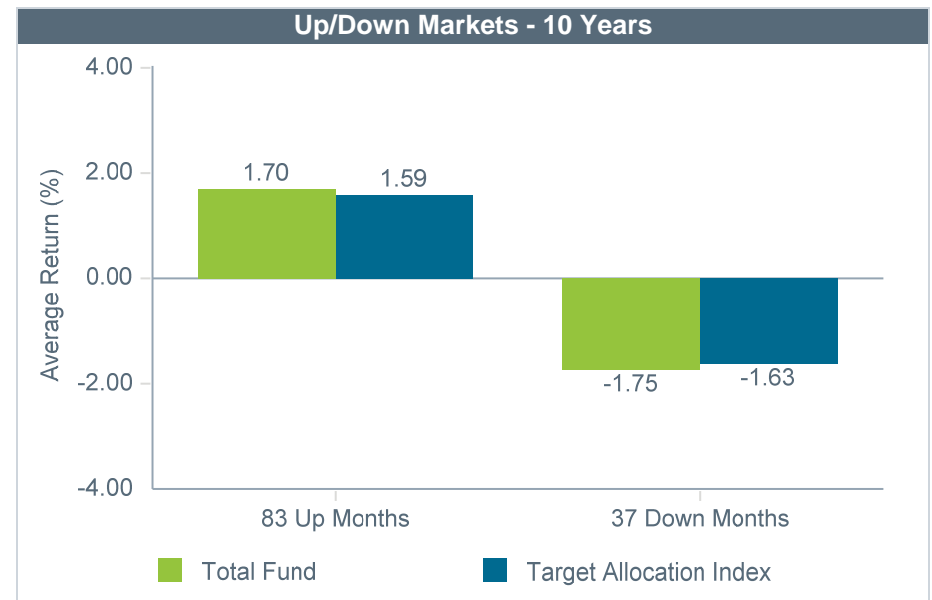
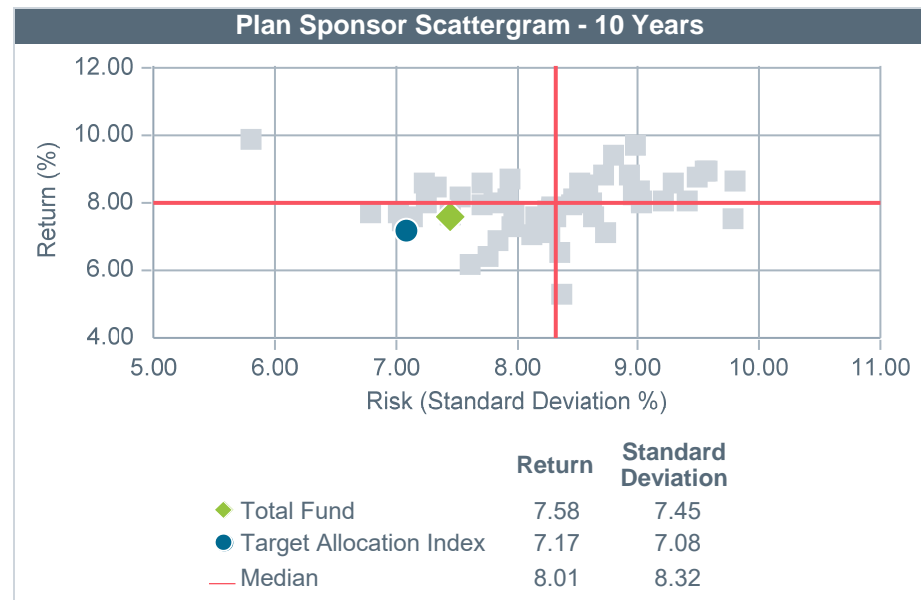
Vermont State Teachers' Retirement System
All Public Plans (\$1B to \$10B) (Custom PG)
Plan Sponsor Peer Group Analysis

As of June 30, 2021



Performance shown is net of fees. Parentheses contain percentile ranks.

Vermont State Teachers' Retirement System vs. All Public Plans (\$1B to \$10B) (Custom PG)



Performance shown is net of fees. Calculation is based on monthly periodicity. Parentheses contain percentile ranks.

Vermont State Teachers' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation		Performance (%)									
	Market Value (\$)	Actual (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
Total Fund	2,376,547,595	100.00	6.38	24.75	24.75	11.27	10.42	7.58	6.44	13.28	6.67	07/01/2005
Target Allocation Index			4.11	22.95	22.95	10.67	9.78	7.17	6.44	12.51	6.66	
Difference			2.27	1.80	1.80	0.60	0.64	0.41	0.00	0.77	0.01	
Actual Allocation Index			4.73	24.02	24.02	10.36	9.71	7.02	6.17	11.88	6.43	
Difference			1.65	0.73	0.73	0.91	0.71	0.56	0.27	1.40	0.24	
Growth Assets	1,672,164,774	70.36	8.30	-	-	-	-	-	-	-	26.68	09/01/2020
MSCI ACW IM Index (USD) (Net)			7.18	40.94	40.94	14.24	14.55	9.90	7.74	16.25	26.33	
Difference			1.12	-	-	-	-	-	-	-	0.35	
Downturn Hedging Assets	535,728,041	22.54	1.90	-	-	-	-	-	-	-	-0.83	09/01/2020
Bloomberg US Agg Bond Index			1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	-1.00	
Difference			0.07	-	-	-	-	-	-	-	0.17	
Inflation Hedging Assets	168,654,780	7.10	2.13	-	-	-	-	-	-	-	0.76	09/01/2020
Consumer Price Index+2.5%			3.21	8.03	8.03	5.11	4.99	4.42	4.51	3.90	6.70	
Difference			-1.08	-	-	-	-	-	-	-	-5.94	

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Vermont State Teachers' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
Total Fund	2,376,547,595	100.00	100.00	6.38	24.75	24.75	11.27	10.42	7.58	6.44	13.28	6.67	07/01/2005
Target Allocation Index				4.11	22.95	22.95	10.67	9.78	7.17	6.44	12.51	6.66	
Difference				2.27	1.80	1.80	0.60	0.64	0.41	0.00	0.77	0.01	
Actual Allocation Index				4.73	24.02	24.02	10.36	9.71	7.02	6.17	11.88	6.43	
Difference				1.65	0.73	0.73	0.91	0.71	0.56	0.27	1.40	0.24	
All Public Plans (\$1B to \$10B)				5.20	26.15	26.15	10.40	10.36	8.01	6.76	11.15	6.91	
Rank				8	70	70	26	46	73	68	23	72	
Domestic Equity	180,357,721	7.59	7.00	7.31	49.13	49.13	16.72	16.42	13.94	-	19.22	14.00	01/01/2011
Russell 3000 Index				8.24	44.16	44.16	18.73	17.89	14.70	10.78	20.89	14.62	
Difference				-0.93	4.97	4.97	-2.01	-1.47	-0.76	-	-1.67	-0.62	
US Large Cap Equity	102,302,730	4.30	4.00	6.85	50.66	50.66	15.18	15.43	13.66	10.40	13.03	10.30	07/01/2005
S&P 500 Index (Cap Wtd)				8.55	40.79	40.79	18.67	17.65	14.84	10.73	18.40	10.60	
Difference				-1.70	9.87	9.87	-3.49	-2.22	-1.18	-0.33	-5.37	-0.30	
Blackrock S&P 500 (EqI Wtd) (CF)	102,302,730	4.30	-	6.85	50.66	50.66	-	-	-	-	13.03	20.80	07/01/2019
S&P 500 Index (Eq Wtd)				6.90	50.71	50.71	16.41	15.68	13.76	10.98	12.83	20.75	
Difference				-0.05	-0.05	-0.05	-	-	-	-	0.20	0.05	
IM U.S. Large Cap Equity (MF) Median				8.22	40.68	40.68	18.02	17.10	13.73	10.14	18.34	22.80	
Rank				68	7	7	-	-	-	-	64	59	
US SMID Cap Equities	78,054,992	3.28	3.00	7.77	46.20	46.20	18.07	17.88	14.30	11.17	27.32	10.97	07/01/2005
Russell 2500 Index				5.44	57.79	57.79	15.24	16.35	12.86	10.25	19.99	10.45	
Difference				2.33	-11.59	-11.59	2.83	1.53	1.44	0.92	7.33	0.52	
Champlain US Mid Cap Core (SA)	78,049,547	3.28	-	7.76	46.20	46.20	18.06	18.66	15.04	-	27.32	16.14	10/01/2009
Custom SMID Cap Equity Index				5.90	59.50	59.50	14.28	16.43	12.75	10.18	19.99	14.24	
Difference				1.86	-13.30	-13.30	3.78	2.23	2.29	-	7.33	1.90	
IM U.S. SMID Cap Equity (MF) Median				4.87	52.55	52.55	14.63	16.05	12.41	10.31	20.27	13.98	
Rank				7	76	76	34	35	19	-	41	26	
Global Equity	936,913,342	39.42	29.00	7.48	40.60	40.60	14.09	-	-	-	19.89	9.31	02/01/2018
MSCI ACW IM Index (USD) (Net)				7.18	40.94	40.94	14.24	14.55	9.90	7.74	16.25	10.63	
Difference				0.30	-0.34	-0.34	-0.15	-	-	-	3.64	-1.32	

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Vermont State Teachers' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
BlackRock MSCI ACW IMI (CF)	813,388,483	34.23	-	7.27	41.53	41.53	-	-	-	-	16.77	19.93	07/01/2019
MSCI ACW IM Index (USD) (Net)				7.18	40.94	40.94	14.24	14.55	9.90	7.74	16.25	19.41	
Difference				0.09	0.59	0.59	-	-	-	-	0.52	0.52	
IM Global Equity (MF) Median				6.95	39.41	39.41	13.96	13.31	9.73	7.52	15.21	19.06	
Rank				45	42	42	-	-	-	-	44	46	
Artisan Global Opportunities (CF)	123,524,859	5.20	-	8.93	35.04	35.04	21.47	-	-	-	40.50	21.47	07/01/2018
MSCI ACW Index (USD) (Net)				7.39	39.26	39.26	14.57	14.61	9.90	7.60	16.25	14.57	
Difference				1.54	-4.22	-4.22	6.90	-	-	-	24.25	6.90	
IM Global Equity (MF) Median				6.95	39.41	39.41	13.96	13.31	9.73	7.52	15.21	13.96	
Rank				20	67	67	12	-	-	-	14	12	
International Equity	180,998,555	7.62	7.00	6.33	39.38	39.38	8.59	10.28	5.78	-	4.84	5.99	01/01/2011
MSCI EAFE Index (USD) (Net)				5.17	32.35	32.35	8.27	10.28	5.89	4.40	7.82	6.09	
Difference				1.16	7.03	7.03	0.32	0.00	-0.11	-	-2.98	-0.10	
Acadian International All Cap (SA)	117,637,486	4.95	-	7.06	42.32	42.32	9.40	13.39	8.41	5.49	12.37	6.74	11/01/2005
MSCI EAFE IM Index (USD) (Net)				5.04	33.57	33.57	8.28	10.53	6.22	4.69	8.47	5.61	
Difference				2.02	8.75	8.75	1.12	2.86	2.19	0.80	3.90	1.13	
IM All EAFE (MF) Median				5.17	32.88	32.88	8.19	9.89	5.69	4.34	8.17	5.26	
Rank				11	7	7	33	8	9	24	33	15	
Mondrian International (SA)	63,361,069	2.67	-	5.00	34.11	34.11	5.84	7.54	5.13	4.27	-4.01	5.39	07/01/2005
MSCI EAFE Index (USD) (Net)				5.17	32.35	32.35	8.27	10.28	5.89	4.40	7.82	5.66	
Difference				-0.17	1.76	1.76	-2.43	-2.74	-0.76	-0.13	-11.83	-0.27	
IM All EAFE (MF) Median				5.17	32.88	32.88	8.19	9.89	5.69	4.34	8.17	5.59	
Rank				58	40	40	77	85	65	53	98	58	
Fixed Income	626,663,165	26.37	24.00	2.21	1.24	1.24	5.32	4.21	4.22	-	8.23	4.43	01/01/2011
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	3.49	
Difference				0.38	1.58	1.58	-0.02	1.18	0.83	-	0.72	0.94	
Core Fixed Income	532,345,750	22.40	20.00	1.91	-	-	-	-	-	-	-	-0.83	09/01/2020
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	-1.00	
Difference				0.08	-	-	-	-	-	-	-	0.17	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Manager inception dates shown represent the first full month of available performance. Fiscal year ends 6/30. Please see addendum for custom benchmark definitions. Private Asset market values and performance are lagged to match custodian reported net asset values. Accordingly, fund reported performance will lag benchmark reported performance. Negative cash performance is due to a valuation decline in the Blackrock Transition account during its liquidation.

Vermont State Teachers' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
BlackRock US Agg (CF)	429,869,280	18.09	-	1.84	-0.31	-0.31	-	-	-	-	7.54	4.38	06/01/2019
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	4.56	
Difference				0.01	0.03	0.03	-	-	-	-	0.03	-0.18	
IM U.S. Broad Mkt Core FI (MF)				1.93	1.25	1.25	5.62	3.31	3.51	4.41	8.19	5.10	
Rank				60	88	88	-	-	-	-	71	81	
PIMCO Core (SA)	102,476,470	4.31	-	2.19	-	-	-	-	-	-	-	-0.23	09/01/2020
Bloomberg US Agg Bond Index				1.83	-0.34	-0.34	5.34	3.03	3.39	4.43	7.51	-1.00	
Difference				0.36	-	-	-	-	-	-	-	0.77	
IM U.S. Broad Mkt Core FI (MF)				1.93	1.25	1.25	5.62	3.31	3.51	4.41	8.19	0.11	
Rank				20	-	-	-	-	-	-	-	63	
Emerging Markets Debt	91,534,584	3.85	4.00	3.97	-	-	-	-	-	-	-	2.84	09/01/2020
JPM Emg Mkts Bond Gbl Index (USD)				3.93	6.81	6.81	6.48	4.44	5.34	6.74	5.88	2.70	
Difference				0.04	-	-	-	-	-	-	-	0.14	
Wellington Opportunistic EMD (CF)	91,534,584	3.85	-	3.97	7.37	7.37	6.83	5.44	5.76	-	7.69	6.51	12/01/2009
JPM Emg Mkts Bond Gbl Index (USD)				3.93	6.81	6.81	6.48	4.44	5.34	6.74	5.88	6.11	
Difference				0.04	0.56	0.56	0.35	1.00	0.42	-	1.81	0.40	
IM Emerging Markets Debt (MF) Median				3.71	9.08	9.08	6.15	4.67	4.32	5.83	5.57	5.22	
Rank				34	90	90	27	20	3	-	15	4	
High Yield Fixed Income	2,298,042	0.10	0.00	2.36	20.27	20.27	4.09	5.23	5.42	6.37	3.26	6.31	06/01/2006
Bloomberg US Corp Hi Yld Index				2.74	15.37	15.37	7.45	7.48	6.66	7.53	7.11	7.46	
Difference				-0.38	4.90	4.90	-3.36	-2.25	-1.24	-1.16	-3.85	-1.15	
PIMCO Liquidation (SA)	2,298,042	0.10	-	2.36	20.27	20.27	-	-	-	-	3.25	3.92	08/01/2018
Bloomberg US Corp Hi Yld Index				2.74	15.37	15.37	7.45	7.48	6.66	7.53	7.11	7.27	
Difference				-0.38	4.90	4.90	-	-	-	-	-3.86	-3.35	
IM U.S. High Yield Bonds (MF) Median				2.59	14.69	14.69	6.43	6.39	5.54	6.22	5.28	6.23	
Rank				67	9	9	-	-	-	-	82	95	
Private Debt	74,014,881	3.11	10.00	1.39	16.33	16.33	5.93	-	-	-	2.36	6.27	01/01/2018
CS Lvg'd Loan Index+2% (Spliced)				1.95	12.98	12.98	4.81	5.24	4.51	4.72	3.12	4.74	
Difference				-0.56	3.35	3.35	1.12	-	-	-	-0.76	1.53	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Manager inception dates shown represent the first full month of available performance. Fiscal year ends 6/30. Please see addendum for custom benchmark definitions. Private Asset market values and performance are lagged to match custodian reported net asset values. Accordingly, fund reported performance will lag benchmark reported performance. Negative cash performance is due to a valuation decline in the Blackrock Transition account during its liquidation.

Vermont State Teachers' Retirement System
Asset Allocation & Performance - Net of Fees

As of June 30, 2021

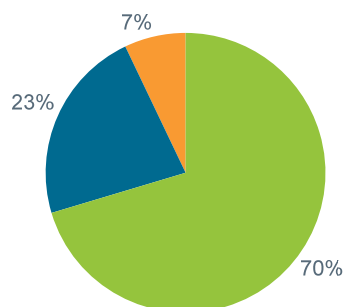
	Allocation			Performance (%)									
	Market Value (\$)	Actual (%)	Policy (%)	QTD	FYTD	1 Year	3 Years	5 Years	10 Years	15 Years	2020	Since Incep.	Inception Date
Private Equity	154,726,223	6.51	10.00	27.62	59.71	59.71	24.63	22.37	-	-	17.27	18.77	01/01/2013
Cambridge US Prvt Eq Index				0.00	35.55	35.55	15.67	16.57	13.90	12.71	21.32	14.69	
Difference				27.62	24.16	24.16	8.96	5.80	-	-	-4.05	4.08	
Non-Core Real Estate	50,361,759	2.12	3.00	3.47	8.47	8.47	4.64	8.72	-	-	-1.77	9.51	09/01/2014
NCREIF ODCE Index+2% (Spliced)				4.19	8.70	8.70	5.94	6.39	8.92	7.07	1.60	8.11	
Difference				-0.72	-0.23	-0.23	-1.30	2.33	-	-	-3.37	1.40	
Inflation Hedging Assets (Spliced)	168,654,780	7.10	10.00	2.13	-2.41	-2.41	-0.35	2.73	7.65	-	-2.80	8.43	01/01/2011
CPI+2.5% (Spliced)				3.21	6.70	6.70	5.28	6.00	8.72	6.93	0.75	9.03	
Difference				-1.08	-9.11	-9.11	-5.63	-3.27	-1.07	-	-3.55	-0.60	
TIPS	64,440,152	2.71	2.00	3.24	-	-	-	-	-	-	-	2.98	09/01/2020
Bloomberg US Trsy US TIPS Index				3.25	6.51	6.51	6.53	4.17	3.40	4.56	10.99	3.00	
Difference				-0.01	-	-	-	-	-	-	-	-0.02	
BlackRock TIPS (CF)	64,440,152	2.71	-	3.24	6.49	6.49	6.45	4.12	3.33	-	10.97	3.73	12/01/2009
Bloomberg US Trsy US TIPS Index				3.25	6.51	6.51	6.53	4.17	3.40	4.56	10.99	3.78	
Difference				-0.01	-0.02	-0.02	-0.08	-0.05	-0.07	-	-0.02	-0.05	
IM U.S. TIPS (MF) Median				2.71	6.51	6.51	5.76	3.72	2.70	3.87	9.64	3.14	
Rank				20	52	52	21	29	13	-	26	11	
Core Real Estate	86,919,663	3.66	5.00	1.28	-3.51	-3.51	-1.00	1.83	7.22	-	-2.26	8.01	01/01/2011
NCREIF ODCE Index (AWA) (Net)				3.68	7.09	7.09	4.60	5.62	8.60	5.34	0.34	9.00	
Difference				-2.40	-10.60	-10.60	-5.60	-3.79	-1.38	-	-2.60	-0.99	
UBS Trumbull Properties (CF)	86,919,202	3.66	-	1.28	-3.51	-3.51	-0.95	1.66	5.83	4.53	-2.26	5.13	07/01/2005
NCREIF ODCE Index (AWA) (Net)				3.68	7.09	7.09	4.60	5.62	8.60	5.34	0.34	6.09	
Difference				-2.40	-10.60	-10.60	-5.55	-3.96	-2.77	-0.81	-2.60	-0.96	
Private Infrastructure/Land	17,294,964	0.73	3.00	2.17	-	-	-	-	-	-	-	2.80	08/01/2020
NCREIF Farmland Index (TR)				1.47	4.97	4.97	4.82	5.51	10.24	11.12	3.08	4.97	
Difference				0.70	-	-	-	-	-	-	-	-2.17	
Cash Equivalents	3,382,292	0.14	0.00	-0.08	-0.02	-0.02	0.45	0.29	0.16	-	0.36	0.16	01/01/2011
ICE BofAML 3 Mo US T-Bill Index				0.00	0.09	0.09	1.34	1.17	0.63	1.08	0.67	0.61	
Difference				-0.08	-0.11	-0.11	-0.89	-0.88	-0.47	-	-0.31	-0.45	

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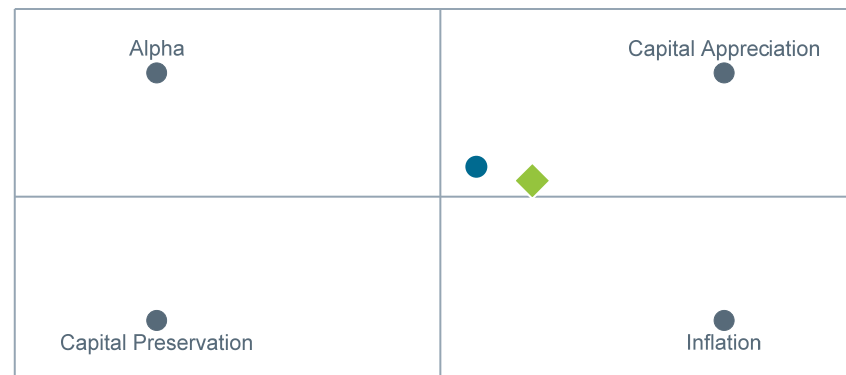
Vermont State Teachers' Retirement System
Total Fund Thematic and Liquidity Analysis

As of June 30, 2021

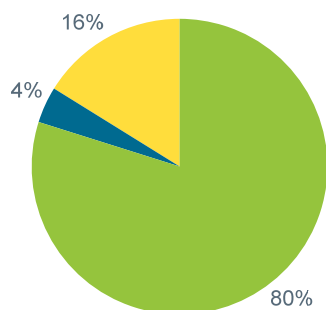
Asset Allocation by Theme



Thematic Analysis - July 1, 2005 to June 30, 2021



Asset Allocation by Liquidity



Liquidity Rating

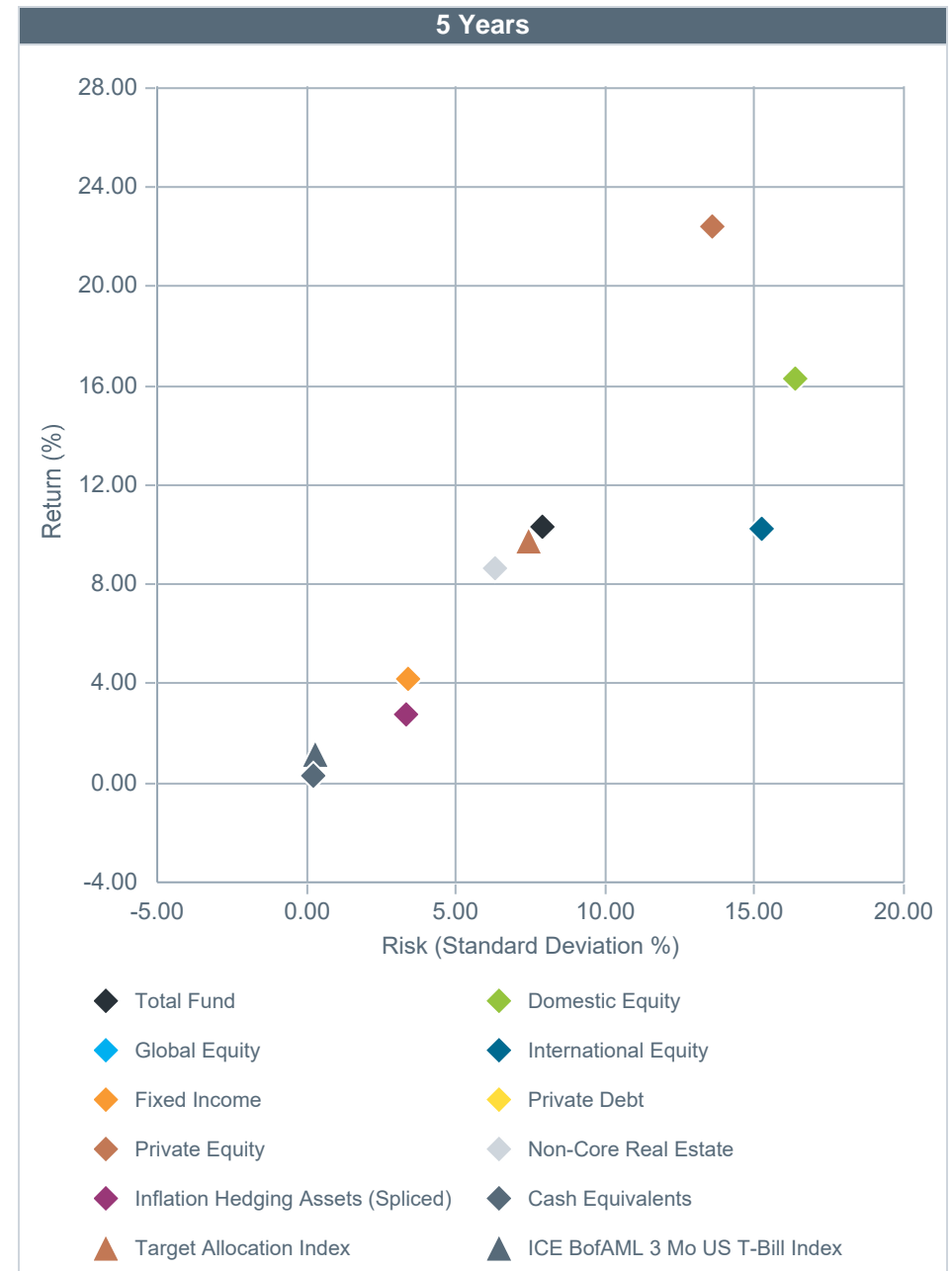
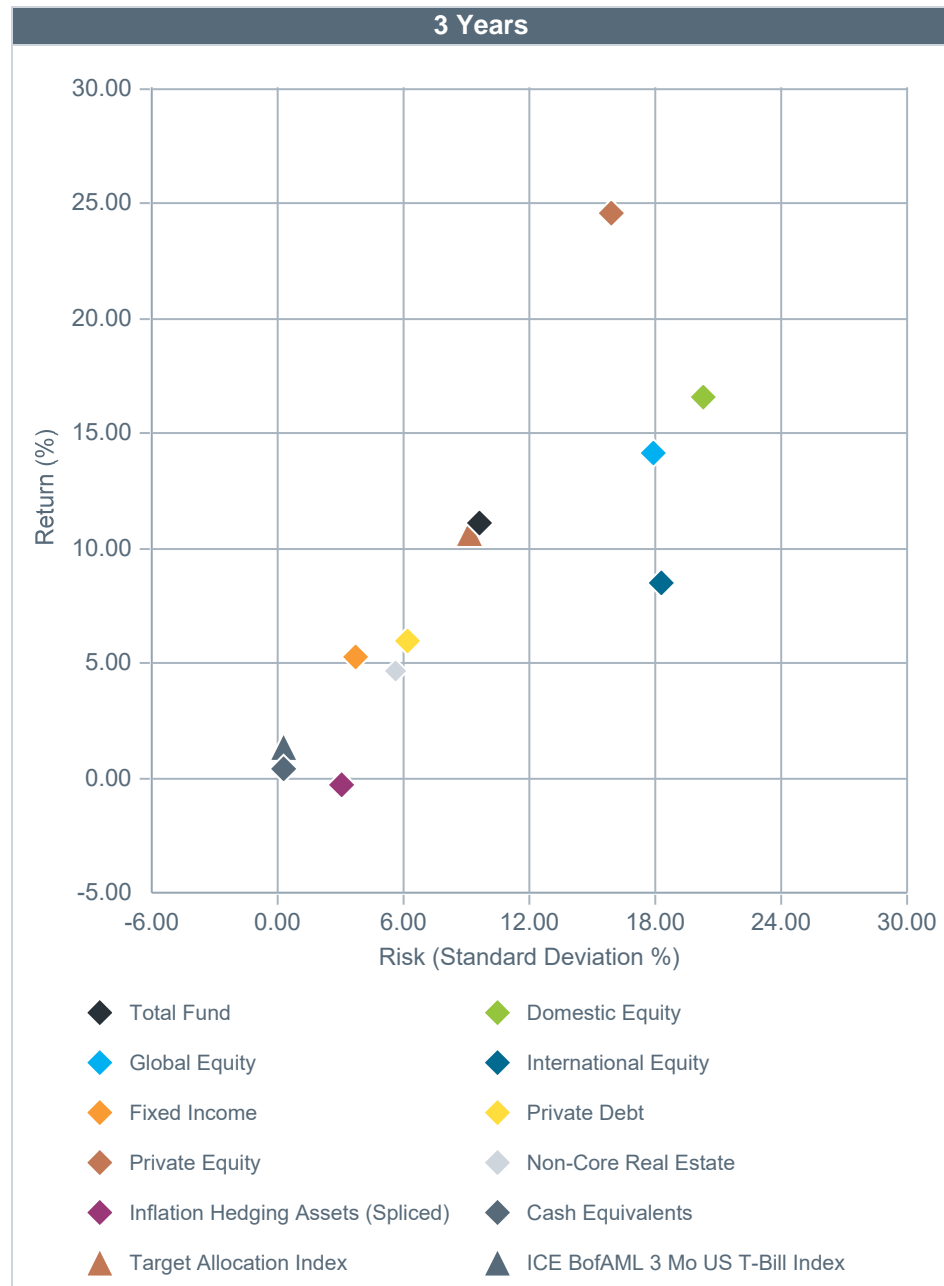
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Correlation Matrix - 10 Years

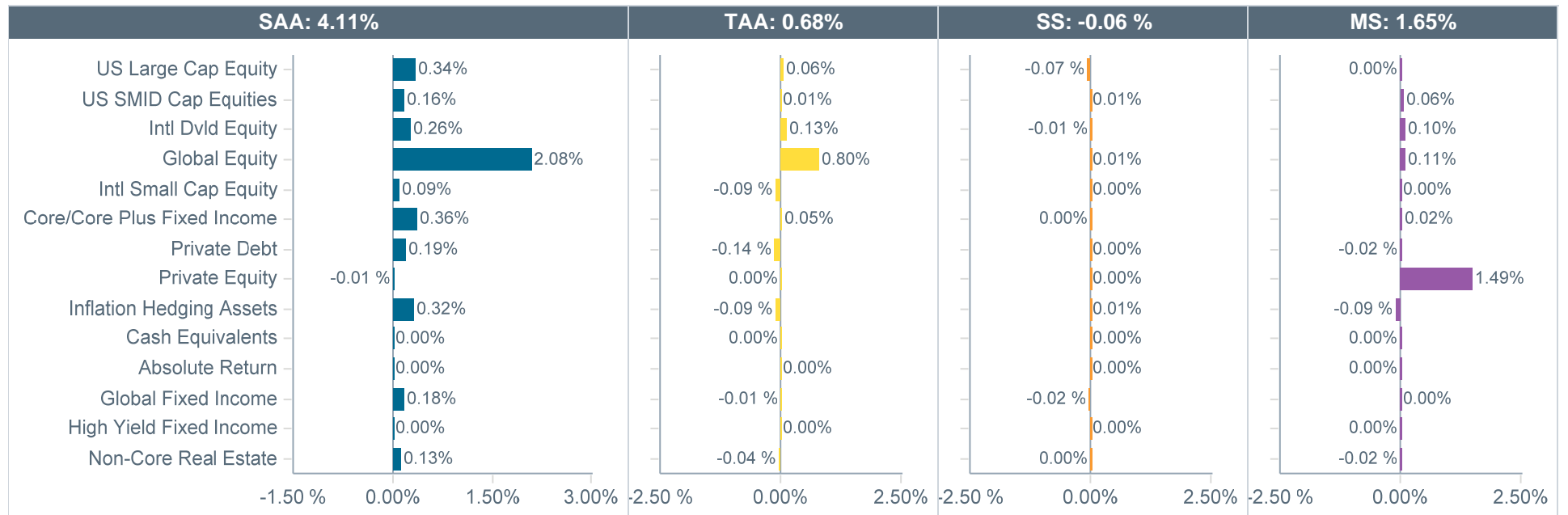
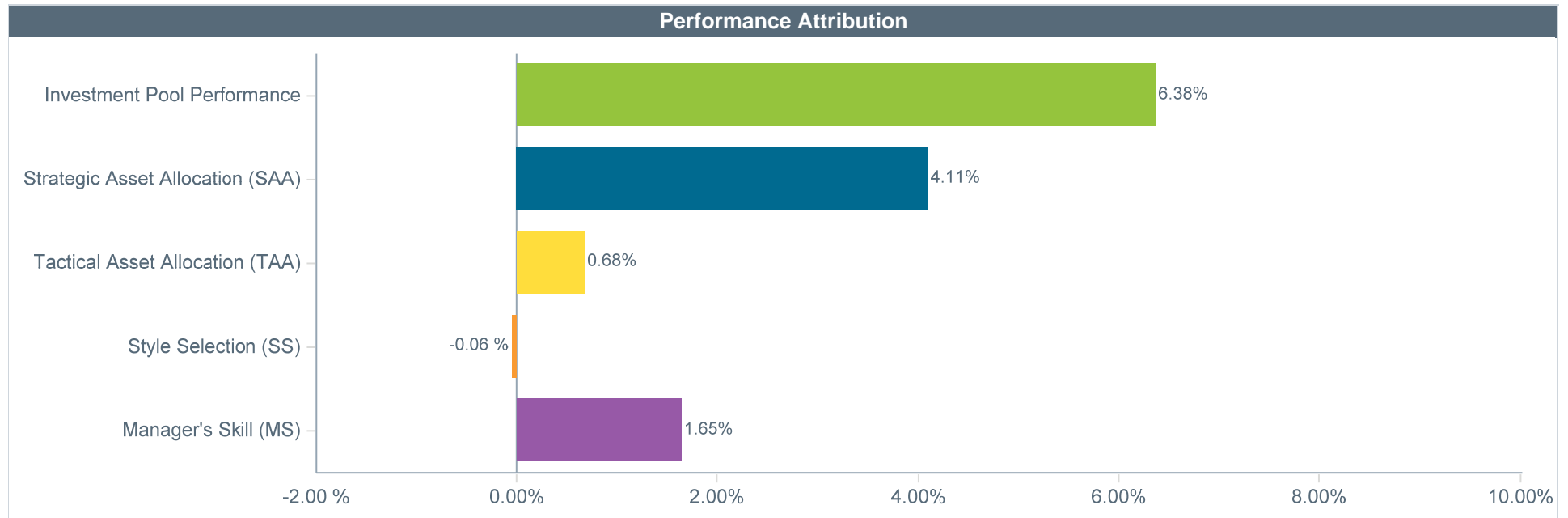
	A	B	C	D
A	1.00			
B	0.70	1.00		
C	-0.26	-0.39	1.00	
D	0.62	0.79	-0.11	1.00

A = HFRI EH: Equity Market Neutral Index (Alpha)
 B = MSCI ACW Index (USD) (Gross) (Capital Appreciation)
 C = Bloomberg US Gov't Bond Index (Capital Preservation)
 D = Real Return Custom Index (Inflation)

Asset Allocation by Theme is based on dedicated manager allocations; as such, thematic allocations are approximations. The RVK Liquidity Rating is calculated using beginning of month investment weights applied to each corresponding asset class liquidity rating. Please see the Glossary for additional information regarding liquidity, thematic, and custom index descriptions. Allocations may not sum to 100% due to rounding.



Performance shown is net of fees. Calculation is based on monthly periodicity. Funds or composites with less history than the specified time period will not appear in the chart.



Performance shown is net of fees. Calculation is based on monthly. Private Asset market values, performance and benchmarks are valued quarterly and shown as of most recently available quarter end, adjusted for subsequent cash flows. RVK cautions that the interpretation of time-weighted data on non-marketable investments, such as Private Equity, is imperfect at best and can potentially be misleading. See Glossary for additional information regarding the Total Fund Attribution - IDP calculation.

Investment Manager Profiles



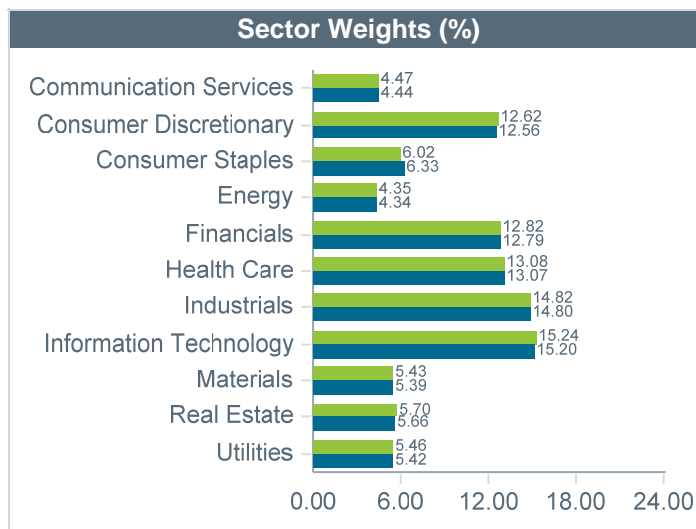
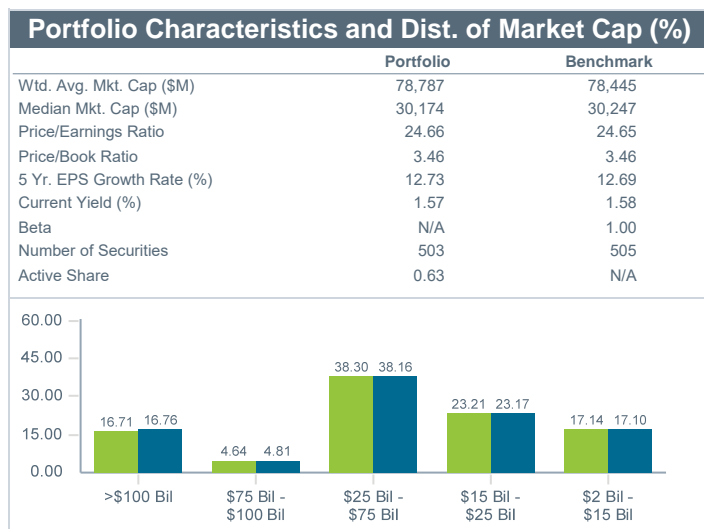
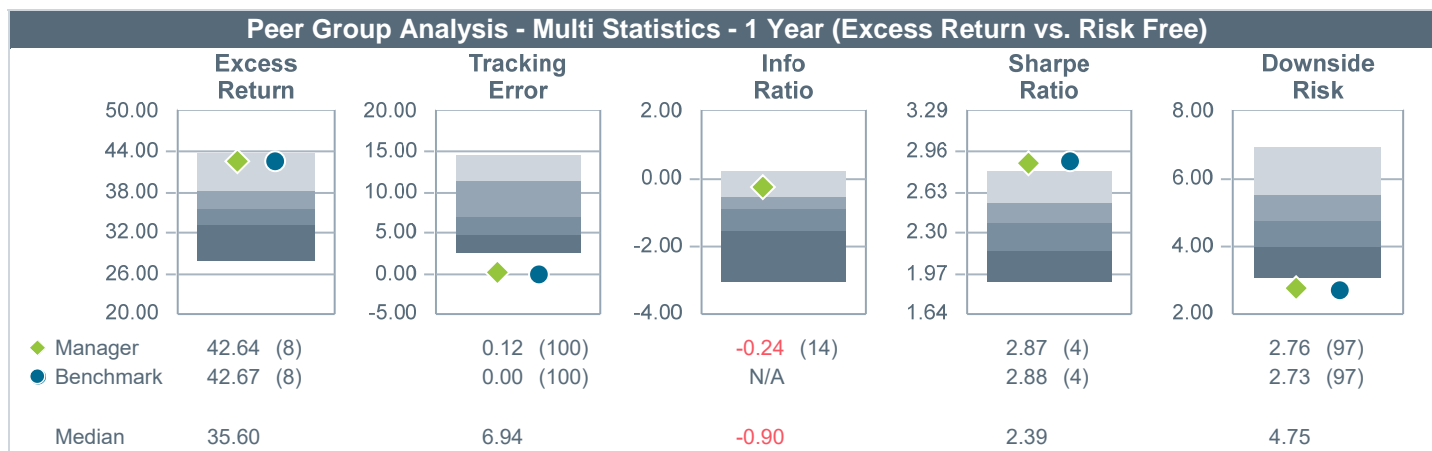
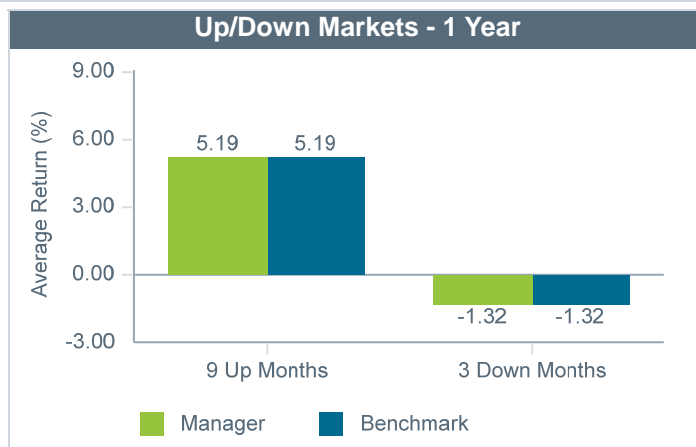
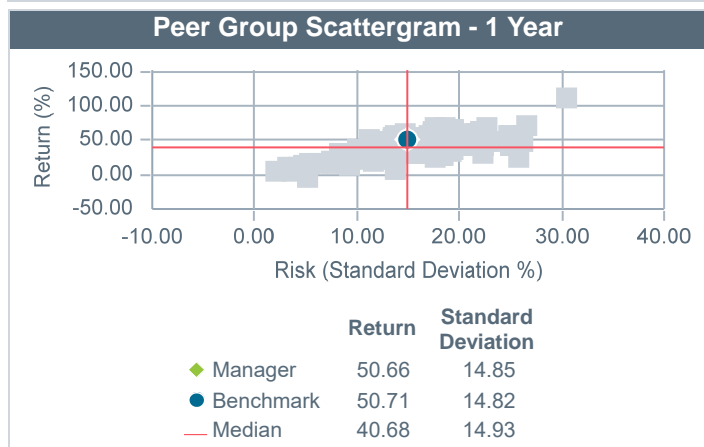
Manager: Blackrock S&P 500 (Eq Wtd) (CF)

As of June 30, 2021

Benchmark: S&P 500 Index (Eq Wtd)

Peer Group: IM U.S. Large Cap Equity (MF)

Performance											
	QTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017	2016
Manager	6.85	50.66	N/A	N/A	N/A	N/A	13.03	N/A	N/A	N/A	N/A
Benchmark	6.90	50.71	16.41	15.68	12.34	13.76	12.83	29.24	-7.64	18.90	14.80
Difference	-0.05	-0.05	N/A	N/A	N/A	N/A	0.20	N/A	N/A	N/A	N/A
Peer Group Median	8.22	40.68	18.02	17.10	13.19	13.73	18.34	30.00	-5.02	21.89	9.05
Rank	68	7	N/A	N/A	N/A	N/A	64	N/A	N/A	N/A	N/A
Population	1,943	1,872	1,694	1,515	1,343	1,179	1,869	1,848	1,862	1,791	1,706



Performance shown is net of fees and client specific. Calculation is based on monthly periodicity. Parentheses contain percentile ranks.

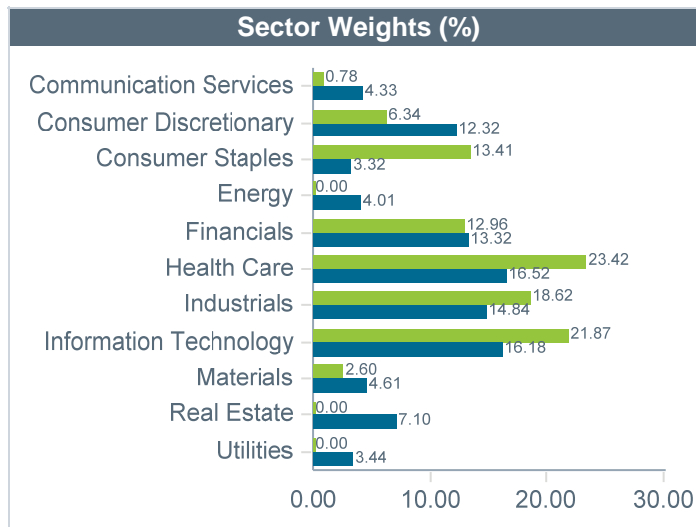
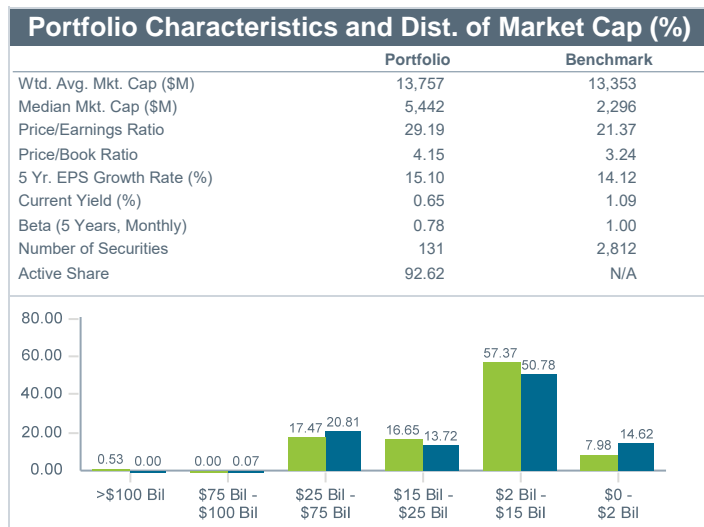
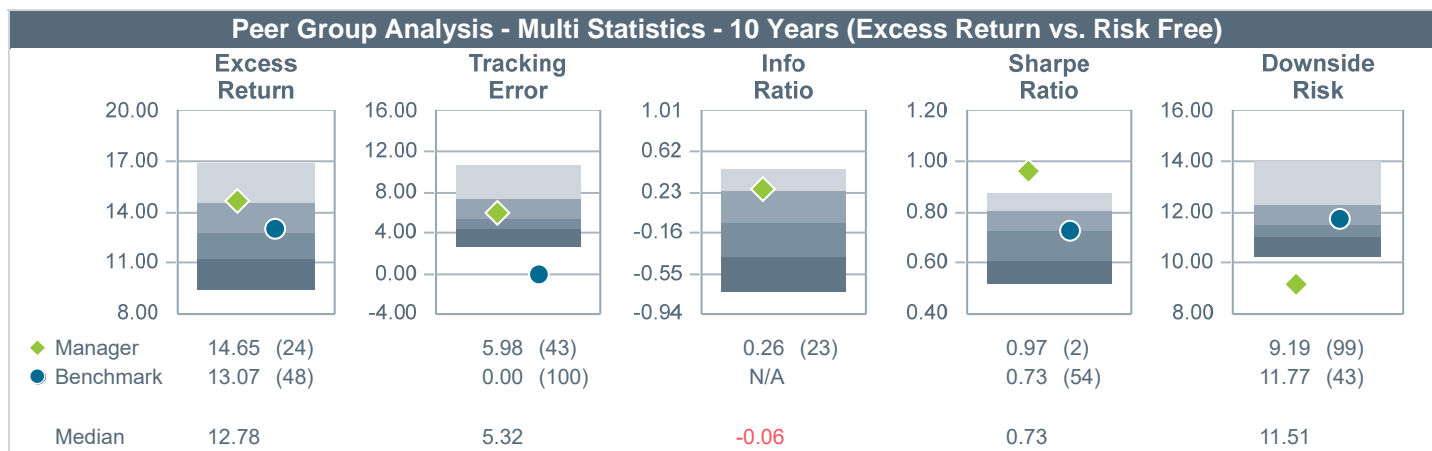
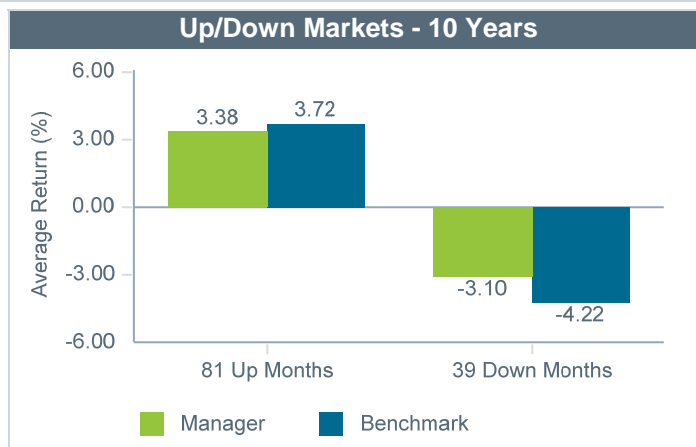
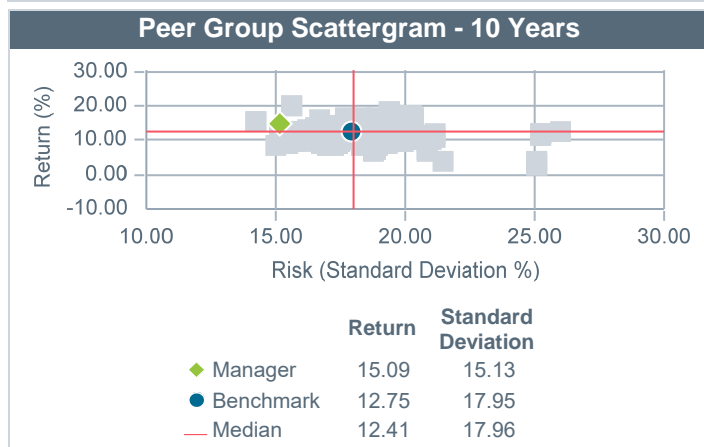
Manager: Champlain US Mid Cap Core (SA)

As of June 30, 2021

Benchmark: Custom SMID Cap Equity Index

Peer Group: IM U.S. SMID Cap Equity (MF)

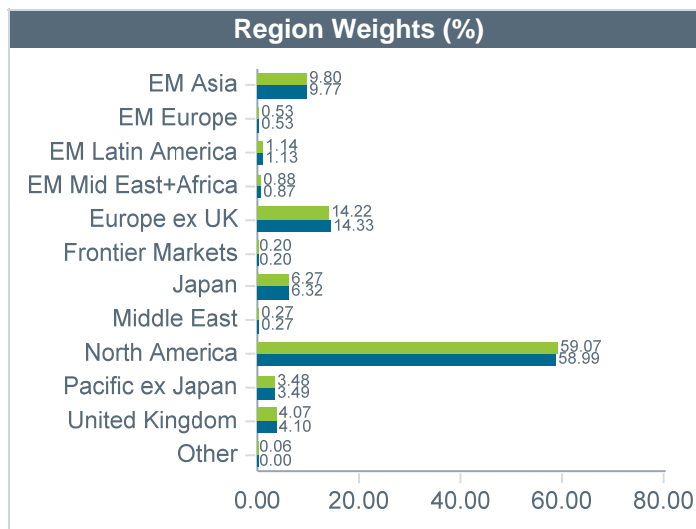
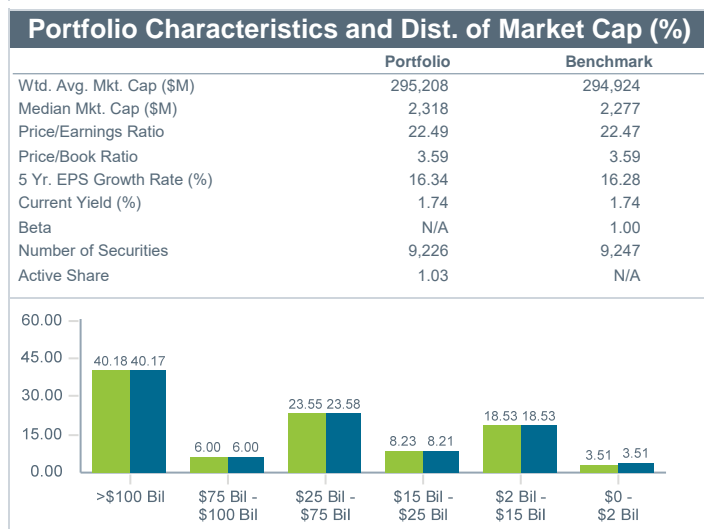
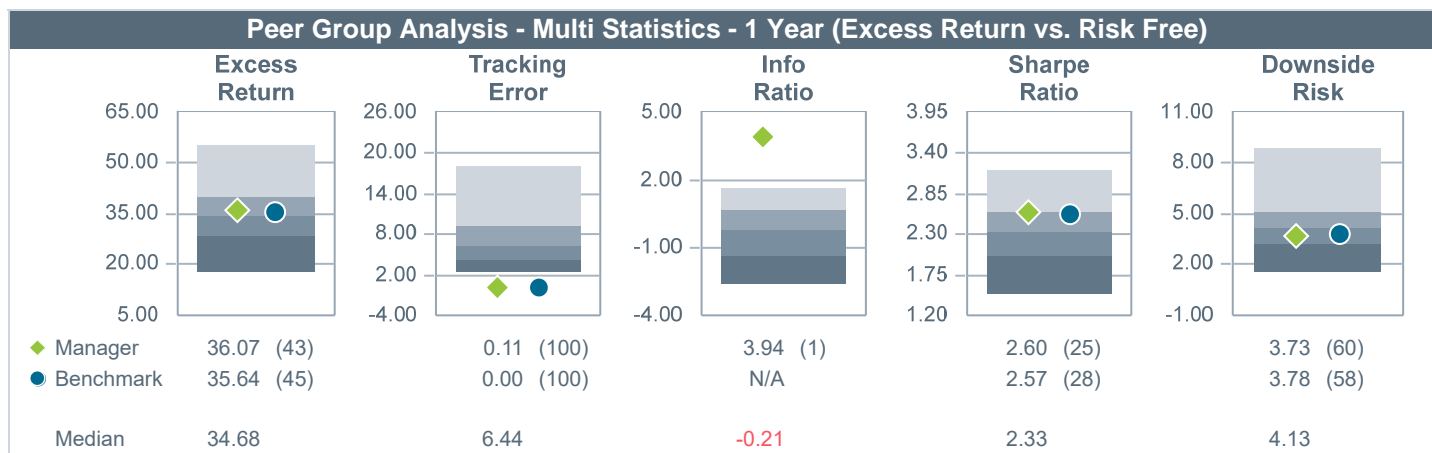
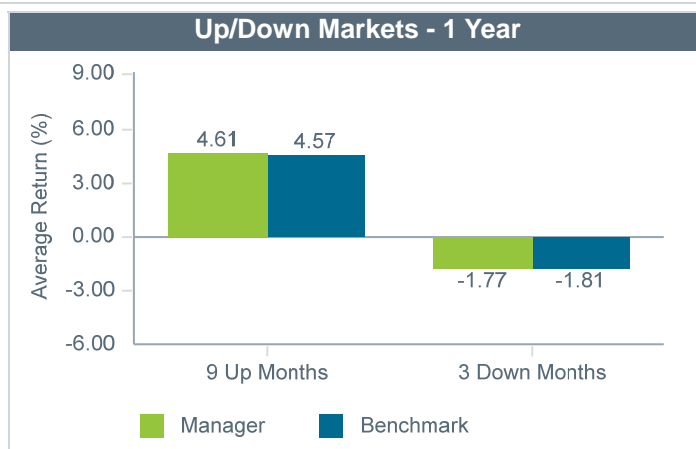
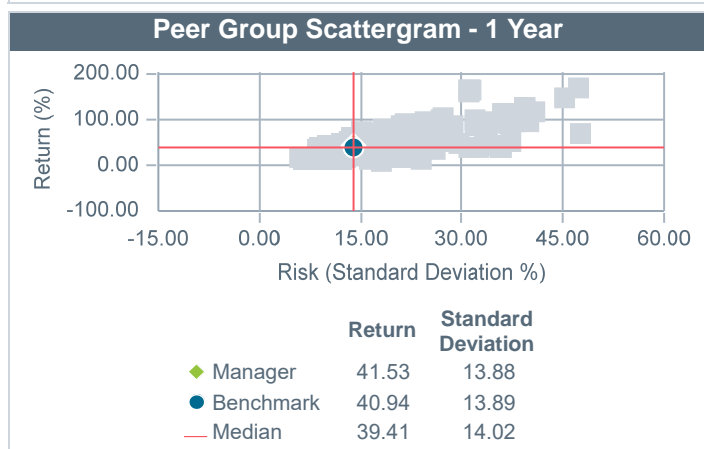
Performance											
	QTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017	2016
Manager	7.76	46.20	18.07	18.66	15.10	15.09	27.32	27.29	0.47	17.33	19.16
Benchmark	5.90	59.50	14.28	16.43	11.63	12.75	19.99	26.65	-10.50	14.67	22.77
Difference	1.86	-13.30	3.79	2.23	3.47	2.34	7.33	0.64	10.97	2.66	-3.61
Peer Group Median	4.87	52.55	14.63	16.05	11.66	12.41	20.27	27.56	-10.18	17.90	14.58
Rank	7	76	34	35	25	19	41	53	9	53	25
Population	466	462	431	379	333	282	466	490	489	462	425



Performance shown is net of fees and client specific. Calculation is based on monthly periodicity. Parentheses contain percentile ranks. The Custom SMID Cap Equity Index currently consists of 50% Russell Midcap Index and 50% Russell 2000 index. From 08/2020 through 12/2020 it consisted of 50% Russell 2500 index and 50% Russell 2000 index. Prior data was provided by the previous consultant.

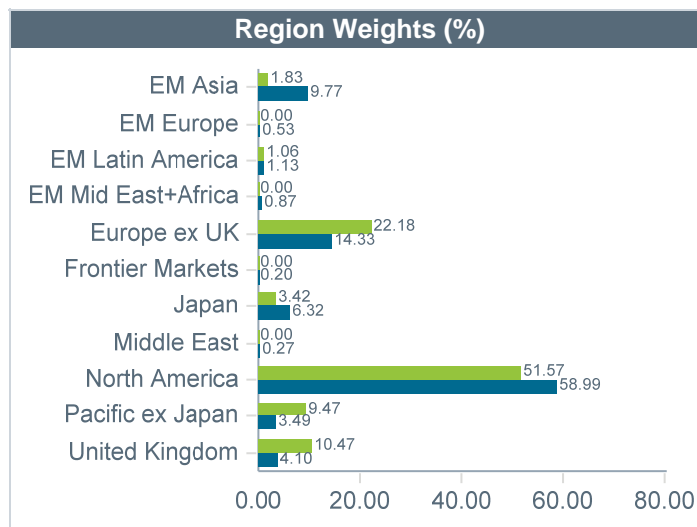
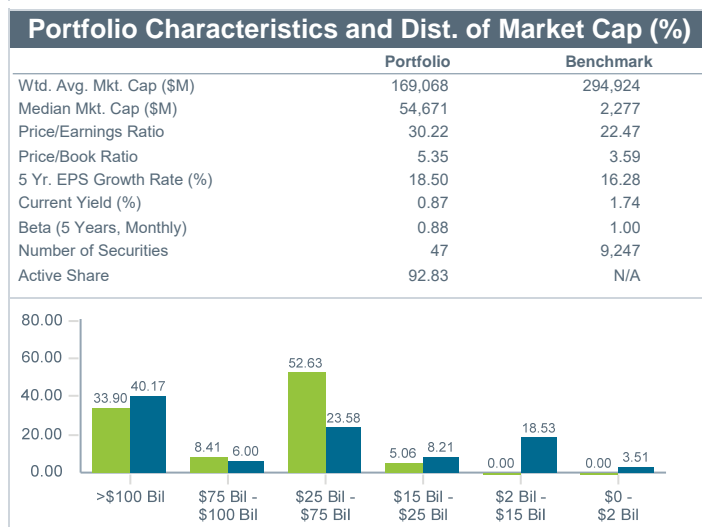
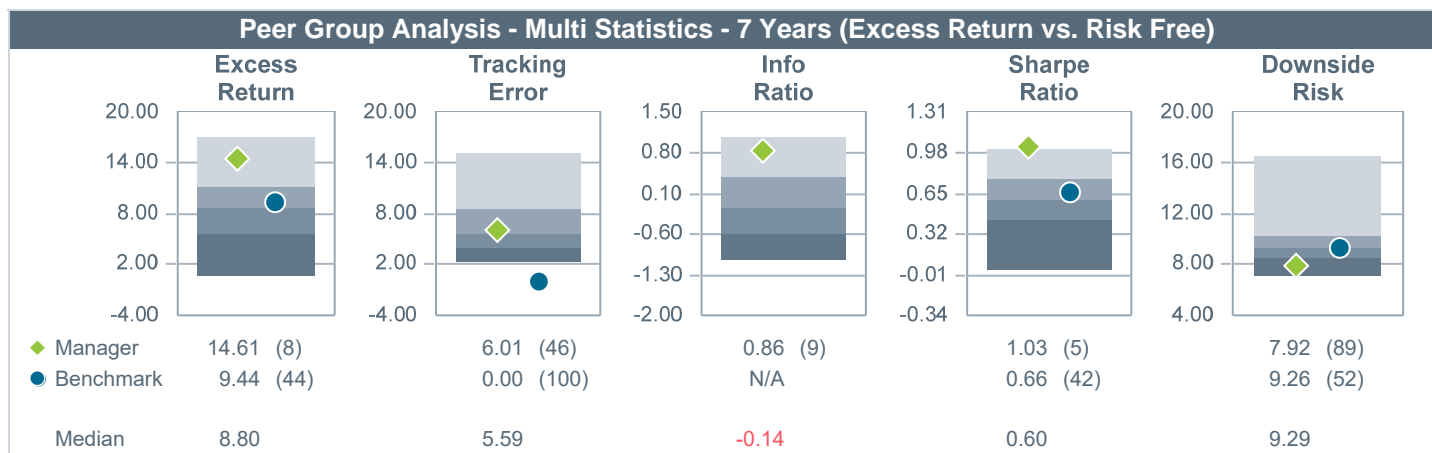
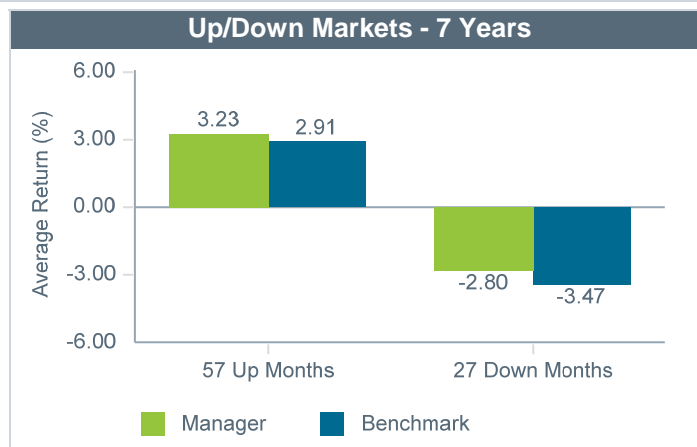
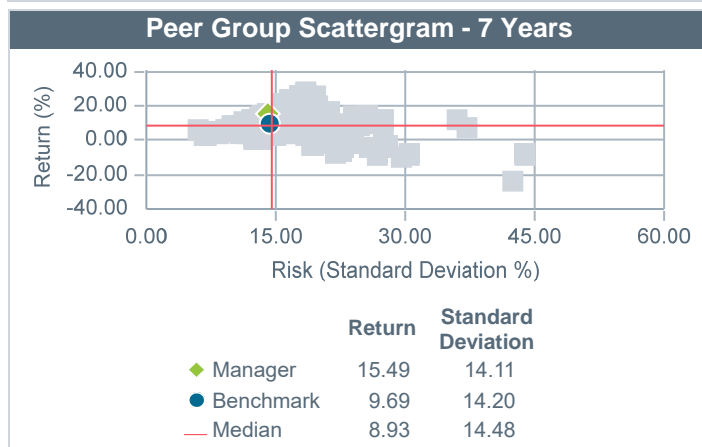


Performance											
	QTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017	2016
Manager	7.27	41.53	N/A	N/A	N/A	N/A	16.77	N/A	N/A	N/A	N/A
Benchmark	7.18	40.94	14.24	14.55	9.69	9.90	16.25	26.35	-10.08	23.95	8.36
Difference	0.09	0.59	N/A	N/A	N/A	N/A	0.52	N/A	N/A	N/A	N/A
Peer Group Median	6.95	39.41	13.96	13.31	8.93	9.73	15.21	26.35	-9.73	22.32	6.37
Rank	45	42	N/A	N/A	N/A	N/A	44	N/A	N/A	N/A	N/A
Population	1,435	1,362	1,177	1,002	838	606	1,356	1,396	1,395	1,307	1,190



Performance shown is net of fees and client specific. Calculation is based on monthly periodicity. Parentheses contain percentile ranks.

Performance											
	QTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017	2016
Manager	8.90	34.89	21.33	20.69	15.49	N/A	40.32	35.89	-8.68	31.69	4.77
Benchmark	7.18	40.94	14.24	14.55	9.69	9.90	16.25	26.35	-10.08	23.95	8.36
Difference	1.72	-6.05	7.09	6.14	5.80	N/A	24.07	9.54	1.40	7.74	-3.59
Peer Group Median	6.95	39.41	13.96	13.31	8.93	9.73	15.21	26.35	-9.73	22.32	6.37
Rank	20	68	13	10	7	N/A	14	6	38	12	64
Population	1,435	1,362	1,177	1,002	838	606	1,356	1,396	1,395	1,307	1,190



Performance shown is net of fees and product specific. Calculation is based on monthly periodicity. Parentheses contain percentile ranks.

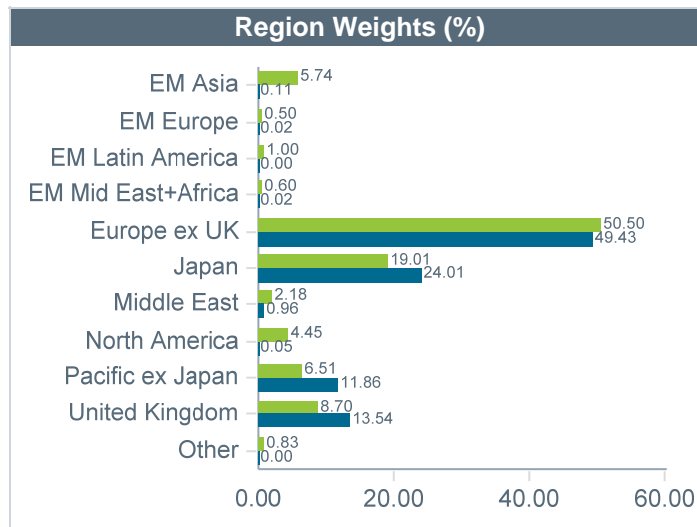
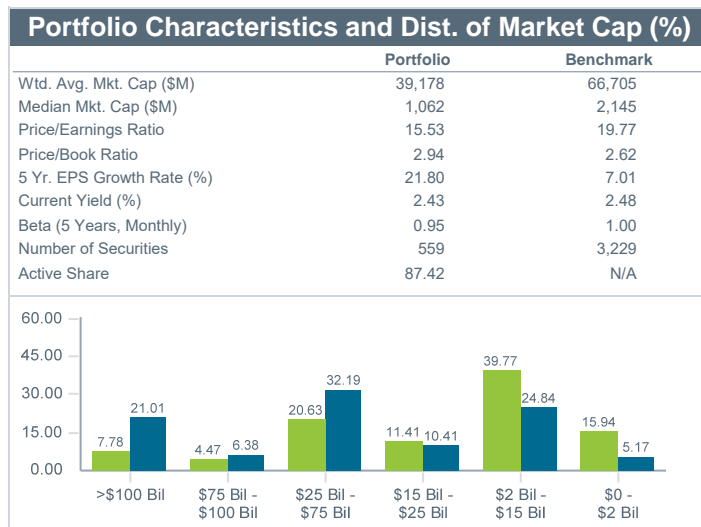
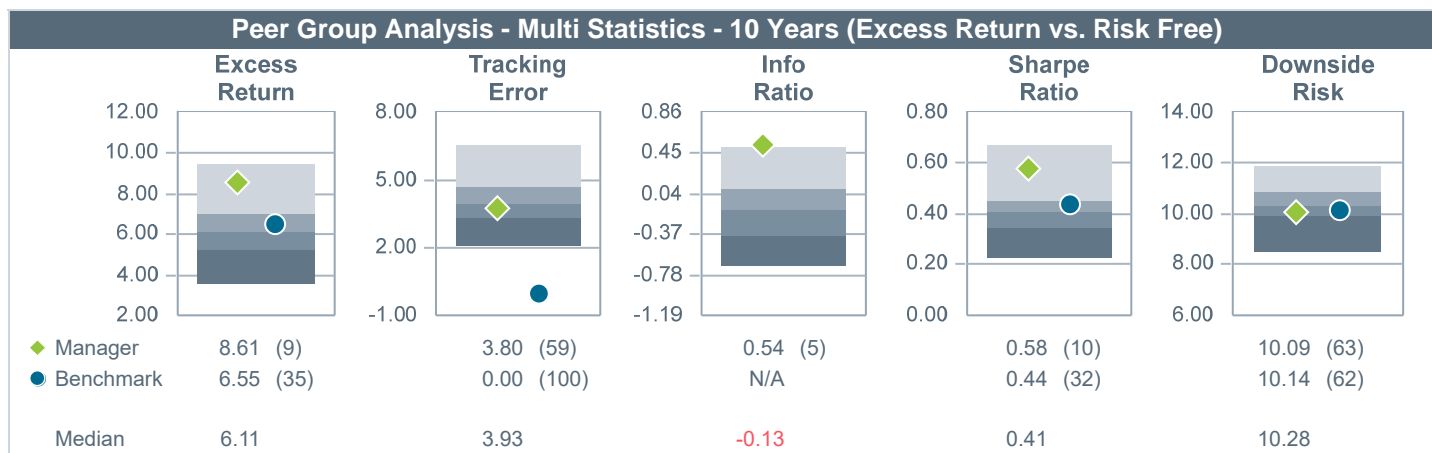
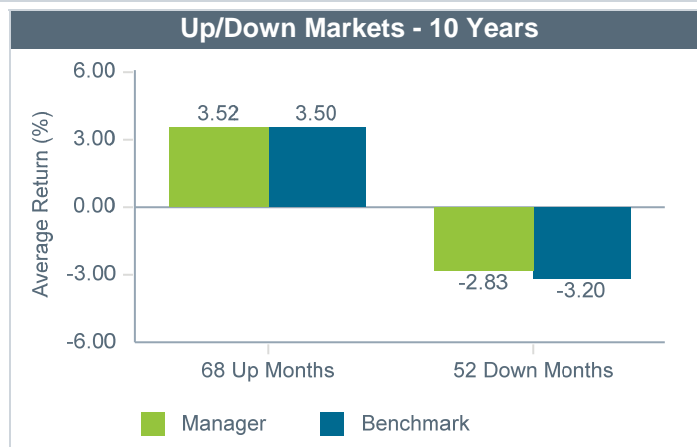
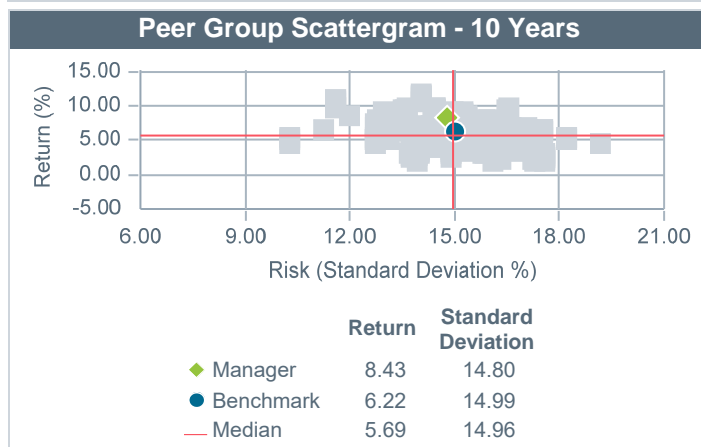
Manager: Acadian International All Cap (SA)

As of June 30, 2021

Benchmark: MSCI EAFE IM Index (USD) (Net)

Peer Group: IM All EAFE (MF)

Performance											
	QTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017	2016
Manager	7.06	42.32	9.40	13.40	8.03	8.43	12.37	18.22	-15.89	36.78	7.45
Benchmark	5.04	33.57	8.28	10.53	5.34	6.22	8.47	22.44	-14.40	26.16	1.15
Difference	2.02	8.75	1.12	2.87	2.69	2.21	3.90	-4.22	-1.49	10.62	6.30
Peer Group Median	5.17	32.88	8.19	9.89	4.88	5.69	8.17	21.59	-15.91	25.26	0.09
Rank	11	7	33	8	10	9	33	78	50	3	4
Population	568	567	567	554	473	402	596	642	671	698	669



Performance shown is net of fees and client specific. Calculation is based on monthly periodicity. Parentheses contain percentile ranks.

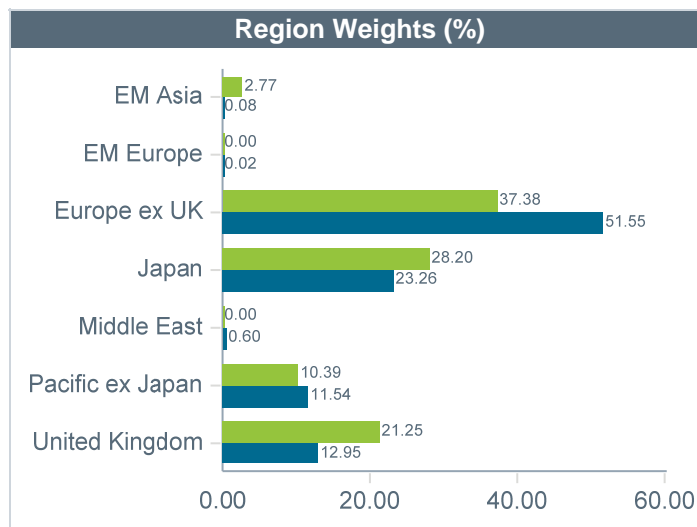
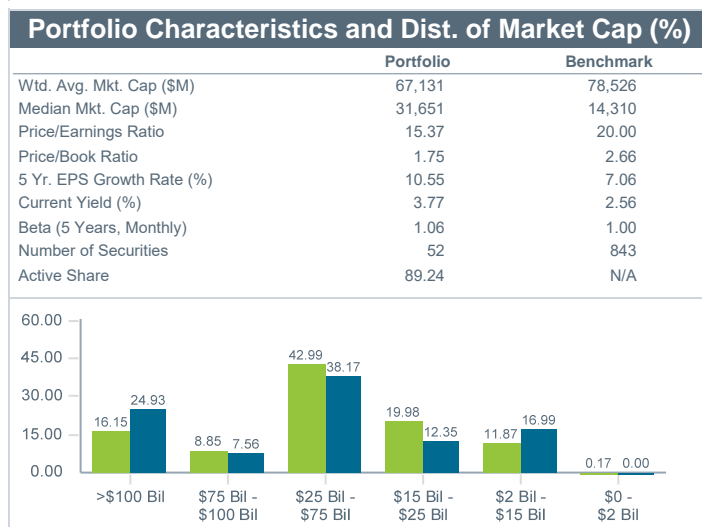
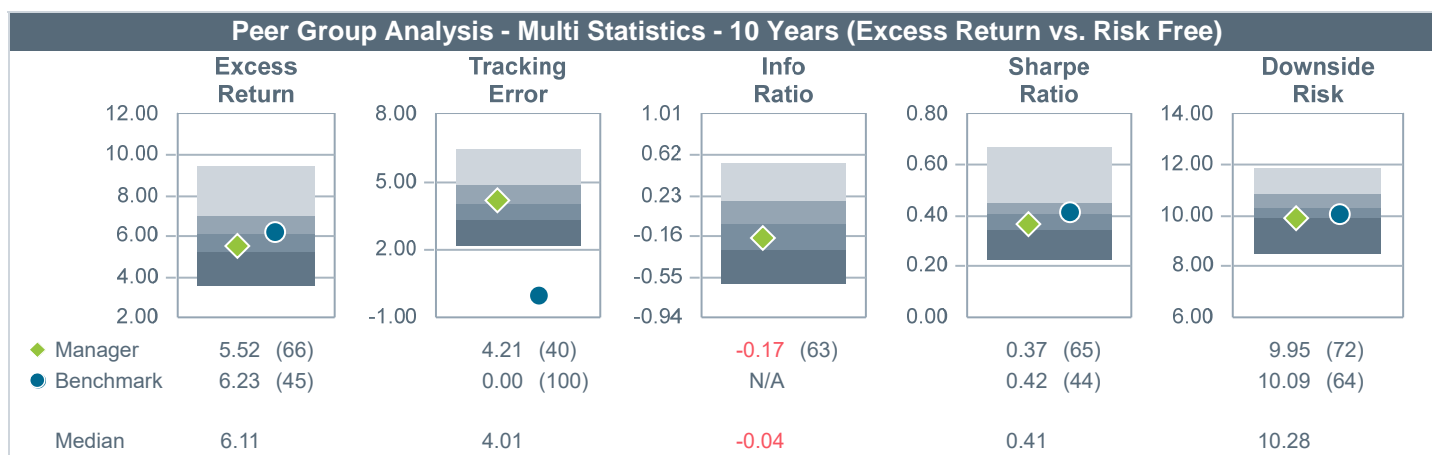
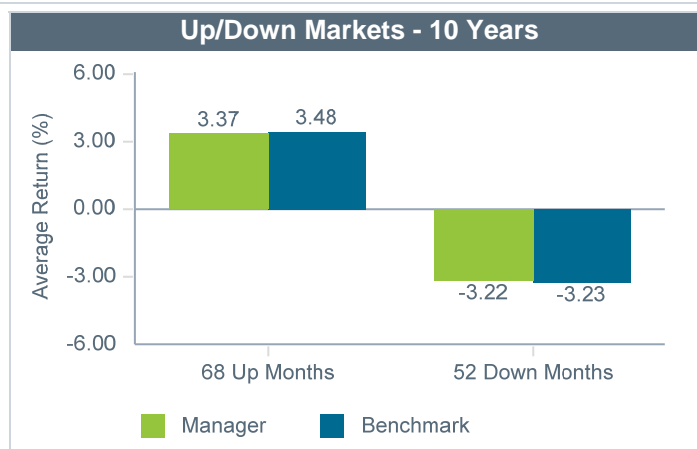
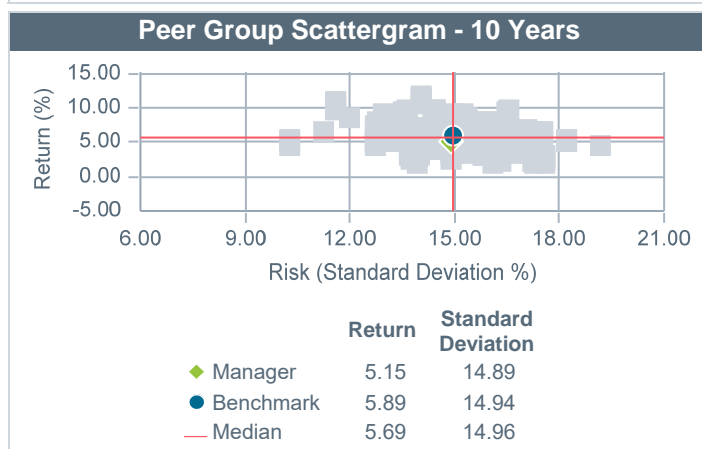
Manager: Mondrian International Equity (SA)

As of June 30, 2021

Benchmark: MSCI EAFE Index (USD) (Net)

Peer Group: IM All EAFE (MF)

	Performance										
	QTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017	2016
Manager	5.00	34.11	5.84	7.54	3.35	5.15	-4.01	19.29	-11.66	22.08	4.37
Benchmark	5.17	32.35	8.27	10.28	4.96	5.89	7.82	22.01	-13.79	25.03	1.00
Difference	-0.17	1.76	-2.43	-2.74	-1.61	-0.74	-11.83	-2.72	2.13	-2.95	3.37
Peer Group Median	5.17	32.88	8.19	9.89	4.88	5.69	8.17	21.59	-15.91	25.26	0.09
Rank	58	40	77	85	83	65	98	69	14	85	8
Population	568	567	567	554	473	402	596	642	671	698	669



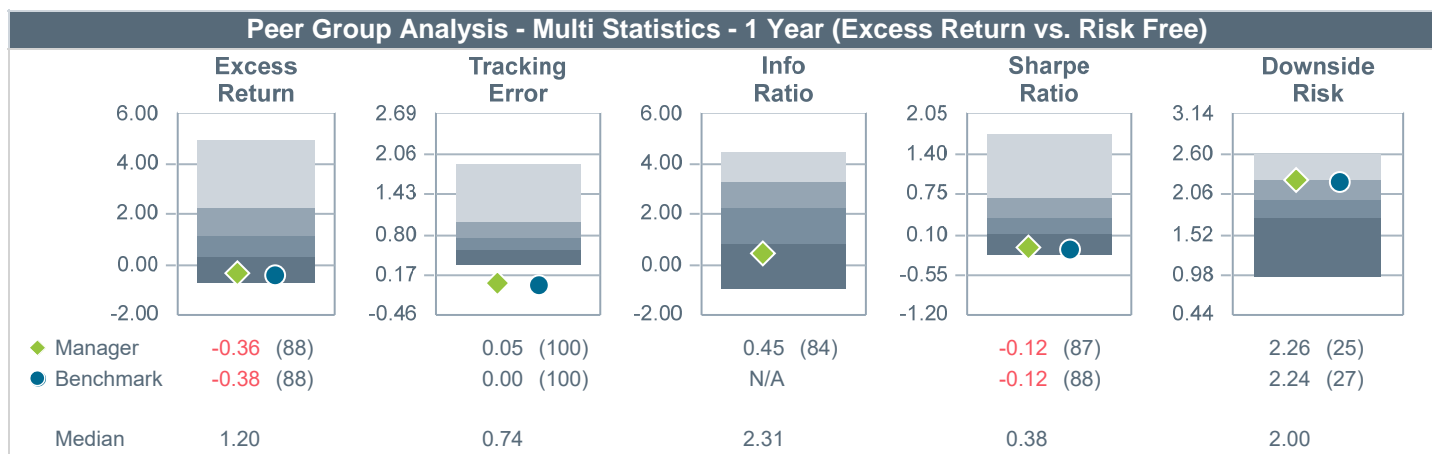
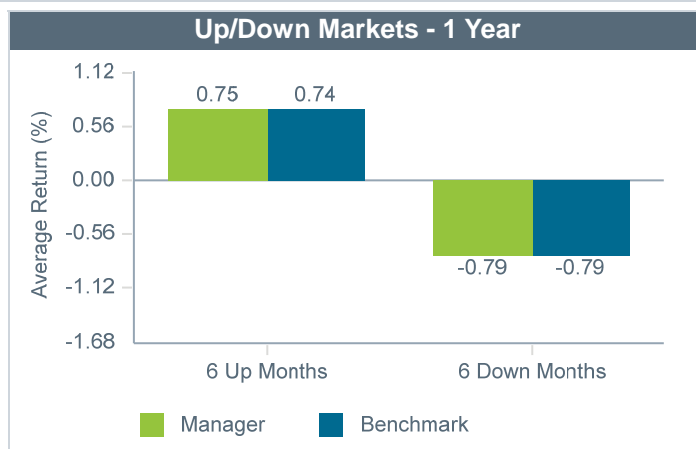
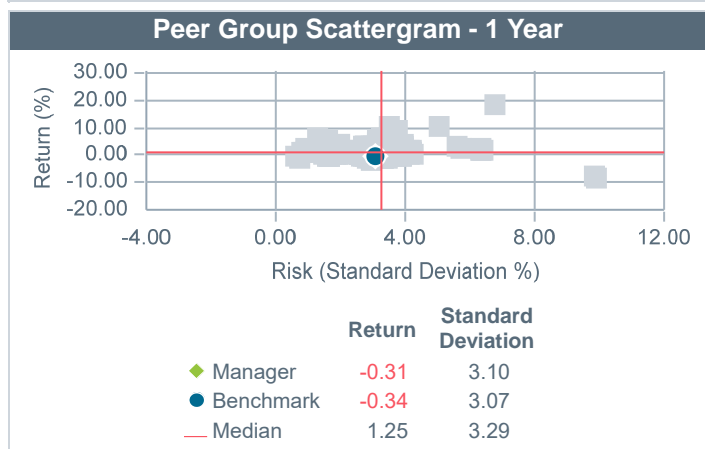
Performance shown is net of fees and client specific. Calculation is based on monthly periodicity. Parentheses contain percentile ranks.



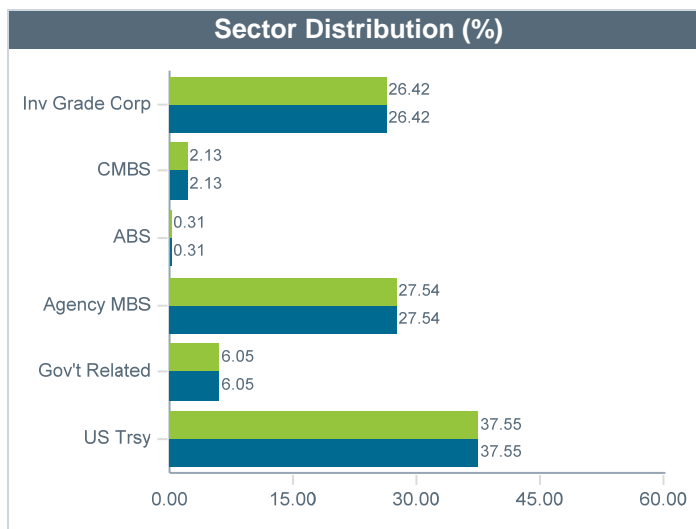
Manager: BlackRock US Agg (CF)
As of June 30, 2021
Benchmark: Bloomberg US Agg Bond Index

Peer Group: IM U.S. Broad Market Core Fixed Income (MF)

Performance											
	QTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017	2016
Manager	1.84	-0.31	N/A	N/A	N/A	N/A	7.54	N/A	N/A	N/A	N/A
Benchmark	1.83	-0.34	5.34	3.03	3.28	3.39	7.51	8.72	0.01	3.54	2.65
Difference	0.01	0.03	N/A	N/A	N/A	N/A	0.03	N/A	N/A	N/A	N/A
Peer Group Median	1.93	1.25	5.62	3.31	3.27	3.51	8.19	8.76	-0.63	3.59	2.86
Rank	60	88	N/A	N/A	N/A	N/A	71	N/A	N/A	N/A	N/A
Population	501	485	461	406	347	303	488	511	506	498	469



Portfolio Characteristics		
	Portfolio	Benchmark
Effective Duration	6.58	6.58
Spread Duration	6.58	6.58
Avg. Maturity	8.53	8.53
Avg. Quality	Aa1/Aa2	Aa1/Aa2
Yield To Maturity (%)	1.51	1.51
Coupon Rate (%)	2.55	2.55
Current Yield (%)	N/A	N/A
Holdings Count	12,207	12,207



Performance shown is net of fees and client specific. Calculation is based on monthly periodicity. Parentheses contain percentile ranks. Portfolio characteristics are proxied using benchmark statistics.



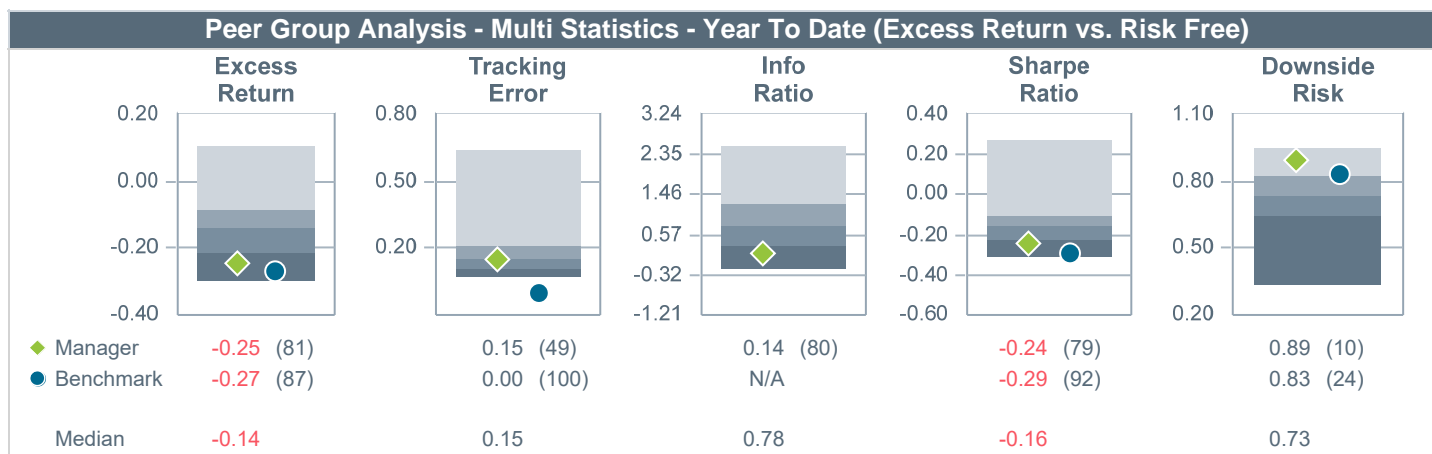
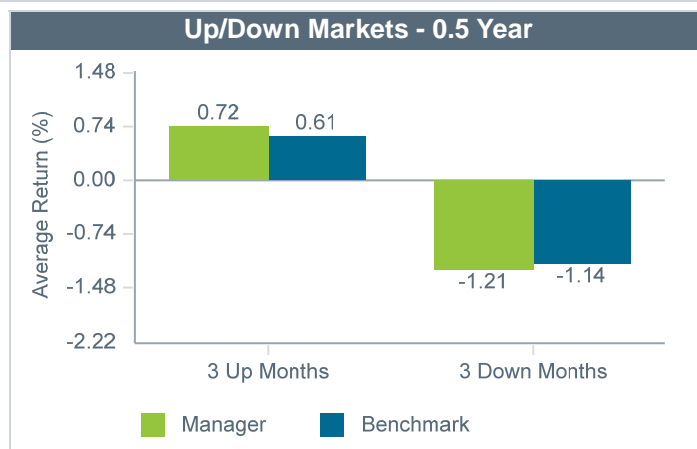
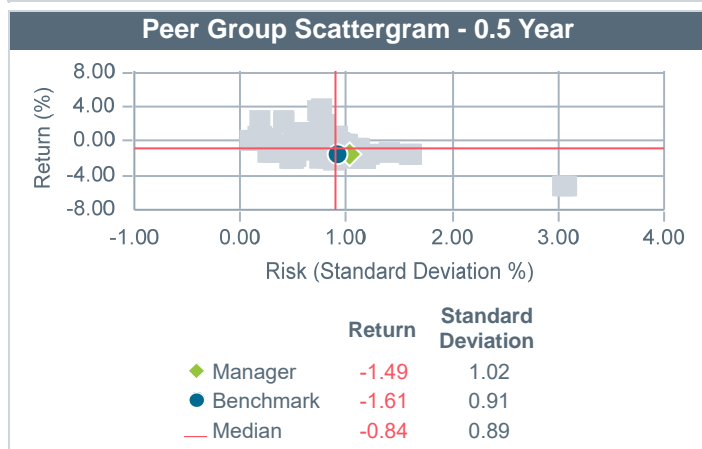
Manager: PIMCO Core (SA)

As of June 30, 2021

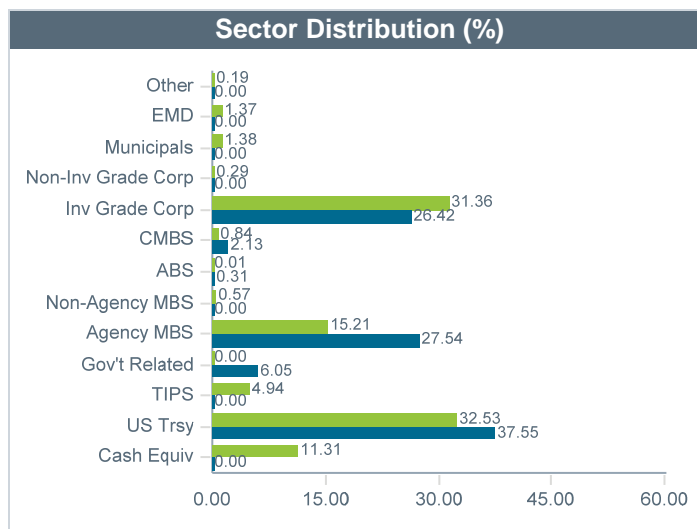
Benchmark: Bloomberg US Agg Bond Index

Peer Group: IM U.S. Broad Market Core Fixed Income (MF)

Performance											
	QTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017	2016
Manager	2.19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benchmark	1.83	-0.34	5.34	3.03	3.28	3.39	7.51	8.72	0.01	3.54	2.65
Difference	0.36	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Peer Group Median	2.23	1.90	6.33	4.03	4.01	4.28	8.99	9.56	0.00	4.37	3.49
Rank	55	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Population	501	485	461	406	347	303	488	511	506	498	469

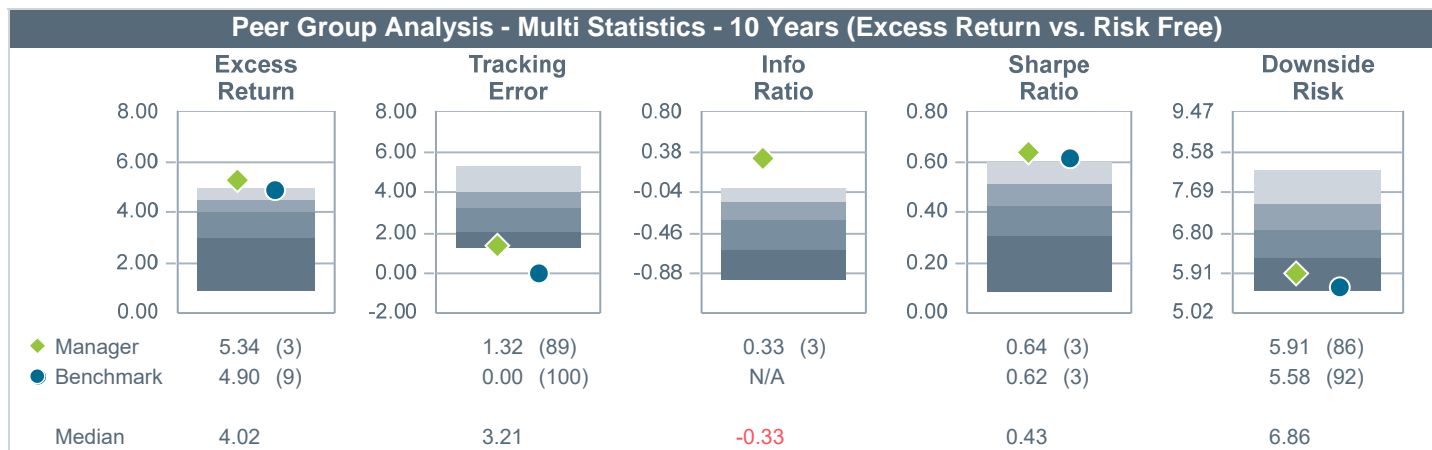
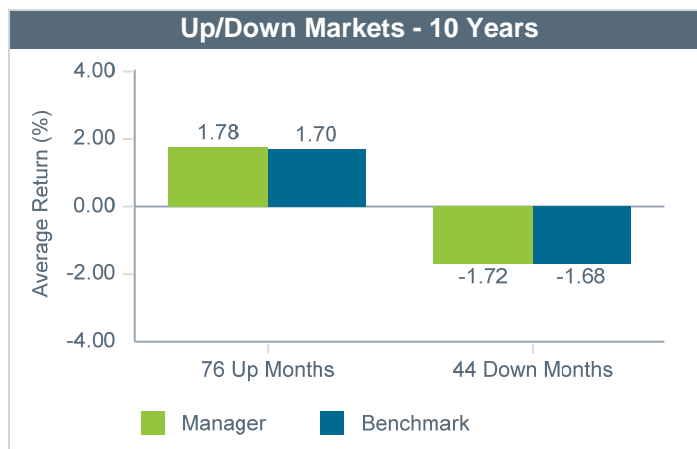
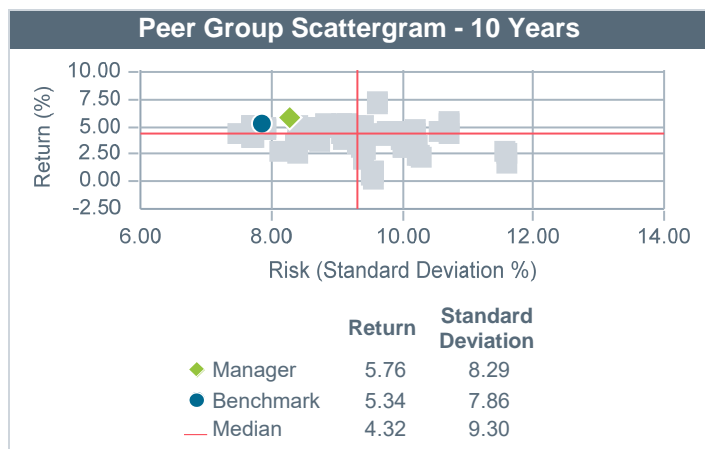


Portfolio Characteristics		
	Portfolio	Benchmark
Effective Duration	5.83	6.58
Spread Duration	4.22	6.58
Avg. Maturity	7.25	8.53
Avg. Quality	Aa2	Aa1/Aa2
Yield To Maturity (%)	1.45	1.51
Coupon Rate (%)	2.07	2.55
Current Yield (%)	1.96	N/A
Holdings Count	259	12,207

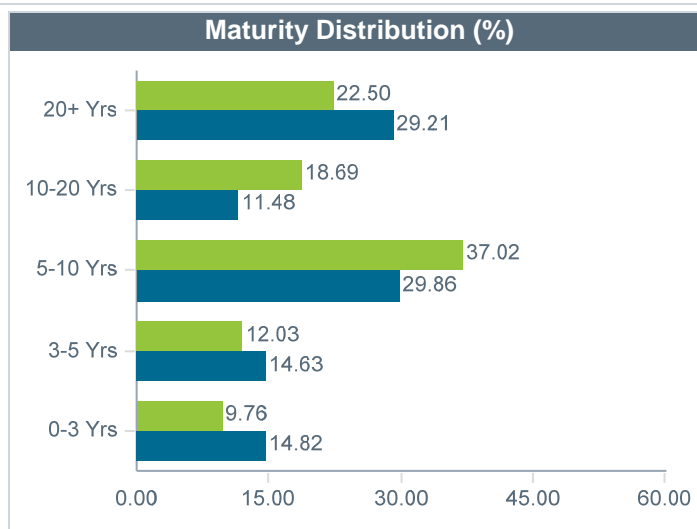


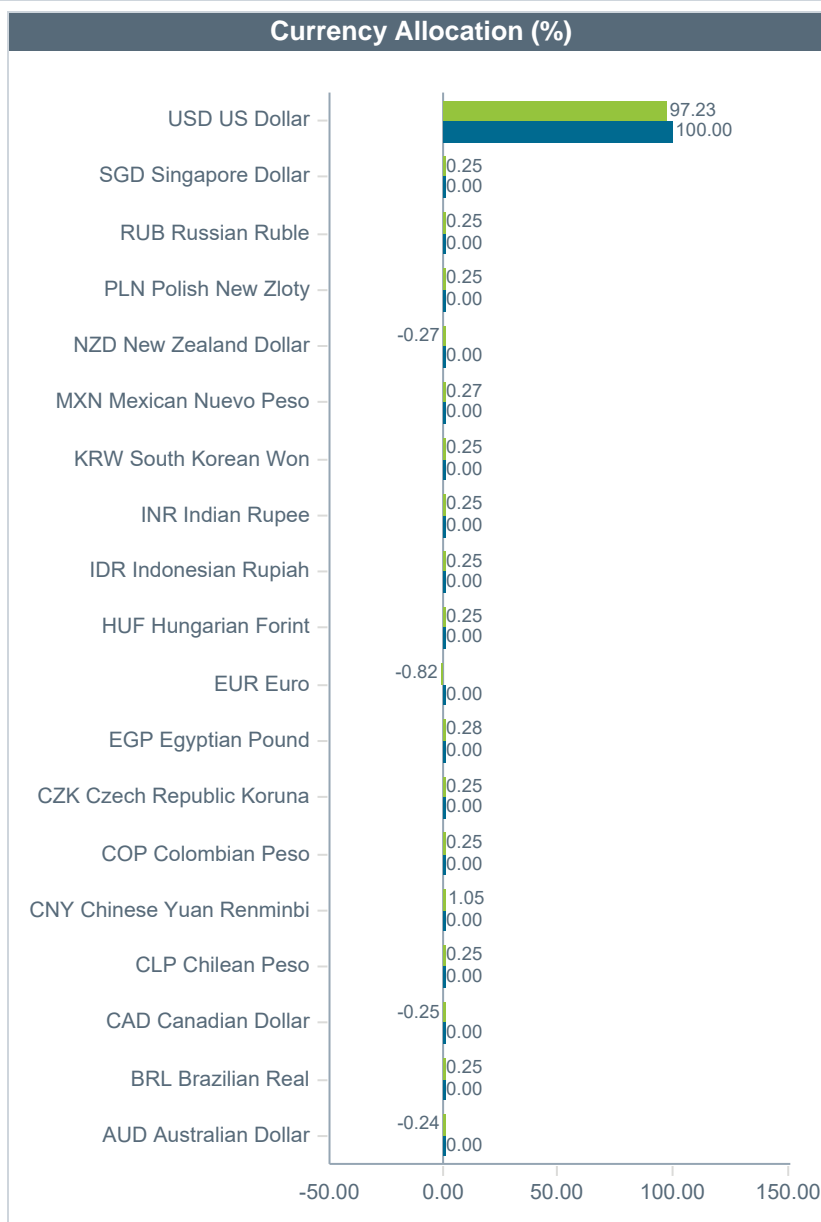
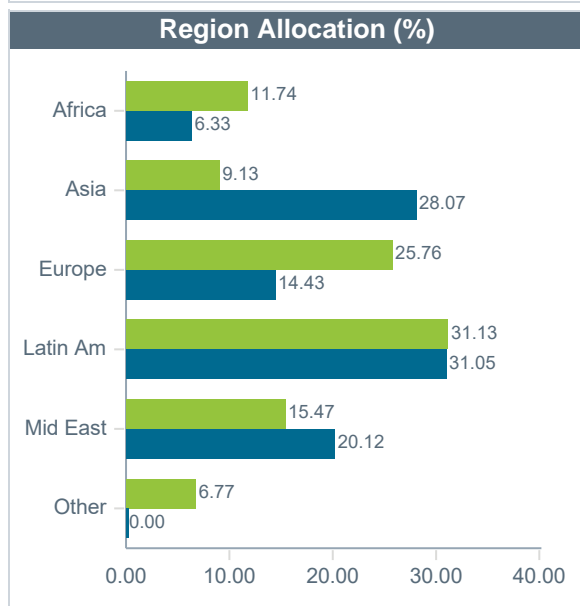
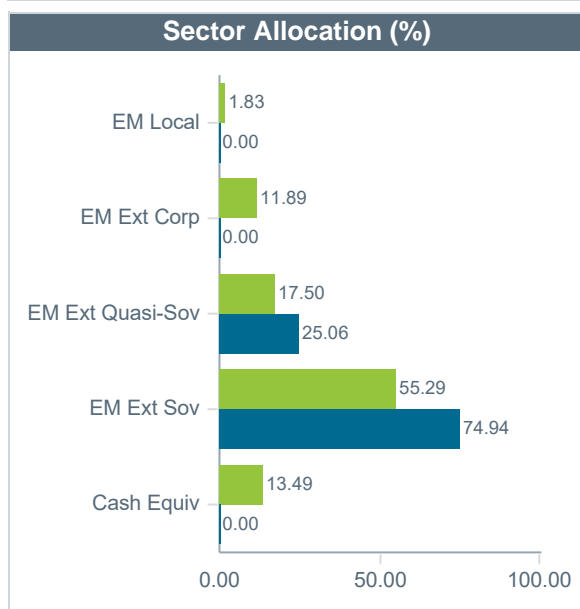
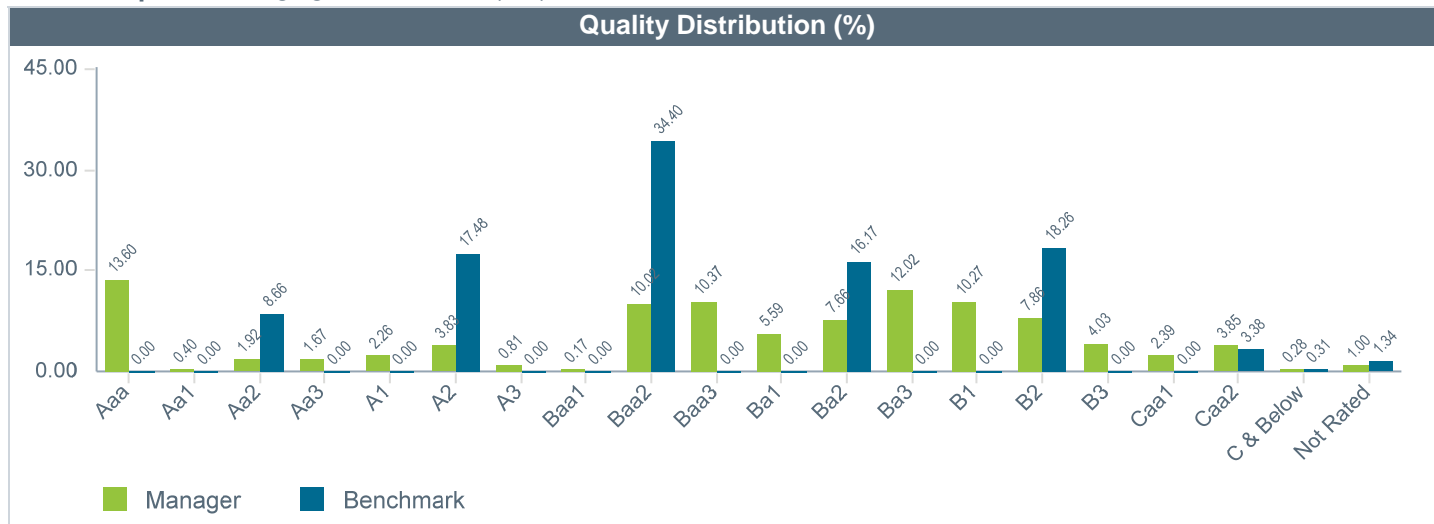
Performance shown is net of fees and client specific. Calculation is based on monthly periodicity. Parentheses contain percentile ranks. Allocation to "other" consists of Euro/Yankees.

Performance											
	QTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017	2016
Manager	3.97	7.37	6.83	5.44	4.78	5.76	7.69	15.84	-5.78	10.56	12.85
Benchmark	3.93	6.81	6.48	4.44	4.37	5.34	5.88	14.42	-4.61	9.32	10.19
Difference	0.04	0.56	0.35	1.00	0.41	0.42	1.81	1.42	-1.17	1.24	2.66
Peer Group Median	3.71	9.08	6.15	4.67	3.65	4.32	5.57	13.58	-5.92	10.49	10.42
Rank	34	90	27	20	12	3	15	9	48	50	28
Population	270	260	243	197	154	77	262	274	275	265	233



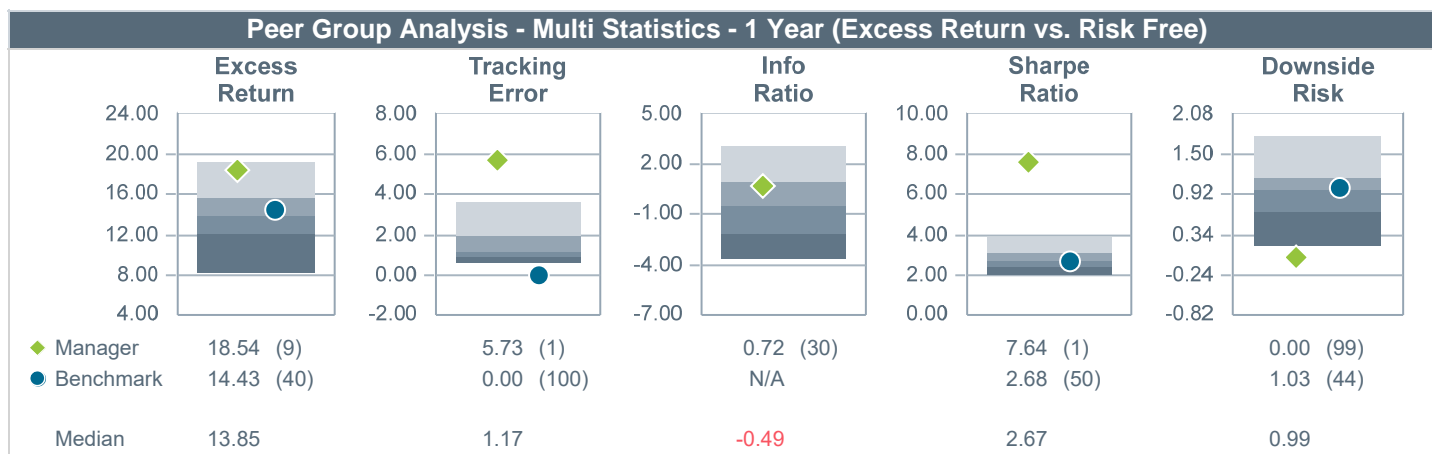
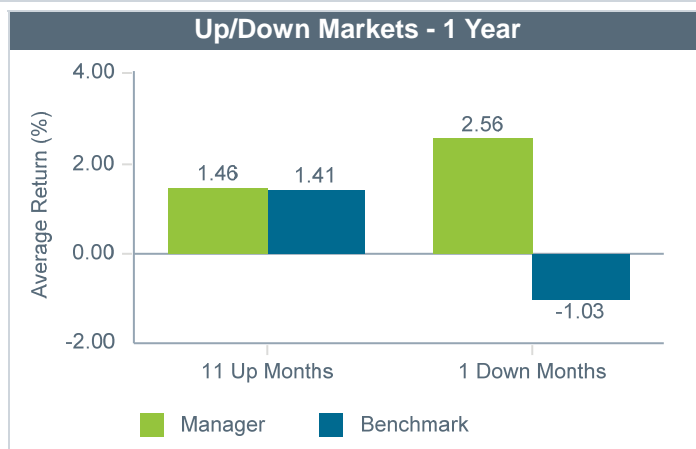
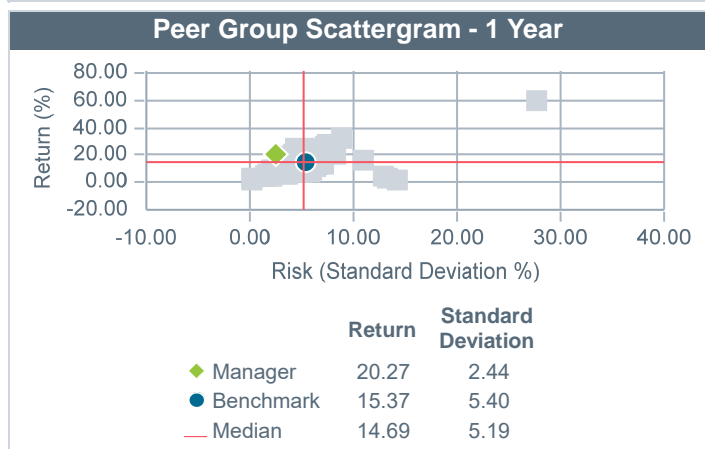
Portfolio Characteristics (%)		
	Portfolio	Benchmark
Effective Duration	7.86	8.10
Spread Duration	7.24	7.87
Avg. Maturity	12.59	13.35
Avg. Quality	Baa3	Baa3
Yield To Maturity (%)	4.57	3.96
Coupon Rate (%)	4.28	4.71
Current Yield (%)	4.70	4.55
Holdings Count	421	933



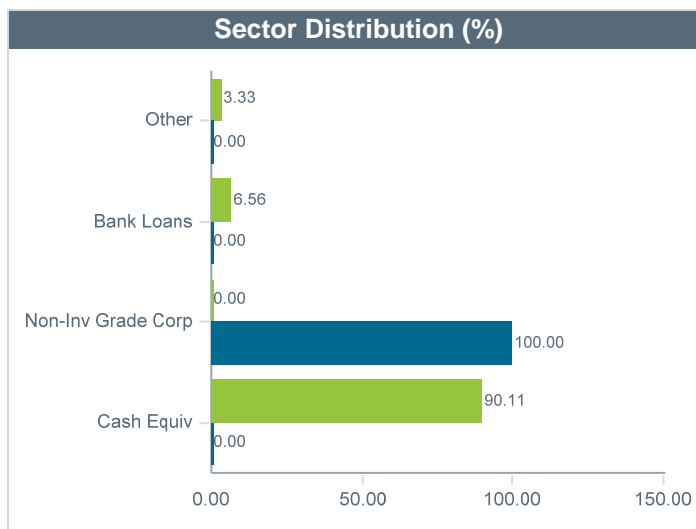


Performance shown is net of fees and client specific. Calculation is based on monthly periodicity. Parentheses contain percentile ranks. Region allocation to other consists of cash, cash equivalents, currency forwards, EM CDX and North America.

Performance											
	QTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017	2016
Manager	2.36	20.27	N/A	N/A	N/A	N/A	3.26	6.30	N/A	N/A	N/A
Benchmark	2.74	15.37	7.45	7.48	5.47	6.66	7.11	14.32	-2.08	7.50	17.13
Difference	-0.38	4.90	N/A	N/A	N/A	N/A	-3.85	-8.02	N/A	N/A	N/A
Peer Group Median	2.59	14.69	6.43	6.39	4.26	5.54	5.28	13.51	-2.91	6.65	13.52
Rank	67	9	N/A	N/A	N/A	N/A	81	99	N/A	N/A	N/A
Population	666	650	612	533	466	345	659	682	669	626	594

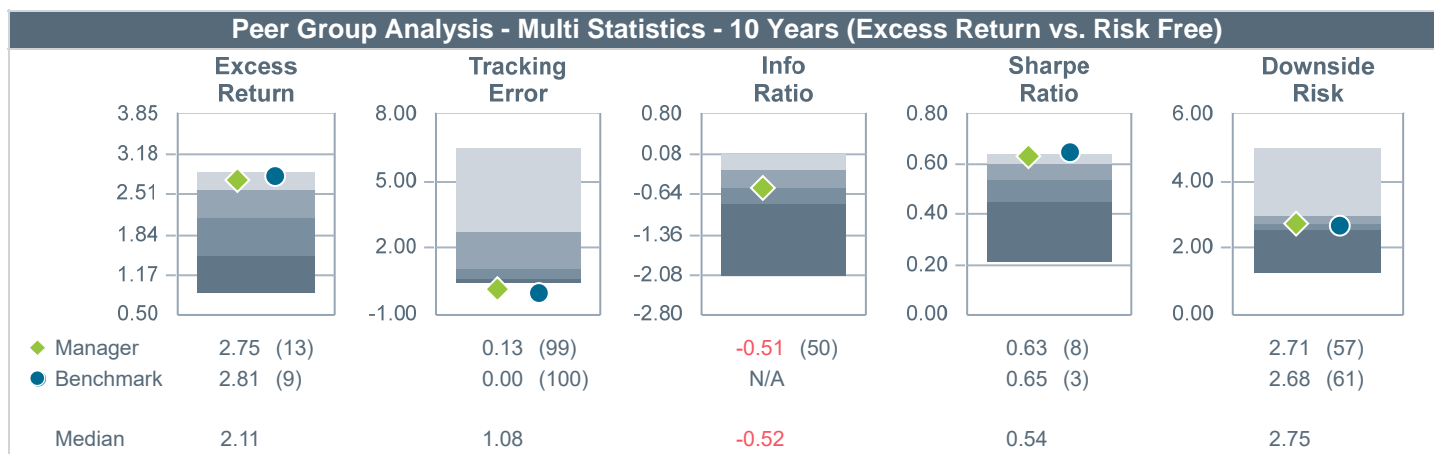
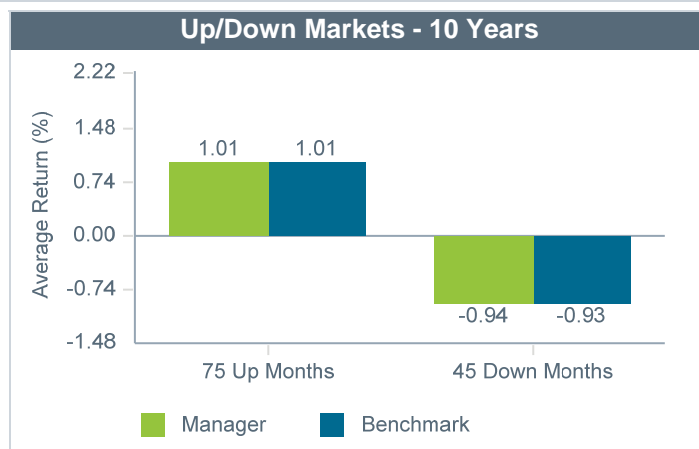
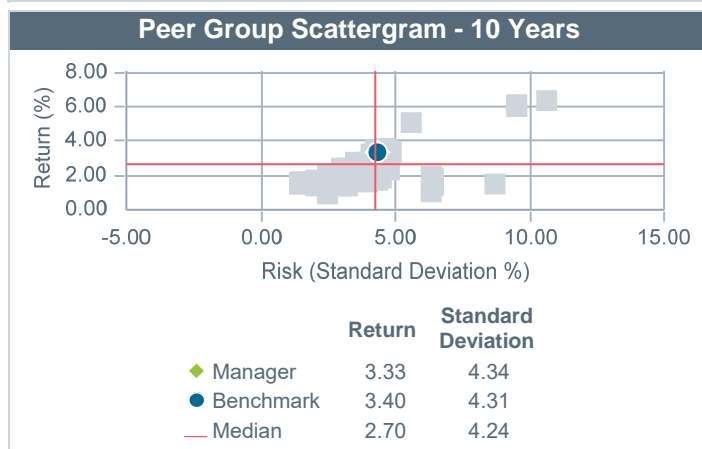


Portfolio Characteristics		
	Portfolio	Benchmark
Effective Duration	0.09	3.84
Spread Duration	1.69	3.80
Avg. Maturity	0.63	6.59
Avg. Quality	Aaa	Ba3/B1
Yield To Maturity (%)	0.67	4.60
Coupon Rate (%)	5.78	5.81
Current Yield (%)	5.87	N/A
Holdings Count	27	2,228



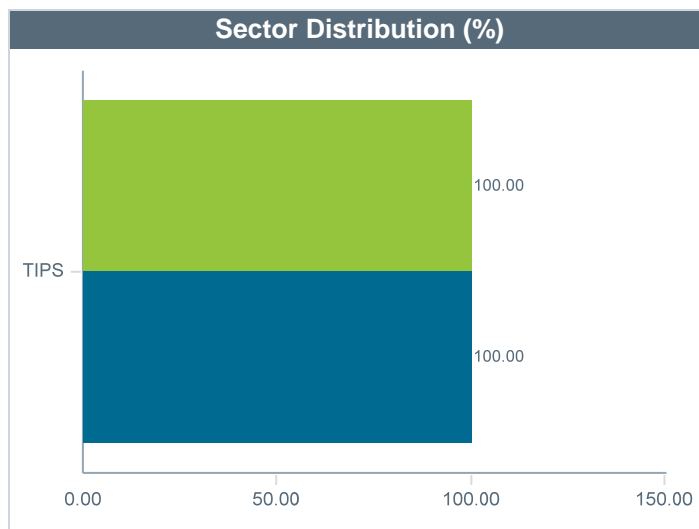
Performance shown is net of fees and client specific. Calculation is based on monthly periodicity. Parentheses contain percentile ranks. Allocation to other consists of common stock.

	Performance										
	QTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017	2016
Manager	3.24	6.49	6.45	4.12	3.27	3.33	10.97	8.33	-1.36	2.98	4.67
Benchmark	3.25	6.51	6.53	4.17	3.34	3.40	10.99	8.43	-1.26	3.01	4.68
Difference	-0.01	-0.02	-0.08	-0.05	-0.07	-0.07	-0.02	-0.10	-0.10	-0.03	-0.01
Peer Group Median	2.71	6.51	5.76	3.72	2.59	2.70	9.64	7.53	-1.57	2.62	4.39
Rank	20	52	21	29	15	12	26	25	42	31	38
Population	210	205	200	174	145	117	206	221	227	228	220



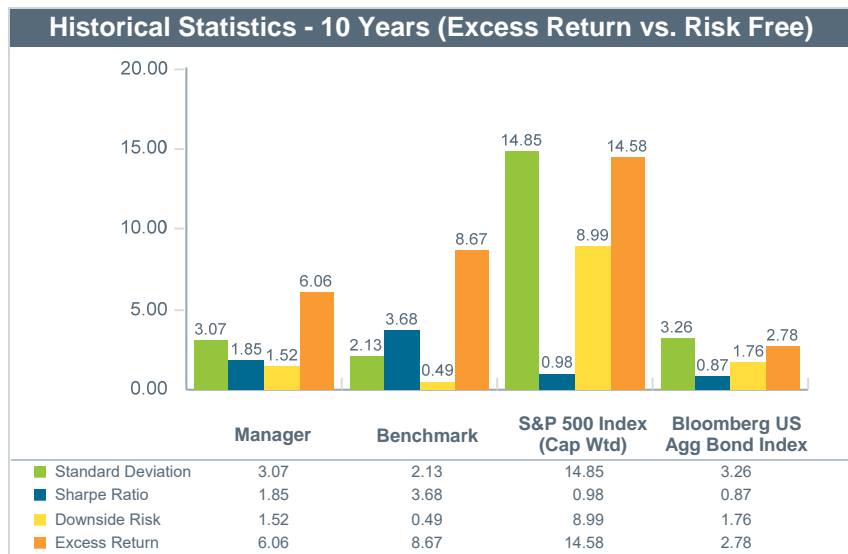
Portfolio Characteristics

	Portfolio	Benchmark
Effective Duration	6.56	6.56
Spread Duration	6.56	6.56
Avg. Maturity	7.99	7.99
Avg. Quality	Aaa	Aaa
Yield To Maturity (%)	1.07	1.07
Coupon Rate (%)	0.67	0.67
Current Yield (%)	N/A	N/A
Holdings Count	44	44



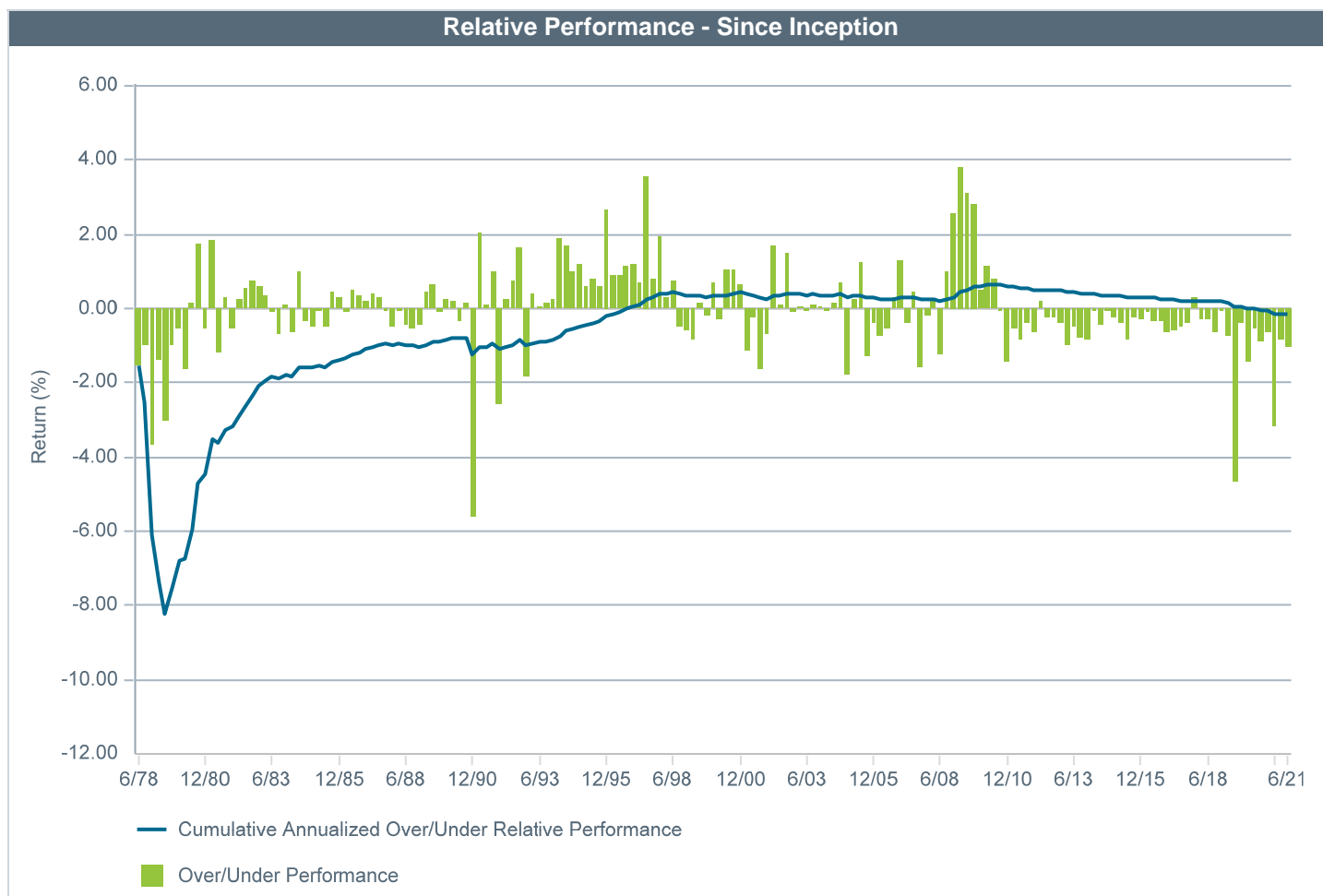
Performance shown is net of fees and client specific. Calculation is based on monthly periodicity. Parentheses contain percentile ranks. Portfolio characteristics are proxied using benchmark statistics.

Performance											
	QTD	1 Year	3 Years	5 Years	7 Years	10 Years	2020	2019	2018	2017	2016
Manager	2.87	2.01	0.32	2.81	5.27	6.80	-4.04	-2.10	6.99	6.30	7.21
Benchmark	3.93	8.02	5.52	6.57	8.40	9.60	1.19	5.34	8.35	7.62	8.77
Difference	-1.06	-6.01	-5.20	-3.76	-3.13	-2.80	-5.23	-7.44	-1.36	-1.32	-1.56



Actual Correlation - 10 Years

	Actual Correlation
NCREIF ODCE Index (AWA) (Gross)	0.85
S&P 500 Index (Cap Wtd)	-0.28
Russell 2000 Index	-0.32
MSCI EAFE Index (USD) (Net)	-0.31
MSCI Emg Mkts Index (USD) (Net)	-0.36
Bloomberg US Agg Bond Index	-0.23
Bloomberg US Trsy US TIPS Index	-0.32
Wilshire US REIT Index	-0.06
HFRI FOF Comp Index	-0.37
Bloomberg Cmnty Index (TR)	-0.27
ICE BofAML 3 Mo US T-Bill Index	-0.45
Cons Price Index (Unadjusted)	-0.03



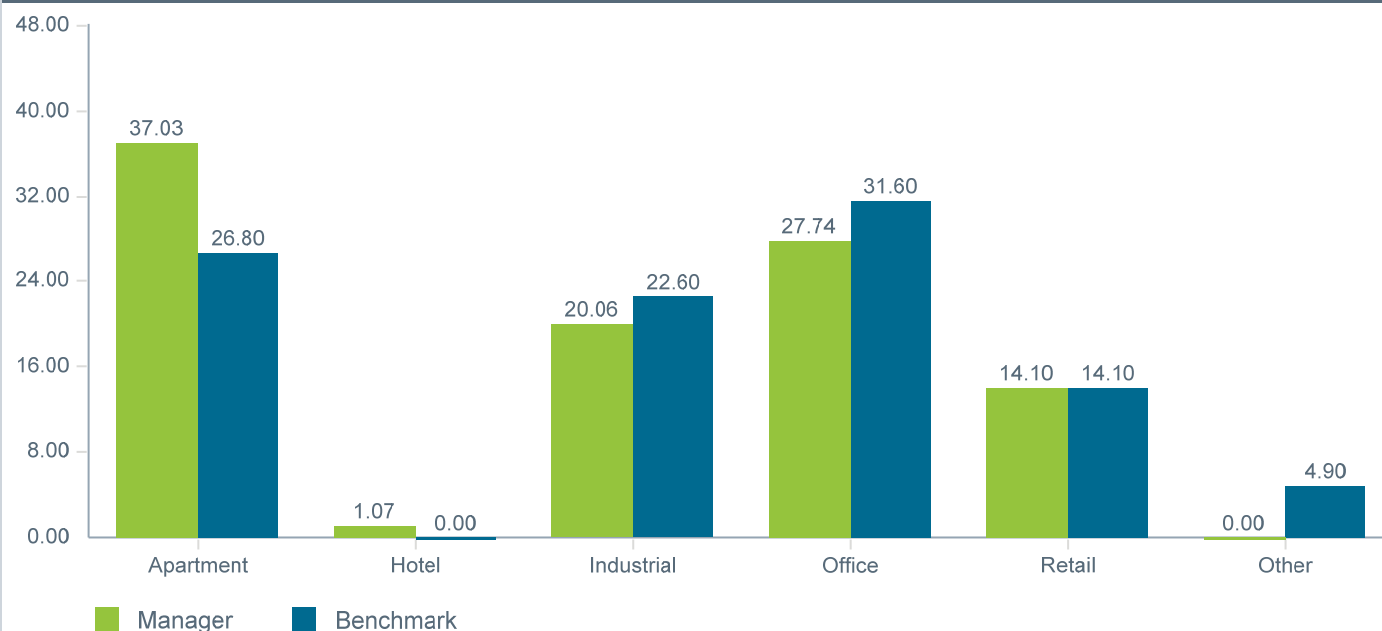
Investment Strategy

The Fund pursues a diversified core real estate strategy that seeks to produce attractive risk-adjusted returns by focusing on selective acquisitions, diversification, active portfolio management, and asset management. The Fund invests in well-leased, stabilized assets in major US metropolitan markets and receives the majority of its return from the income component. Diversification for the Fund is consistently pursued on many levels, including geographic region, property type, and economic sector. The Fund has historically maintained a leverage ratio significantly lower than the NCREIF ODCE Index and invests 5-15% of its gross assets in value-added type real estate investment opportunities.

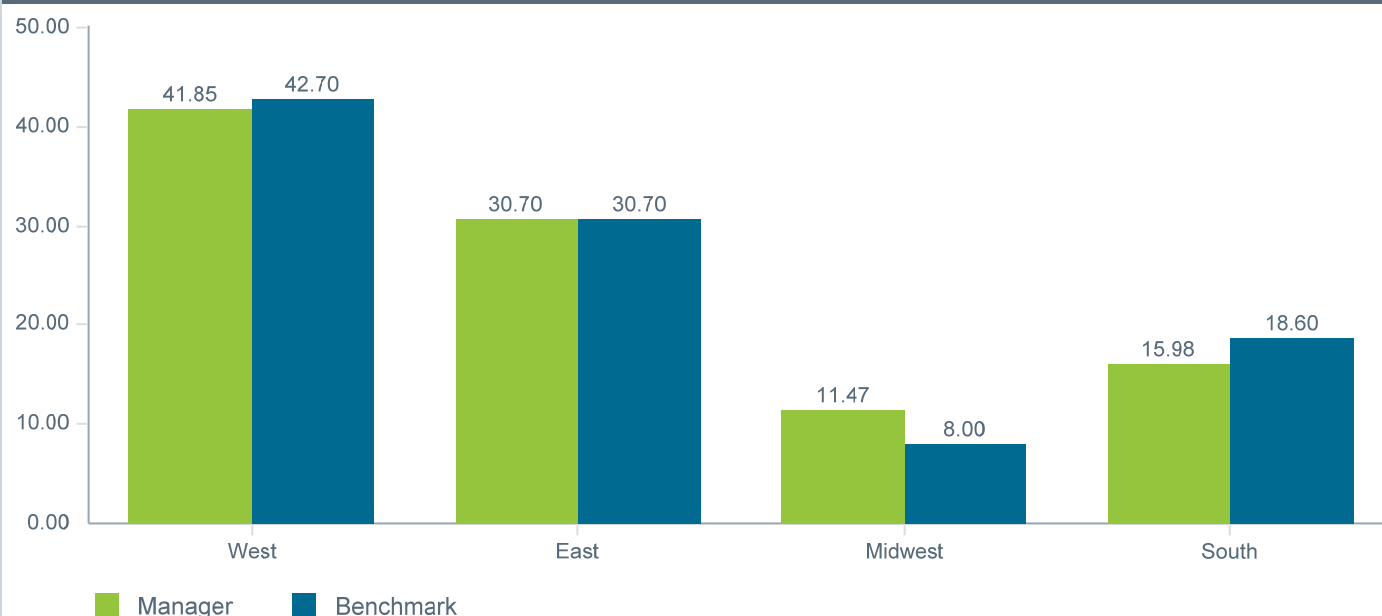
Investment Profile

Fund Inception	1978
Legal Structure	LP
Fund Structure	Open-End
Gross Real Estate Assets (\$M)	18,020
Fund Leverage %	19.00
Portfolio Occupancy %	91.10
Cash Reserve %	3.40
Number of Investments	178
Number of Limited Partners	446

Property Type Allocation (%)



Geographic Allocation (%)



Performance shown is gross of fees and product specific. Calculation is based on quarterly periodicity. Investment profile data shown is provided by the investment manager and is as of the most recently available quarter end. Allocation data shown is based on NAV. Benchmark allocation to "Other" consists of entertainment (theaters, golf courses, bowling alleys), healthcare (hospitals, clinics), manufactured homes, parking lots, self-storage units, senior living, and undeveloped land.

Addendum & Glossary



**Vermont Pension Investment Committee
Fee Schedule**

As of June 30, 2021

	Fee Schedule	Market Value As of 06/30/2021 (\$)	Estimated Annual Fee (\$)	Estimated Annual Fee (%)
Blackrock S&P 500 (Eql Wtd) (CF)	0.020 % of Assets	255,868,375	51,174	0.020
Champlain US Mid Cap Core (SA)	0.850 % of First \$50 M 0.750 % of Next \$50 M 0.650 % Thereafter	183,004,705	1,339,531	0.732
BlackRock MSCI ACW IMI (CF)	0.025 % of Assets	1,950,919,853	487,730	0.025
Artisan Global Opportunities (CF)	0.750 % of Assets	305,843,167	2,293,824	0.750
Acadian International All Cap (SA)	0.700 % of First \$25 M 0.600 % of Next \$25 M 0.500 % of Next \$25 M 0.300 % Thereafter	273,326,520	1,044,980	0.382
Mondrian International Equity (SA)	0.500 % of First \$50 M 0.350 % of Next \$50 M 0.300 % Thereafter	150,693,788	577,081	0.383
Wellington Opportunistic EMD (CF)	0.550 % of Assets	218,818,864	1,203,504	0.550
PIMCO Liquidation (SA)	0.300 % of Assets	7,302,989	21,909	0.300
BlackRock US Agg (CF)	0.030 % of Assets	1,010,510,130	303,153	0.030
PIMCO Core (SA)	0.190 % of Assets	242,876,835	461,466	0.190
UBS Trumbull Properties (CF)	0.955 % of First \$10 M 0.825 % of Next \$15 M 0.805 % of Next \$25 M 0.790 % of Next \$50 M 0.670 % of Next \$150 M 0.600 % of Next \$150 M 0.560 % of Next \$200 M 0.520 % Thereafter	203,423,045	1,508,434	0.742
BlackRock TIPS (CF)	0.025 % of Assets	158,441,949	39,610	0.025
Total Fund		5,657,364,156	9,332,396	0.165

Mutual Fund fees are sourced from Morningstar and/or the investment manager. UBS also has a variable fee ranging from 0.00% to 0.25%. The variable fee has been suspended from 4/01/2018 to 3/31/2022. Total fund fee shown excludes fees on Private Assets.

Performance Related Comments

- RVK began monitoring the plan's assets as of 9/2020. Prior data was provided by the previous consultant.
- Performance shown is net of fees.
- Inception dates shown represent the first full month of available performance.
- Fiscal year ends 6/30.
- Private Asset market values and performance are lagged to match custodian reported net asset values. Accordingly, fund reported performance will lag benchmark reported performance.
- Inception dates for allocation buckets are when RVK started calculating performance in 09/2020.
- PIMCO Liquidation (SA) consists of residual assets from Vermont Pension's High Yield allocation.
- During 12/2020, the Real Assets composite consisting of Core Real Estate, Non-Core Real Estate, and Private Infrastructure/Land was replaced by the Inflation Hedging Assets composite consisting of TIPS, Core Real Estate, and Private Infrastructure/Land. A new Non-Core Real Estate composite was created.
- Negative cash performance is due to a valuation decline in the Blackrock Transition account during its liquidation.
- During 06/2021, the inception dates for Blackrock S&P 500, Artisan Global Opportunities and Wellington EMD were adjusted to reflect the first full month of performance.

Decisions Made by the Committee Over the Last 18 Months

Manager Additions

- Blackrock S&P 500 (EqI Wtd) (CF), BlackRock MSCI ACW IMI (CF), BlackRock US Agg (CF), Nuveen Global Agriculture (CF), Angelo Gordan Direct Lending, Harbourvest Dover X, Harbourvest XI Funds, Siguer Guff SBOF IV, Neuberger Berman, Benefit Street Partners II, Blue Vista Real Estate Partners and Kennedy Lewis Capital II.

Manager Liquidations

- SGA International Small Cap (CF), Pinnacle Natural Resources, KDP High Yield, Allianz Structured Alpha, Guggenheim High Yield, PIMCO Unconstrained Bond Fund, Grosvenor Hedge Fund of Funds, Aberdeen International Equities, Hosking Partners Global Equity Fund.

Policy Changes

- During 01/2021, the board approved an updated target allocation index and fund level benchmarks. Benchmark changes were reflected starting 01/2021.
- The Wellington Small Cap Value (SA) liquidation was completed during 03/2021.

Historical Transition Comments

- SGA International Small Cap (CF) was liquidated during 09/2020. Remaining market value represents residual assets.
- Angelo Gordon Direct Lending IV was funded during 09/2020.
- Wellington Small Cap Value (SA), SSgA Russell 2000 Growth (SA), Pinnacle Natural Resources (CF) and PIMCO Unconstrained (SA) were liquidated prior to 09/2020. Remaining market values represent residual assets.
- The Wellington Small Cap Value (SA) liquidation was completed during 03/2021.
- Ares Pathfinder Fund I was funded during 04/2021.
- During 06/2021, Blackrock Transition was liquidated.

Benchmark Comments

- The Target Allocation Index currently consists of 4% S&P 500 Index (Cap Wtd), 3% Russell 2500 Index, 5% MSCI EAFE Index, 29% MSCI ACW IM Index (USD) (Net), 2% MSCI EAFE Small Cap Index, 20% Bloomberg US Aggregate Bond Index, 3% NCREIF ODCE Index (AWA) (Net)+2%, 4% JP Morgan Emerging Mkts Bond Gbl Index, 10% Credit Suisse Leveraged Loan Index + 2%, 10% Cambridge US PE Index and 10% CPI+ 2.5%. From 08/31/2020 through 12/31/2020, the index consisted of 4% S&P 500 Index (Cap Wtd), 3% Russell 2500 Index, 5% MSCI EAFE Index, 29% MSCI ACW IM Index (USD) (Net), 2% MSCI EAFE Small Cap Index, 20% Bloomberg US Aggregate Bond Index, 3% Bloomberg US Treasury US TIPS Index (TR), 4% JP Morgan Emerging Mkts Bond Gbl Index, 10% S&P/LSTA Leveraged Loan Index (TR), 10% Cambridge US PE Index and 10% NCREIF Property Index. Prior data was provided by the previous consultant.
- The Actual Allocation Indices are calculated monthly using beginning of month investment weights applied to each corresponding benchmark return.
- The Custom SMID Cap Equity Index currently consists of 50% Russell Midcap Index and 50% Russell 2000 index. From 08/2020 through 12/2020 it consisted of 50% Russell 2500 index and 50% Russell 2000 index. Prior data was provided by the previous consultant.

- The CPI+2.5% (Spliced) consists of the NCREIF Property Index prior to 08/31/2020 and the Consumer Price Index+2.5% thereafter.
- CS Lvg'd Loan Index+2% (Spliced) consists of the S&P/LSTA Loan Index prior to 12/31/2020 and the Credit Suisse Leveraged Loan Index+2% thereafter.
- NCREIF ODCE Index+2% (Spliced) consists of the NCREIF Property Index prior to 12/31/2020 and the NCREIF ODCE Index (Net)+2% thereafter.

Glossary

Active Return - The difference between the investment manager/composite performance relative to the performance of an appropriate market benchmark.

Active Share - Measures the degree to which the holdings of a fund differ from the holdings of the benchmark. Active share is calculated by taking the sum of the absolute value of the differences of the weight of each holding in the fund versus the weight of each holding in the benchmark and dividing by two.

Alpha - A measure of the difference between a portfolio's actual returns and its expected performance, given its level of risk as measured by beta. It is a measure of the portfolio's historical performance not explained by movements of the market or a portfolio's non-systematic return.

Alpha Ratio - A measure of a portfolio's non-systematic return per unit of downside risk. It is measured by dividing the alpha of a portfolio by the downside risk. The non-systematic return is a measure of a portfolio's historical performance not explained by movements of the market.

Average Quality - Bond quality ratings are reported using the investment managers' and the index providers' preferred rating agency. *Average Quality for managers unable to provide this statistic is instead provided by Morningstar; if unavailable on Morningstar, it has been estimated using a credit quality distribution provided by the manager.* There are two primary rating agencies in the US. *Moody's* assigns ratings on a system that employs up to four symbols (consisting of letters and numbers), such as, Aaa, Aa2, etc., with Aaa being the highest or safest rating. *Standard & Poor's (S&P)* employs a system that uses + and - along with letters, such as AAA, AA+, etc. The two rating agencies' systems are summarized below:

<u>S&P</u>	<u>Moody's</u>	<u>Explanation</u>	<u>S&P</u>	<u>Moody's</u>	<u>Explanation</u>
Higher Credit Quality – Investment Grade			Lower Credit Quality – Below Investment Grade		
AAA	Aaa	Prime/Highest credit quality	BB+	Ba1	Speculative/Low credit quality
AA+	Aa1	High credit quality	BB	Ba2	
AA	Aa2		BB-	Ba3	
AA-	Aa3		B+	B1	Highly speculative
A+	A1	Upper-medium credit quality	B	B2	
A	A2		B-	B3	
A-	A3		CCC+	Caa1	Substantial credit/default risk
BBB+	Baa1	Lower-medium credit quality	CCC	Caa2	Extremely speculative
BBB	Baa2		CCC-	Caa3	
BBB-	Baa3		CC	Ca	Vulnerable to default
			C	Ca	
			D	C	In default

Benchmark Effect - The difference between the blended return of each respective managers' benchmark within a composite and the composite's benchmark return.

Beta - A measure of the sensitivity of a portfolio to the movements in the market. It is a measure of a portfolio's non-diversifiable or systematic risk.

Box Plots - A graphical representation of the distribution of observations. From top to bottom, the four boxes represent the spread between the maximum value and the minimum value in each quartile. A quartile represents the values that divide the observations into four quarters (i.e., 1st quartile, 2nd quartile, 3rd quartile, and 4th quartile). The median observation is where the 2nd quartile and 3rd quartile meet.

Buy and Hold Attribution - At the beginning of the time period under analysis, the manager and benchmark portfolios are broken down into segments (i.e., styles, sectors, countries, and regions) based on the desired type of attribution. The formula assumes zero turn-over to the manager and benchmark portfolios throughout the period and calculates the segment returns ("buy and hold returns") to arrive at performance attribution. Due to portfolio turnover, buy and hold attribution may not accurately represent quarterly performance relative to the benchmark. Country, region, sector, and style allocations are as of the date one quarter prior to the reporting date, and the returns shown are for those segments throughout the quarter reported. Due to disclosure guidelines set by each investment manager, equity characteristics shown are as of the most recent date available. The following is the methodology for segment classification:

Sector - Attribution is calculated using the Global Industry Classification Standard (GICS), which is a detailed and comprehensive structure for sector and industry analysis. Stocks are classified by their primary sector as defined by S&P Capital IQ data.

Country/Region - Attribution is calculated using the Morgan Stanley Capital International (MSCI) region standards. Stocks are classified by their domicile country/region, as defined by S&P Capital IQ data, and thus may differ from the classification of the investment manager and/or index provider.

Style - Stocks are classified into the following style boxes: large/mid/small vs. growth/neutral/value. Stocks are classified along large/mid/small categories at the time of the Russell index rebalancing, using the index market cap boundaries as cutoff points. Stocks are classified along growth/neutral/value categories at the time of the Russell index rebalancing, using the price/book ratio as supplied by S&P Capital IQ. Stocks in the Russell 3000 Index portfolio are sorted by price/book ratio; names with the highest price/book ratio that make up 1/3 of the total market capitalization are assigned to the growth category, and names that make up the subsequent 1/3 of the total market capitalization are assigned to the neutral category, while the balance of the names are assigned to the value category. Stocks are unclassified when there is not enough data to determine a size and style metric.

Portfolio Characteristics and Buy and Hold Attribution reports utilize product-specific data for all mutual funds and commingled funds.

Capital Markets Review -

Breakeven Inflation - Measures the expected inflation rate at each stated maturity by taking the difference between the real yield of the inflation-linked maturity curve and the yield of the closest nominal Treasury maturity.

Consumer Confidence - Measures domestic consumer confidence as defined by the degree of optimism on the state of the economy that consumers express through saving and spending.

Consumer Price Index (CPI) - Measures the change in the price level of consumer goods and services.

Glossary

- Federal Funds Rate** - The interest rate at which a depository institution lends funds maintained at the Federal Reserve to another depository institution overnight. It is one of the most influential interest rates in the US economy, since it affects monetary and financial conditions, which in turn have a bearing on key aspects of the broad economy including employment, growth and inflation.
- Option-Adjusted Spread** - Measures the flat spread of an index or bond to the Treasury yield curve after removing the effect of any embedded options.
- Purchasing Managers Index (PMI)** - Measures economic activity by surveying purchasing managers on a monthly basis as to whether business conditions have improved, worsened, or stayed the same.
- Real Gross Domestic Product (Real GDP)** - An inflation-adjusted measure that reflects the value of all goods and services produced by an economy in a given year.
- Unemployment Rate** - The percentage of the total labor force that is unemployed but actively seeking employment.
- US Dollar Total Weighted Index** - Measures the value of the US Dollar relative to a basket of other world currencies. It is calculated as the weighted geometric mean of the dollar's value versus the EUR, GBP, CAD, SEK, CHF, and JPY.
- VIX** - Measures the implied volatility of S&P 500 Index options by looking at the market's expectation of the S&P 500 Index volatility over the next 30 day period. Commonly referred to as the "fear index" or the "fear gauge."
- Cash Flow Effect** - The composite's active return minus the sum of each managers' active return minus the benchmark effect.
- 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.
- Convexity** - A measure of the shape of the curve that describes the relationship between bond prices and bond yields.
- Correlation** - A statistical measure of the relationship between asset class returns. A value of 1.00 is a perfect correlation; that is, the asset classes always move in the same direction. A value of -1.00 indicates a perfect negative correlation, in which the asset classes always move in opposite directions of each other. A value of 0 indicates there is no relationship between the direction of returns of the two asset classes. Correlation calculations only consider the direction of changes relative to two variables and not the magnitude of those changes.
- Coupon Rate** - The percentage rate of interest paid on a bond or fixed income security; it is typically paid twice per year.
- Current Yield** - The annual income of a security divided by the security's current price.
- Down Market Capture** - Down market by definition is negative benchmark return and down market capture represents the ratio in % terms of the average portfolios return over the benchmark during the down market period. The lower the value of the down market capture the better the product's performance.
- Downside Risk** - A measure similar to standard deviation that focuses only on the negative movements of the return series. It is calculated by taking the standard deviation of the negative returns for the selected periodicity. The higher the factor, the riskier the product.
- Earnings Per Share** - It is backward looking, calculated using the one year current EPS divided by the one year EPS five years ago.
- Effective Duration** - The approximate percentage change in a bond's price for a 100 basis point change in yield.
- Excess Return vs. Market** - Average of the monthly arithmetic difference between the manager's return and the benchmark return over a specified time period, shown on an annualized basis.
- Excess Return vs. Risk Free** - Average of the monthly arithmetic difference between the manager's return and the risk-free return (i.e., ICE BofAML 3 Mo US T-Bill Index unless specified otherwise) over a specified time period, shown on an annualized basis.
- Excess Risk** - A measure of the standard deviation of a portfolio's performance relative to the risk-free return.
- Expense Ratios** - Morningstar is the source for mutual fund expense ratios.
- Gain/Loss** - The net increase or decrease in the market value of a portfolio excluding its Net Cash Flow for a given period.
- Indices** - All indices and related information are considered intellectual property and are licensed by each index provider. The indices may not be copied, used, or distributed without the index provider's prior written approval. Index providers make no warranties and bear no liability with respect to the indices, any related data, their quality, accuracy, suitability, and/or completeness.
- 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.
- Liability Driven Investing (LDI)** - A method to optimally structure asset investments relative to liabilities. The change in liabilities is estimated by the Ryan Labs Generic PPA Index of appropriate duration for that Plan. This benchmark is based on generic data and is therefore an approximation. RVK is not an actuarial firm, and does not have actuarial expertise.
- Estimated Funded Status** - The estimated ratio of a Plan's assets relative to its future liabilities. This is calculated by dividing the Plan's asset market value by the estimated present value of its liabilities. The higher the estimated funded status, the better the Plan's ability to cover its projected benefit obligations. An estimated funded status of 100% indicates a Plan that is fully funded.
- Estimated PV of Liabilities** - An estimate of a Plan's future liabilities in present value terms. The beginning of the period liability is provided by the Plan's actuary. The period-end present value liability estimate provided in this report is derived by applying the estimated percentage change generated using the Ryan Labs Generic PPA Index with duration similar to that reported on the most recent actuarial valuation report.
- Duration of Liabilities** - The sensitivity of the value of a Plan's liabilities to changes in interest rates, as calculated by the Plan's actuary.
- Duration of Assets** - The dollar-weighted average duration of all the individual Plan assets.
- Estimated Plan Hedge Ratio** - The estimate of how well a Plan's investment portfolio is hedged against changes in interest rates - a primary driver of funded status movements. This is calculated by dividing the dollar-weighted values of both the Plan asset duration by the liability duration and

Glossary

multiplying by the estimated funded status. An estimated plan hedge ratio of zero indicates that the Plan's liabilities have not been hedged, whereas a value of one indicates fully hedged.

Modified Duration - The approximate percentage change in a bond's price for a 100 basis point change in yield, assuming the bonds' expected cash flows do not change.

Mutual Fund Performance - Whenever possible, manager performance is extended for any share class that does not have 10 years of history. Using Morningstar's methodology, a single ticker within the same fund family (often the oldest share class) is chosen to append historical performance.

Net Cash Flow - The sum, in dollars, of a portfolio's contributions and withdrawals. This includes all management fees and expenses only when performance shown is gross of fees.

Peer Groups -

Plan Sponsor Peer Groups - RVK utilizes the Mellon Analytical Solutions Trust Universe along with the Investment Metrics Plan Sponsor Universe. The combined Mellon Analytical Solutions Trust Universe and Investment Metrics Plan Sponsor Universe is used for comparison of total fund composite results and utilizes actual client performance compiled from consultant and custodian data. The Plan Sponsor Peer Group database includes performance and other quantitative data for over 2,100 plans which include corporate, endowment, foundation, public, and Taft Hartley plans.

Investment Manager Peer Groups - RVK utilizes Investment Metrics' Peer Groups for investment manager peer comparison and ranking. The Investment Metrics Peer Group database includes performance and other quantitative data for over 840 investment management firms and 29,000 investments products, across more than 160 standard peer groups. Mutual Fund Peer Groups are net of fees.

Percentile Rankings - Percentile rank compares an individual fund's performance with those of other funds within a defined peer group of managers possessing a similar investment style. Percentile rank identifies the percentage of a fund's peer group that has a higher return (or other comparative measurement) than the fund being ranked. Conversely, 100 minus the individual fund's ranking will identify the percentage of funds within the peer group that have a lower return than the fund being ranked.

1 - Highest Statistical Value

100 - Lowest Statistical Value

Example: American Funds AMCP;R-4 (RAFEX) is ranked in the 4th percentile within the IM US Equity Large-Cap Growth Funds (MF) Peer Group for the Sharpe Ratio. Within the IM US Equity Large-Cap Growth Funds peer group, 4% of the other funds performed better than American Funds AMCP;R-4 (RAFEX), while 96% of the funds performed worse.

Performance Methodology - RVK calculates performance for investment managers and composites using different methodologies.

Investment Managers - Performance is calculated for interim periods between all large external cash flows for a given month and geometrically linked to calculate period returns. An external cash flow is defined as cash, securities, or assets that enter or exit a portfolio. RVK defines a "large cash flow" as a net aggregate cash flow of $\geq 10\%$ of the beginning-period portfolio market value or any cash flow that causes RVK calculated performance to deviate from manager/custodian reported performance in excess of 5 basis points for a given month.

Composites - The Modified Dietz methodology is utilized to calculate asset class, sub-asset class, and total fund composite performance. The Modified Dietz method calculates a time-weighted total rate of return that considers the timing of external cash flows; however, it does not utilize interim period performance to mitigate the impact of significant cash in- and outflows to the composite.

RVK calculates performance beginning with the first full month following inception. Since inception performance may vary from manager reported performance due to RVK using the first full month of returns as the inception date. Performance for both managers and composites is annualized for periods greater than one year.

Portfolio Characteristics - Due to disclosure guidelines set by each investment manager, portfolio characteristics shown are as of the most recent date available.

Price to Earnings Ratio - The ratio valuing a company's current share price relative to its trailing 12-month per-share earnings (EPS).

Private Equity Quartile Ranks - Private Equity quartile ranks are generated using vintage year peer group data provided by Thomson Reuters, and are based on each fund's annualized, since inception internal rate of return (IRR). Three Private Equity peer groups are available via Thomson Reuters: Buyout, Venture, and All Private Equity. Ranks are available quarterly, at a one-quarter lag.

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.

Return - Compounded rate of return for the period.

% Return - The time-weighted rate of return of a portfolio for a given period.

Risk Free Benchmark - ICE BofAML 3 Mo US T-Bill Index unless specified otherwise.

Glossary

RVK Liquidity Rating - A qualitative method for determining the relative amount of liquidity in a portfolio. The characteristics considered when determining relative liquidity include trading volume, gates for redemption, leverage, nature of transactions, and pricing mechanisms. The RVK Liquidity Rating is calculated using beginning of month investment weights applied to each corresponding asset class liquidity rating.

<u>Asset Class</u>	<u>RVK Liquidity Rating</u>	<u>Asset Class</u>	<u>RVK Liquidity Rating</u>
<u>Liquid Investments</u>		<u>Less Liquid Investments</u>	
T-Bills and Treasuries	100	Fixed Income Plus Sector	50
Cash Equivalents	98	Stable Value (Plan Sponsor Directed)	50
TIPS	95	Hedge Funds of Funds	35
US Large Cap Equity	95		
Diversified Real Return	93		
Stable Value (Participant Directed)	91		
Global Equity	90	<u>Not Liquid Investments</u>	
Non-US Large Cap Equity	90	Core Real Estate	25
Global Tactical Asset Allocation	88	Core Plus Real Estate	15
MLPs	85	Non-Core Real Estate	5
US Mid Cap Equity	85	Private Equity Funds of Funds	5
US SMid Cap Equity	85		
US Small Cap Equity	85		
REITs	85		
Non-US Small Cap Equity	85		
Emerging Markets Equity	85		
Core Fixed Income	85		
Core Plus Fixed Income	80		

Sector Allocation - Negative fixed income sector allocation reflects manager's use of derivatives, short selling, or interest rate swaps.

Sharpe Ratio - Represents the excess rate of return over the risk-free return (i.e., ICE BofAML 3 Mo US T-Bill Index unless specified otherwise), divided by the standard deviation of the excess return to the risk free asset. 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.

Simple Alpha - The difference between the manager's return and the benchmark's return.

Spread Duration - The approximate percentage change in a bond's price for a 100 basis point change in its spread over a Treasury of the same maturity.

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.

Thematic Classification - Represents dedicated manager allocations; as such, thematic allocations are approximations. RVK categorizes the following asset classes as Alpha, Capital Appreciation, Capital Preservation, and Inflation:

<u>Alpha</u>	<u>Capital Appreciation</u>	<u>Capital Preservation</u>	<u>Inflation</u>
Absolute Return Strategies	Public Equity	Core Fixed Income	TIPS
Currency Overlay	Private Equity	CMBS Fixed Income	Bank Loans
	Preferred Securities	Asset Backed Fixed Income	Core Real Estate
	High Yield	Domestic Core Plus Fixed Income	Real Return
	Convertible Fixed Income	Mortgage Backed Fixed Income	Inflation Hedges
	TALF Funds	International Developed Fixed Income	REITs
	Distressed Debt	Cash Equivalents	Commodities
	Emerging Market Fixed Income	Stable Value	
	Value Added Real Estate		
	Opportunistic Real Estate		

Time Period Abbreviations - **QTD** - Quarter-to-Date. **CYTD** - Calendar Year-to-Date. **FYTD** - Fiscal Year-to-Date. **YOY** - Year Over Year.

Total Fund Attribution - The Investment Decision Process (IDP) model provides an approach to evaluating investment performance that applies to all asset classes and investment styles. The IDP model is based on a top-down hierarchy framework of investment decisions, with each decision contributing to the overall profit or loss. The IDP approach starts from the strategic asset allocation and follows the flow of the investments down to the manager's skill.

Strategic Asset Allocation (SAA) - The percentage return gained or lost from the long-term strategic asset allocation decision, the most significant determinant of long-term performance. SAA is the product of the target asset allocation multiplied by the corresponding benchmark returns.

Tactical Asset Allocation (TAA) - The percentage return gained or lost from not having been precisely allocated at the target asset allocation mix, whether by deviations that are tactical in nature or a by-product of moving towards the target mix. TAA is the product of the actual asset allocation multiplied by the broad asset class benchmarks, less the SAA.

Style Selection (SS) - The percentage return gained or lost from intentional style biases within each asset class (e.g. value rather than core or overweight to emerging markets relative to benchmark). SS is the product of the actual manager allocation within each asset class multiplied by their specific benchmark, less TAA.

Manager's Skill (MS) - The percentage return gained or lost from manager value added relative to their specific benchmark. MS is the product of the actual manager allocation multiplied by their achieved excess return.

Total Fund Beta - Total Fund Beta is calculated using the S&P 500 as the benchmark. It represents a measure of the sensitivity of the total fund to movements in the S&P 500 and is a measure of the Total Fund's non-diversifiable or systematic risk.



Glossary

Tracking Error - A measure of the standard deviation of a portfolio's performance relative to the performance of an appropriate market benchmark.

Treynor Ratio - Similar to Sharpe ratio, but focuses on beta rather than excess risk (standard deviation). Treynor ratio represents the excess rate of return over the risk-free rate (i.e., ICE BofAML 3 Mo US T-Bill Index unless specified otherwise) divided by the beta. The result is the absolute rate of return per unit of risk. The higher the value, the better historical risk-adjusted performance.

Unit Value - The dollar value of a portfolio, assuming an initial nominal investment of \$100, growing at the compounded rate of %Return for a given period.

Up Market Capture - Up market by definition is positive benchmark return and up market capture represents the ratio in % terms of the average portfolio's return over the benchmark during the up market period. The higher the value of the up market capture the better the product's performance.

Yield to Maturity - The rate of return achieved on a bond or other fixed income security assuming the security is bought and held to maturity and that the coupon interest paid over the life of the bond will be reinvested at the same rate of return. The 30-Day SEC Yield is similar to the Yield to Maturity and is reported for mutual funds.

Yield to Worst - The bond yield calculated by using the worst possible yield taking into consideration all call, put, and optional sink dates.

PORTLAND

BOISE

CHICAGO

NEW YORK

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STATE OF VERMONT
VERMONT PENSION INVESTMENT COMMISSION

Attachment B: Asset Allocation Study



April 2021

Asset Allocation Study

Vermont Pension Investment Committee



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I. Executive Summary



Executive Summary

- As a next step in the asset allocation review process, RVK, in collaboration with Staff, have completed a formal Asset Allocation Study. This Study mainly focuses on reviewing the long-term expectations of the current and target asset allocation, in addition to alternative target asset allocations for the VPIC's consideration.
 - RVK applied our 2021 Capital Market Assumptions to each portfolio mix and conducted a stress test to each that estimates the short-term and long-term volatility of the expected returns.
- No specific action is being sought today. RVK and Staff seek feedback from the VPIC regarding the initial modeling results.
- A follow-on discussion is slated for the May Committee meeting, where we will present any additional requested analyses along with a formal recommendation.
 - The VPIC may be prepared to take action at that meeting.
 - Following any action taken, as appropriate, RVK and Staff will collaborate on updating the Investment Policy Statement for VPIC review and approval.

Executive Summary

Background

- RVK lowered its 2021 forecasted capital market return assumptions for the majority of asset classes compared to our 2020 Q1 assumptions, largely driven by elevated equity valuations, reduced dividends yields, historically low fixed income starting yields and reduced spreads.
- Based on RVK's 2021 forward assumptions, the expected compound return of the target portfolio decreased, while the expected risk (or standard deviation) increased modestly compared to the initial asset allocation study work conducted at the end of 2020.
- While RVK analyzes both expected arithmetic and geometric returns as part of our analysis, we have focused primarily on geometric returns, which factor in the impact of asset class correlation and risk over time; a more appropriate calculation for such an analysis in our opinion.

	2020 Q1	2021	Change
Expected Compound (Geometric) Return	6.49%	5.31%	-1.18%
Expected Risk	10.61%	10.85%	+0.24%

- As part of this asset allocation study RVK analyzed expectations for both the current, interim target, target, and several alternative portfolios. The results of the expected portfolios are outlined below.

Portfolios	
Current	5.06% expected geometric return
Interim Target	5.20% expected geometric return
Target	5.31% expected geometric return
Option 1	5.30% expected geometric return
Option 2	5.36% expected geometric return
Option 3	5.41% expected geometric return

Objectives

- Review current, target, and proposed allocations and risk/return profiles.
- Consider potential changes to target asset allocation.

II. 2021 RVK Capital Market Assumptions



RVK Capital Market Assumptions

- The table below outlines RVK's year-over-year CMA changes for each of the asset classes utilized in the Asset Allocation Study.

Asset Class	2020 Q1		2021		Change (2020 Q1 - 2021)	
	Nominal Return (Arith.)	Risk (St. Dev.)	Nominal Return (Arith.)	Risk (St. Dev.)	Nominal Return (Arith.)	Risk (St. Dev.)
Large/Mid Cap US Equity	7.25%	16.00%	6.00%	16.00%	-1.25%	0.00%
Small Cap US Equity	8.50%	19.00%	6.50%	19.00%	-2.00%	0.00%
Dev'd Large/Mid Cap Int'l Equity	9.00%	17.00%	7.50%	17.00%	-1.50%	0.00%
Dev'd Small Cap Int'l Equity	10.00%	20.00%	8.00%	20.00%	-2.00%	0.00%
Global Equity	8.35%	16.35%	7.05%	16.60%	-1.30%	0.25%
US Aggregate Fixed Income	2.50%	5.00%	2.00%	5.00%	-0.50%	0.00%
Emerging Markets Debt Hard Currency	7.00%	10.00%	5.00%	10.00%	-2.00%	0.00%
TIPS	2.50%	5.50%	1.50%	5.50%	-1.00%	0.00%
Core Real Estate	5.75%	12.50%	5.75%	12.50%	0.00%	0.00%
Non-Core Real Estate	7.75%	22.50%	7.75%	22.50%	0.00%	0.00%
Listed Infrastructure	7.75%	19.00%	6.50%	19.00%	-1.25%	0.00%
Agriculture/Farmland	6.25%	12.00%	6.25%	12.00%	0.00%	0.00%
Private Credit	9.00%	13.00%	6.75%	13.00%	-2.25%	0.00%
Private Equity	10.00%	22.00%	8.75%	22.00%	-1.25%	0.00%
US Inflation	2.00%	1.50%	2.00%	1.50%	0.00%	0.00%
Cash Equivalents	1.50%	2.00%	1.50%	2.00%	0.00%	0.00%

 Represents an increase year-over-year.

 Represents a decrease year-over-year.

III. Asset Allocation Study



Asset Allocation Study

Process

- The **goal** of an Asset Allocation Study is to identify alternative portfolios that satisfy the return objectives and unique risk tolerances of a given institution.
- Inputs:
 - Allowable asset classes (cash, bonds, stocks, private equity, real estate, etc.)
 - **Capital Market Assumptions** for each individual asset class:
 - Expected Return
 - Expected Risk
 - Correlations
 - Constraints:
 - For each asset class (minimums, maximums)
 - Global constraints for “groups” of asset classes
- When conducting an asset allocation review, RVK employs a modelling process called **Mean Variance Optimization**, which produces a set of optimal (aka “efficient”) portfolios providing the highest level of expected return for a given level of risk. This set of optimal portfolios is called the **Efficient Frontier**.
- The Efficient Frontier is then referenced when identifying alternative portfolios; additional adjustments are typically necessary to take into account the **qualitative factors that the model simply cannot account for** (e.g. a Committee’s desire for a certain allocation cap on illiquid assets).
- Finally, a **Monte Carlo analysis** is incorporated, which allows us to ascertain the real-world probability of achieving various return targets over time as well as the associated risks.

Asset Allocation Study

Background

- The following slides review key output from the Asset Allocation Study that RVK conducted for the VPIC, in collaboration with Staff. A full version of the Study can be found in the Appendix.
- Currently, the VPIC employs the use of **three thematic buckets** to drive asset allocation decisions; each thematic bucket and associated target is outlined below and modeled in the following slides.
 - **Growth (70%)**: serves to diversify and increase the return potential of the portfolio.
 - Includes asset classes such as: Equities, High Yield fixed Income, Emerging Market Debt and Private Markets (Non-core Real estate, Private Equity, and Private Credit).
 - **Downturn Hedging (20%)**: serves to protect the portfolio during periods of a market dislocation and provide adequate liquidity for retirement system liabilities.
 - Includes asset classes such as: Core Fixed Income and Short-term Quality Credit.
 - **Inflation Hedging (10%)**: serves to protect the portfolio during periods of increased unexpected inflation.
 - Includes asset classes such as Infrastructure, Core Real Estate, Farmland and TIPS.

Asset Allocation Study

Background

- In addition to the current allocation and target outlined on the prior slide, RVK and Staff ran **three additional scenarios** for review and consideration:
 - **Option 1:**
 - Maintains the current thematic targets (**70% / 20% / 10%**).
 - Reallocates the 2% target to International Small Cap Equities, an asset classes VPIC has exited, to International Large Cap Equities (7%), to better reflect previous decision making.
 - **Option 2:**
 - Modestly reduces the Downturn Hedging bucket, while increasing the Growth Bucket, and evolving the composition of the Inflation Hedging bucket (**71% / 19% / 10%**).
 - Reallocates the 2% target to International Small Cap Equities, to International Large Cap Equities (7%).
 - Reduces the Core Fixed Income allocation (by 1%) and reallocates to Non Core Real Estate.
 - Evolves the composition of the Inflation Hedging bucket, reallocating 1% from Core Real Estate and into Infrastructure / Farmland.
 - **Option 3:**
 - Further reduces the Downturn Hedging bucket, while increasing the Growth Bucket (**72% / 18% / 10%**).
 - Reallocates the 2% target to International Small Cap Equities, to International Large Cap Equities (7%).
 - Reduces the Core Fixed Income allocation (by 2%) and reallocates to Non Core Real Estate.

Asset Allocation Study

Modeled Portfolios

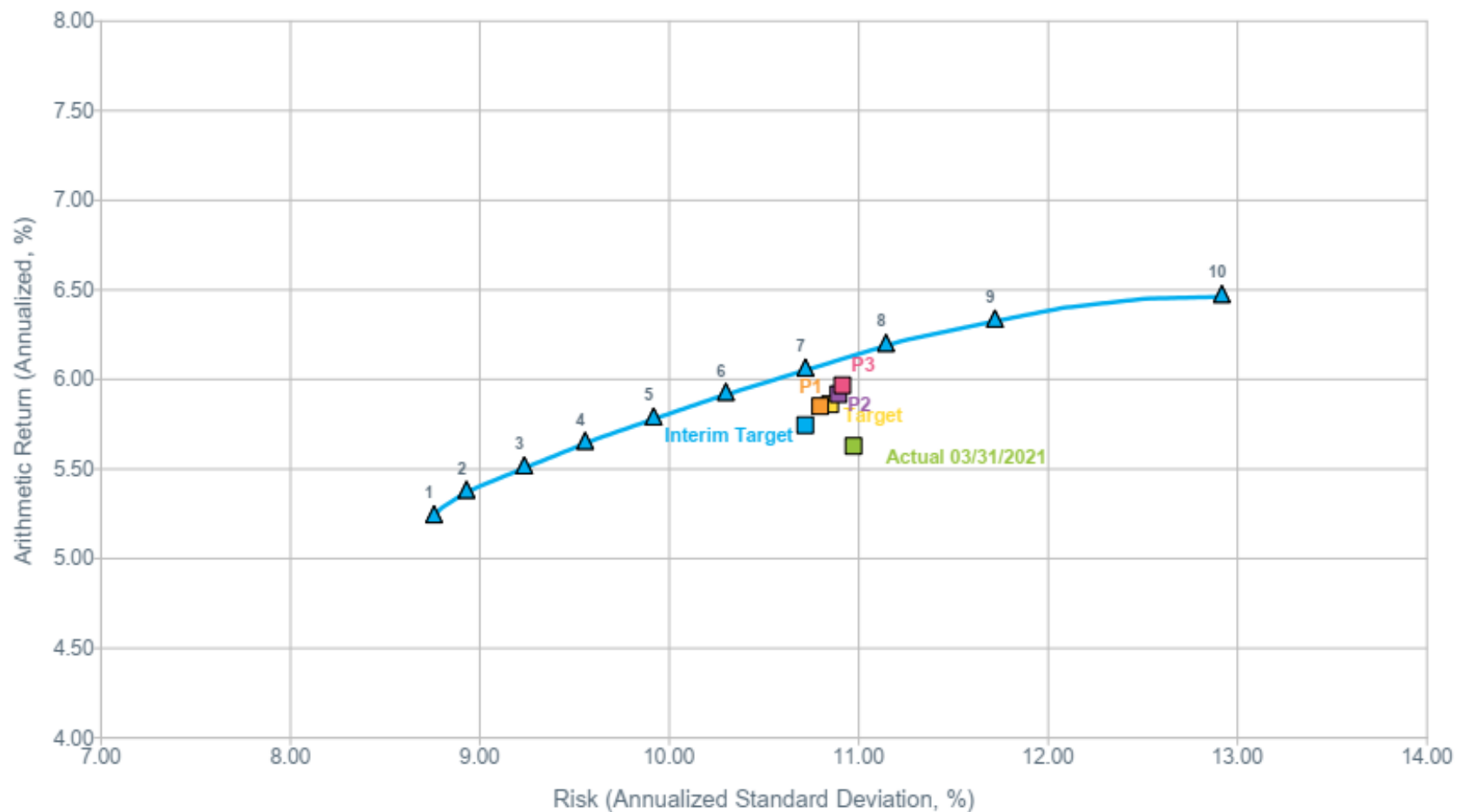
	Min	Max	Actual 3/31/2020	Interim Target ¹	Target	P1	P2	P3	
Large/Mid Cap US Equity	0	8	5	4	4	4	4	4	Growth
Small Cap US Equity	0	5	3	3	3	3	3	3	
Global Equity	25	40	40	33	29	29	29	29	
Dev'd Large/Mid Int'l Equity	0	8	8	7	5	↑ 7	↑ 7	↑ 7	
Dev'd Small Int'l Equity	0	0	0	0	2	↓ 0	↓ 0	↓ 0	
Emerging Markets Debt (Hard)	0	5	4	4	4	4	4	4	
Private Equity	0	12	5	8	10	10	10	10	Downturn Hedging
Private Credit	5	12	3	7	10	10	10	10	
Non-Core Real Estate	0	5	2	3	3	3	↑ 4	↑ 5	
US Agg Fixed Income	15	25	24	21	20	20	↓ 19	↓ 18	
Core Real Estate	0	8	4	5	5	5	↓ 4	5	
TIPS	0	5	3	4	3	3	3	3	
Private Core Infrastructure/Farmland	0	3	1	2	2	2	↑ 3	2	Inflation Hedging
Total			100	100	100	100	100	100	
Growth			69	68	70	70	71	72	
Downturn Hedging			24	21	20	20	19	18	
Inflation Hedging			7	11	10	10	10	10	
Expected Arithmetic Return			5.63	5.74	5.86	5.85	5.92	5.97	
Expected Risk (Standard Deviation)			10.97	10.72	10.85	10.80	10.89	10.91	
Expected Compound (Geometric Return)			5.06	5.20	5.31	5.30	5.36	5.41	
Expected Return (Arithmetic)/Risk Ratio			0.51	0.54	0.54	0.54	0.54	0.55	
RVK Expected Eq Beta (LCUS Eq = 1)			0.64	0.62	0.62	0.62	0.63	0.62	
RVK Liquidity Metric (T-Bills = 100)			76	68	63	63	62	62	

1) The pacing studies model the Private Equity, Private Credit, and Non Core Real Estate allocations at approximately 8%, 7%, and 2.8%, respectively, in the year 2022, assuming no extraordinary market events that might affect the actual allocations to other asset classes. Allocations may not sum due to rounding.

Asset Allocation Study

Efficient Frontier

The figure below illustrates the relationship between risk and return. The risk of each allocation is plotted against the horizontal axis, while the return is measured on the vertical axis. The line connecting the points represents all the optimal portfolios subject to the given constraints and is known as the "efficient frontier." The colored portfolios represent those portfolios that Staff and RVK have arrived at using the model output and the current target allocations as a guide.



Asset Allocation Study

Percent Probability of Achieving or Exceeding Target Return

1 Year	Actual 3/31/2021	Interim Target	Target	P1	P2	P3
Target 0%	71	73	74	74	74	74
Target 4%	57	58	58	58	59	59
Target 6.5%	47	47	48	48	48	49
Target 7%	45	45	46	46	46	46
Target 7.5%	44	43	44	44	44	44
Target 10%	35	34	34	34	34	34
3 Years						
Target 0%	80	83	84	84	84	84
Target 4%	60	61	62	62	63	63
Target 6.5%	44	44	45	45	46	46
Target 7%	41	41	42	42	42	42
Target 7.5%	38	38	38	38	39	39
Target 10%	23	23	23	22	23	23
5 Years						
Target 0%	84	86	87	88	88	88
Target 4%	60	63	64	64	64	65
Target 6.5%	41	42	43	43	43	43
Target 7%	37	37	38	38	39	39
Target 7.5%	33	33	34	34	34	35
Target 10%	17	16	16	16	16	16
10 Years						
Target 0%	90	93	94	94	94	94
Target 4%	62	65	67	67	67	68
Target 6.5%	35	36	38	38	38	39
Target 7%	31	31	32	32	33	33
Target 7.5%	26	26	27	27	28	28
Target 10%	9	8	9	8	9	9

Asset Allocation Study

Monte Carlo Simulation Results

1 Year	Actual 3/31/2021	Interim Target	Target	P1	P2	P3
1st Percentile	-26.49	-23.61	-22.88	-22.49	-22.71	-22.45
5th Percentile	-12.41	-10.86	-10.49	-10.3	-10.45	-10.15
25th Percentile	-1.21	-0.59	-0.33	-0.3	-0.33	-0.22
50th Percentile	5.78	5.86	6.02	6.01	6.09	6.14
75th Percentile	13.11	12.64	12.63	12.57	12.75	12.71
95th Percentile	24.13	22.71	22.44	22.29	22.69	22.51
99th Percentile	33.42	31.42	31.05	30.92	31.27	30.74
3 Years						
1st Percentile	-14.15	-12.14	-11.56	-11.35	-11.62	-11.29
5th Percentile	-6.21	-5.10	-4.76	-4.69	-4.8	-4.58
25th Percentile	1.26	1.71	1.95	1.97	1.97	2.06
50th Percentile	5.54	5.68	5.79	5.78	5.86	5.9
75th Percentile	9.72	9.55	9.59	9.55	9.68	9.66
95th Percentile	15.96	15.26	15.19	15.09	15.31	15.26
99th Percentile	20.76	19.68	19.37	19.27	19.51	19.39
5 Years						
1st Percentile	-9.88	-8.38	-7.89	-7.73	-7.91	-7.74
5th Percentile	-4.01	-3.09	-2.83	-2.78	-2.85	-2.67
25th Percentile	1.87	2.33	2.5	2.54	2.54	2.6
50th Percentile	5.34	5.51	5.65	5.64	5.7	5.74
75th Percentile	8.67	8.58	8.65	8.62	8.71	8.71
95th Percentile	13.57	13.09	13.04	12.96	13.09	13.08
99th Percentile	17.05	16.37	16.26	16.25	16.49	16.42
10 Years						
1st Percentile	-4.96	-3.91	-3.59	-3.47	-3.62	-3.39
5th Percentile	-1.48	-0.70	-0.46	-0.4	-0.46	-0.31
25th Percentile	2.55	2.97	3.15	3.17	3.18	3.27
50th Percentile	5.14	5.33	5.46	5.47	5.51	5.57
75th Percentile	7.63	7.63	7.71	7.7	7.79	7.81
95th Percentile	11.18	10.89	10.93	10.88	11	10.99
99th Percentile	13.7	13.15	13.19	13.07	13.27	13.23

IV. Incorporating Risk



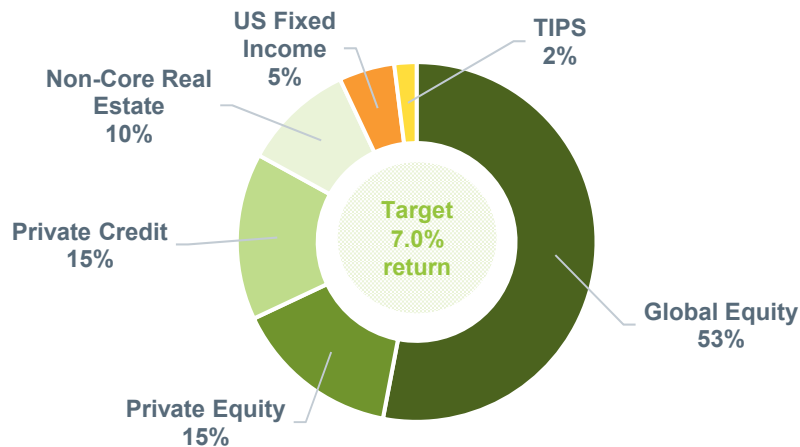
Incorporating Risk

Risk and Portfolio Management

- Mean Variance Optimization (MVO) introduces the critical concept of diversification and is a powerful quantitative tool to identify distinct asset allocation targets with optimal risk/return tradeoffs.
- However, using this framework to explicitly modify expected returns without fully considering risk can be detrimental to portfolio health in the long-run.

Risk Efficiency (MVO)

- To earn an expected return of 7.0%, VPIC's portfolio would need to potentially target the following:

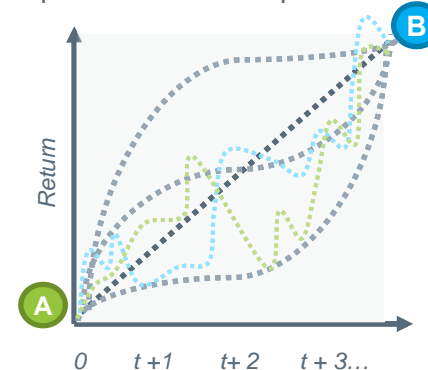


Portfolio Highlights

Expected Arithmetic Return	7.0
Expected Risk (Standard Deviation)	13.7
Expected Compound Return	6.1
Max Drawdown (1-Year)	-28.4
Probability of Achieving Target (7.0%)	
5 Year	47
10 Year	44

Risk Holistically

- Summary statistics (expected return and standard deviation) are valuable inputs for quantitative modeling, but these averages do not provide insight about an investor's experience between point A and point B.



- It is nearly impossible to predict prices, and therefore returns, accurately.
- Managing a portfolio to returns forces investors to focus on what is out of their control instead of what they can control: **managing risk**.
- Taking well compensated risks instead of focusing on incremental gains can yield better outcomes over the long-run.

Incorporating Risk

Considerations for VPIC

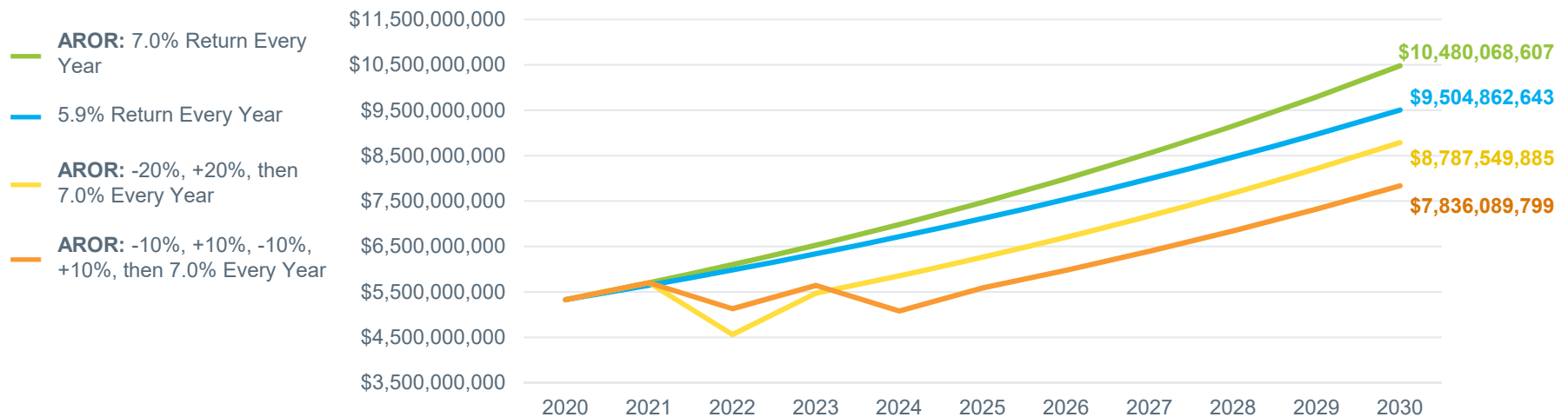
Drawdowns and Funding Levels

- Investors understand the importance of compounding and that volatility has adverse effects on returns, but they often ignore the arithmetic of losses.
- Large drawdowns test investors' confidence, but they can also impair the portfolio's objective of funding future benefit payments.

Drawdown	Cumulative Gain to Break Even	Subsequent Rates of Return ²		
		5%	10%	15%
-10%	11.1%	2.2	1.1	0.8
-15%	17.6%	3.3	1.7	1.2
-20%	25.0%	4.6	2.3	1.6
-25%	33.3%	5.9	3.0	2.1
-30%	42.9%	7.3	3.7	2.6
-35%	53.8%	8.8	4.5	3.1
-40%	66.7%	10.5	5.4	3.7

Years needed to recover from drawdown, given various rates of returns

Sequencing Example⁽¹⁾



(1) Graph assumes combined market value for the three VPIC Plans as of 12/31/2020 as a starting point, shows subsequent growth in assets under various return scenarios. Does not incorporate cash flows.

V. Conclusion



Summary Commentary & Next Steps

- In addition to reviewing forward-looking expectations for both the current and target allocations, in the context of RVK's most recent Capital Market Assumptions, several additional portfolios have been presented for consideration, each offering modestly increased return expectations, for a moderate amount of increased risk and illiquidity.
- For Portfolios 2 and 3, the decrease in allocation to Downturn Hedging, increases both the expected return and risk compared to the current target allocation, but the portfolios' expected equity beta and liquidity metric (as calculated by RVK) remain relatively unchanged.
- The Monte Carlo study shows the down market experiences of the potential portfolios are forecasted to either be an improvement or remain consistent with that of the current target allocation.
- Attempts to achieve a 7% return may require significantly reducing Downturn Hedging and subsequently increasing expected volatility.
- RVK and Staff welcome comments and requests for additional analyses to assist the VPIC with developing a consensus and final decision.

VI. Appendix

- Asset Allocation Study





VPIC

Asset Allocation Study

March 2021



VPIC
Asset Allocation Study
March 2021

Introduction

The selection of the asset allocation is one of the most important decisions that VPIC can make. It is the major determinant of both the long-term rates of return and the volatility of asset values. Two facets comprise the asset allocation decision: identification of the alternative asset allocations to be considered and selection of the alternative allocation that best meets the investment objectives. The identification of alternative asset allocations begins with estimating the probable future performance of the various asset classes. Using these projections, we can identify the most desirable alternative allocations (potential portfolios) and evaluate them in light of the investment objectives to select that which is most appropriate.

The structure of this report follows the process described above. First, we present our return and risk expectations for each asset class, along with a brief explanation of their relevance to asset allocation. Next, the report will address the creation of the asset allocation alternatives. A description of how the alternatives were identified accompanies a table detailing their composition.

Asset Class Expectations

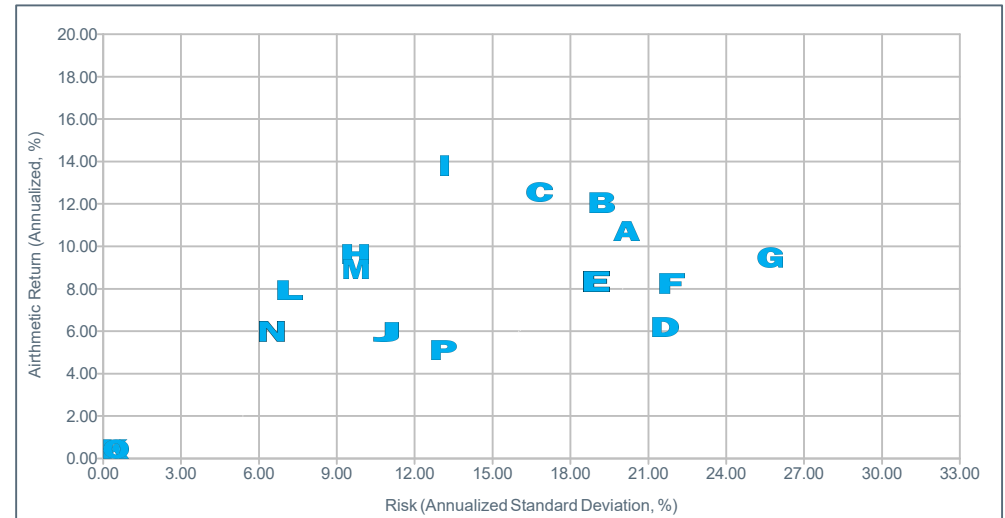
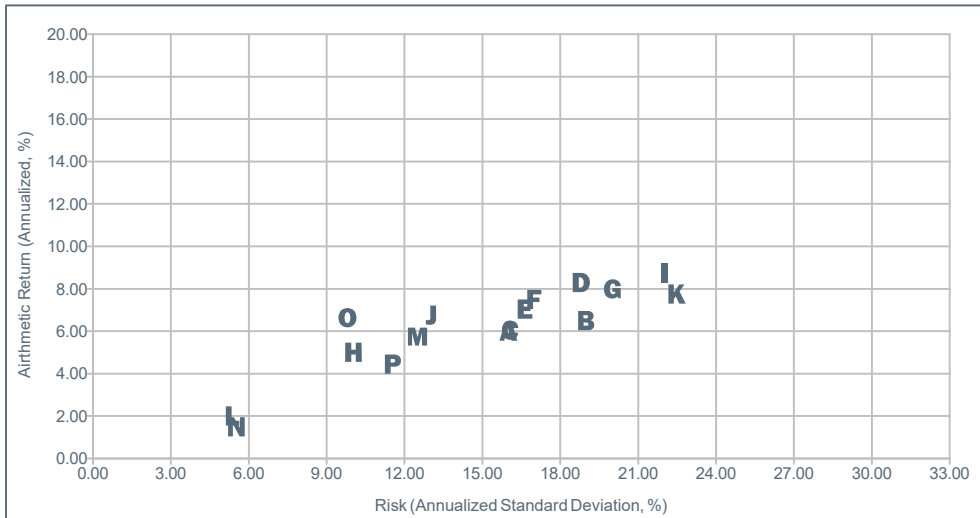
To create asset allocation alternatives, it is necessary to estimate, for each asset class to be employed, its probable return, risk, and behavior relative to other asset classes. The expected returns are our best estimates of the average annual percentage increases in the values of each asset class over a prospective long period of time. The expected returns and risks (as measured by standard deviation of returns) are listed on the left side of Figure 1 (next page), and the historical risks and returns of each asset class, as measured by comparable indexes, are listed on the right side of Figure 1 (next page).

Figure 1 - RVK Assumptions vs. Longest Historical Time Frame

Statistics are calculated based on annual periodicity.

Asset Class	Arithmetic Return Assumption	Standard Deviation Assumption
Large/Mid Cap US Equity	6.00	16.01
Small Cap US Equity	6.50	19.00
Broad US Equity	6.05	16.06
Broad International Equity	8.30	18.81
Global Equity	7.05	16.65
Dev'd Large/Mid Int'l Equity	7.50	17.00
Dev'd Small Int'l Equity	8.00	20.00
Emerging Markets Debt (Hard)	5.00	10.03
Private Equity	8.75	22.00
Private Credit	6.75	13.01
Non-Core Real Estate	7.75	22.50
US Agg Fixed Income	2.00	5.37
Core Real Estate	5.75	12.50
TIPS	1.50	5.52
Private Core Infrastructure/Farmland	6.63	9.80
Diversified Infl Strat	4.45	11.55

Index	Longest Historical Time Frame	Annualized Arithmetic Return	Annual Standard Deviation
S&P 500 (Cap Wtd)	Jan 1926 - Dec 2020	10.29	19.67
Russell 2000	Jan 1979 - Dec 2020	11.62	18.72
Russell 3000	Jan 1979 - Dec 2020	12.13	16.32
MSCI ACW Ex US IMI (Gross)	Jun 1994 - Dec 2020	5.75	21.18
MSCI ACW IMI (Gross)	Jun 1994 - Dec 2020	7.89	18.52
MSCI EAFE (Gross)	Jan 1986 - Dec 2020	7.81	21.43
MSCI EAFE Small Cap (Gross)	Jan 2001 - Dec 2020	9.04	25.21
JPMorgan EMBI Global Div.	Jan 1999 - Dec 2020	9.18	9.23
Cambridge US Private Equity Index	Jun 1986 - Jun 2020	13.36	12.64
Credit Suisse Leveraged Loan Index+2%	Jan 1992 - Dec 2020	7.63	7.48
NCREIF ODCE Index+2%	Jan 1978 - Dec 2020	8.94	5.67
Bloomberg US Agg Bond	Jan 1980 - Dec 2020	7.50	6.70
NCREIF ODCE (Gross) (AWA)	Mar 1978 - Jun 2020	8.47	9.24
Bloomberg US Trsy: US TIPS	Jan 1998 - Dec 2020	5.53	6.00
Custom Infrastructure/Farmland Index*	Dec 2001 - Dec 2020	8.57	16.12
Custom Div Infl Strat Index*	Dec 1994 - Dec 2020	4.68	12.65



- A** Large US **B** Small US **C** Broad US **D** Broad IE **E** Global Equity **F** Large IE **G** Small IE
- H** EMD (H) **I** Priv Equity **J** Private Credit **K** Non-Core RE **L** Agg FI **M** Core RE **N** TIPS
- O** Private Infra/Farm **P** DIS

*See appendix for custom index definitions.



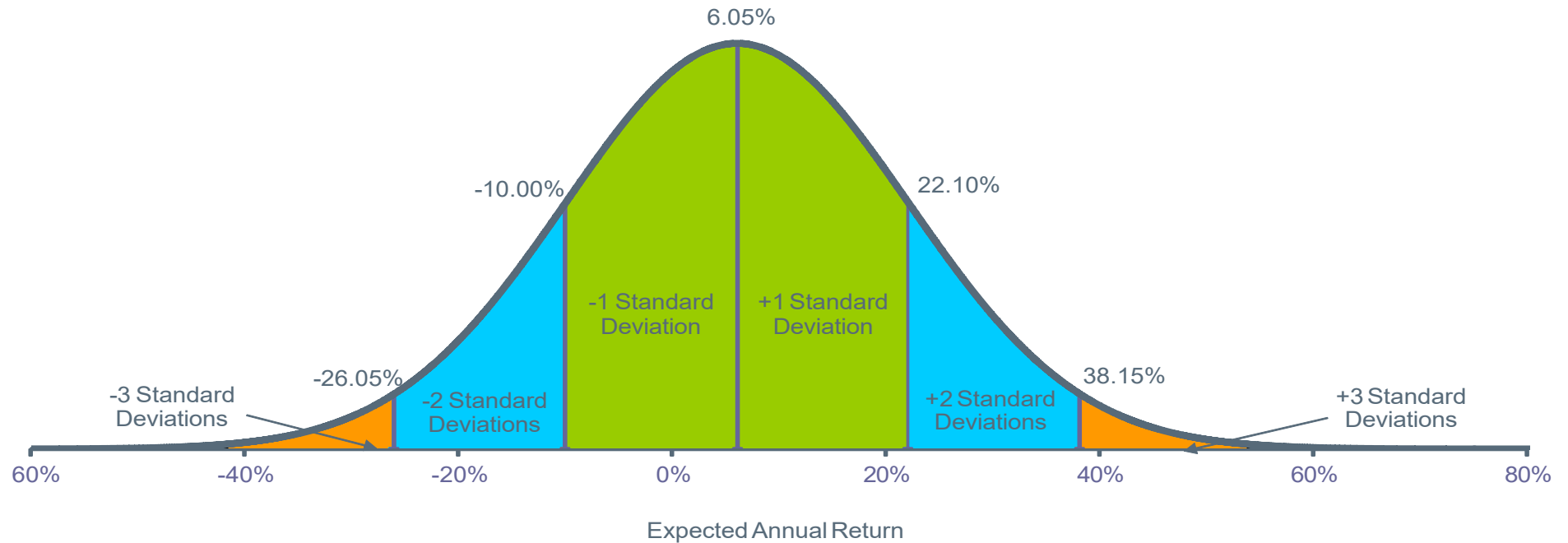
Please reference the RVK Capital Market Assumptions white paper for details of the analysis undergone in developing the assumptions for each asset class. Also, note that the relationship between the asset classes (their positioning in the graph relative to one another) is much more important for investment decision-making than the absolute expected return level of each asset class.

It is important to understand that these expectations are assumptions of long-term future performance and are, therefore, subject to uncertainty. The risk, or volatility, of each asset class reflects this uncertainty, which is quantified by the statistic known as standard deviation of returns. The standard deviation for each asset class is listed in Figure 1.

The standard deviation of returns measures the volatility ("risk") of an asset class by assigning probabilities to a range of different possible returns. If asset returns are normally distributed (bell-shaped curve) then two-thirds (67%) of all returns are expected to lie within one standard deviation on either side of the mean. For example, we expect Broad US Equity to return, annually on average, 8.50% with a standard deviation of 23.00%, meaning that for a normal distribution two-thirds of the time we expect its returns to lie between -14.50% ($= 8.50\% - 23.00\%$) and 31.50% ($= 8.50\% + 23.00\%$). Moreover, we expect 95% of all return outcomes to lie within two standard deviations of the mean return, implying only a one-in-twenty chance that the return on Broad US Equity will either fall below -37.50% or rise above 54.50%. Figure 2 (next page) provides the expected range of single year returns in each asset class using the above methodology, and also uses a bell-shaped (normal distribution) diagram to illustrate the above example.

Figure 2 - Annual Volatility of Return Assumptions

	-3 St Dev	-2 St Dev	-1 St Dev	Expected Return	+1 St Dev	+2 St Dev	+3 St Dev
Large/Mid Cap US Equity	-42.03	-26.02	-10.01	6.00	22.01	38.02	54.03
Small Cap US Equity	-50.50	-31.50	-12.50	6.50	25.50	44.50	63.50
Broad US Equity	-42.13	-26.07	-10.01	6.05	22.11	38.17	54.23
Broad International Equity	-48.13	-29.32	-10.51	8.30	27.11	45.92	64.73
Global Equity	-42.90	-26.25	-9.60	7.05	23.70	40.35	57.00
Dev'd Large/Mid Int'l Equity	-43.50	-26.50	-9.50	7.50	24.50	41.50	58.50
Dev'd Small Int'l Equity	-52.00	-32.00	-12.00	8.00	28.00	48.00	68.00
Emerging Markets Debt (Hard)	-25.09	-15.06	-5.03	5.00	15.03	25.06	35.09
Private Equity	-57.25	-35.25	-13.25	8.75	30.75	52.75	74.75
Private Credit	-32.28	-19.27	-6.26	6.75	19.76	32.77	45.78
Non-Core Real Estate	-59.75	-37.25	-14.75	7.75	30.25	52.75	75.25
US Agg Fixed Income	-14.11	-8.74	-3.37	2.00	7.37	12.74	18.11
Core Real Estate	-31.75	-19.25	-6.75	5.75	18.25	30.75	43.25
TIPS	-15.06	-9.54	-4.02	1.50	7.02	12.54	18.06
Private Core Infrastructure/Farmland	-22.77	-12.97	-3.17	6.63	16.43	26.23	36.03
Diversified Infl Strat	-30.20	-18.65	-7.10	4.45	16.00	27.55	39.10



Correlation

Creating a diversified portfolio of asset classes enables the investor to achieve a high rate of return while minimizing volatility of the portfolio. Diversification exists because the returns of different asset classes do not always move in the same direction, at the same time, or with the same magnitude. Varied investment environments cause some asset classes to rise in value while others fall, and correlation is the measure that quantifies the degree to which asset classes do not move in tandem.

Correlation can take on values between 1.00 and -1.00. If returns of two asset classes rise or fall at the same time they are said to be perfectly correlated and have a correlation value of 1.00. Conversely, two asset classes that simultaneously move in opposite directions are said to be perfectly negatively correlated and have a correlation value of -1.00. A correlation of 0 indicates no relationship between the returns. It is imperfect correlations between asset classes that enable an investor to create efficient portfolios; that is, those with the highest amount of return at a given level of risk. The correlations for the asset classes used in this study are shown in Table 1 (next page).

The fact that the correlations shown in the table are nearly all positive does not imply that these asset classes do not diversify one another. Their correlations are significantly less than 1.00, meaning we expect a measurable number of instances when the underperformance of one or more of the asset classes will be offset by the outperformance of others.

Table 1 - Correlation Matrix

	Large/Mid Cap US Equity	Small Cap US Equity	Broad US Equity	Broad International Equity	Global Equity	Dev'd Large/Mid Int'l Equity	Dev'd Small Int'l Equity	Emerging Markets Debt (Hard)	Private Equity	Private Credit	Non-Core Real Estate	US Agg Fixed Income	Core Real Estate	TIPS	Private Core Infrastructure/Farmland	Diversified Infl Strat
Large/Mid Cap US Equity	1.00	0.85	0.99	0.84	0.93	0.84	0.82	0.54	0.78	0.64	0.13	0.13	0.22	0.08	0.81	0.65
Small Cap US Equity	0.85	1.00	0.90	0.78	0.87	0.76	0.80	0.52	0.75	0.62	0.09	0.06	0.18	0.04	0.77	0.63
Broad US Equity	0.99	0.90	1.00	0.85	0.94	0.85	0.83	0.55	0.79	0.65	0.13	0.13	0.22	0.08	0.82	0.66
Broad International Equity	0.84	0.78	0.85	1.00	0.97	0.99	0.95	0.66	0.79	0.67	0.15	0.01	0.28	0.17	0.89	0.78
Global Equity	0.93	0.87	0.94	0.97	1.00	0.96	0.92	0.62	0.83	0.68	0.14	0.02	0.29	0.12	0.88	0.74
Dev'd Large/Mid Int'l Equity	0.84	0.76	0.85	0.99	0.96	1.00	0.94	0.62	0.79	0.64	0.16	0.01	0.30	0.13	0.89	0.74
Dev'd Small Int'l Equity	0.82	0.80	0.83	0.95	0.92	0.94	1.00	0.62	0.78	0.72	0.17	0.03	0.31	0.21	0.86	0.78
Emerging Markets Debt (Hard)	0.54	0.52	0.55	0.66	0.62	0.62	0.62	1.00	0.54	0.65	0.11	0.44	0.21	0.52	0.73	0.70
Private Equity	0.78	0.75	0.79	0.79	0.83	0.79	0.78	0.54	1.00	0.69	0.18	-0.25	0.33	-0.02	0.74	0.68
Private Credit	0.64	0.62	0.65	0.67	0.68	0.64	0.72	0.65	0.69	1.00	0.14	-0.12	0.21	0.16	0.72	0.73
Non-Core Real Estate	0.13	0.09	0.13	0.15	0.14	0.16	0.17	0.11	0.18	0.14	1.00	-0.04	0.78	0.03	0.26	0.18
US Agg Fixed Income	0.13	0.06	0.13	0.01	0.02	0.01	0.03	0.44	-0.25	-0.12	-0.04	1.00	-0.05	0.70	0.22	0.22
Core Real Estate	0.22	0.18	0.22	0.28	0.29	0.30	0.31	0.21	0.33	0.21	0.78	-0.05	1.00	0.10	0.39	0.37
TIPS	0.08	0.04	0.08	0.17	0.12	0.13	0.21	0.52	-0.02	0.16	0.03	0.70	0.10	1.00	0.36	0.48
Private Core Infrastructure/Farmland	0.81	0.77	0.82	0.89	0.88	0.89	0.86	0.73	0.74	0.72	0.26	0.22	0.39	0.36	1.00	0.88
Diversified Infl Strat	0.65	0.63	0.66	0.78	0.74	0.74	0.78	0.70	0.68	0.73	0.18	0.22	0.37	0.48	0.88	1.00

Table 2 (previous page) lists historical annual returns for most major asset classes reflected in this study. The highest-performing asset class in each year is highlighted in blue, while the lowest-performing asset class is highlighted in green. The chart illustrates how investments among several asset classes can diversify the portfolio, helping to lower the risk level and potentially increase returns over full market cycles.

Asset Allocation Alternatives

The expected returns, risks and correlations described in the previous section are the primary inputs for the model that constructs the asset allocation alternatives. The model uses this information to build many portfolios with different proportions of each, subject to whatever constraints are placed upon it. The model then determines which of these hypothetical portfolios are most "efficient" – that is, those that achieve the best combination of return and risk. Allocations achieving a given rate of return at the least amount of risk, or the highest amount of return at a specific level of risk, are known as "efficient" or "optimal" portfolios. We constrain the model to take into account reasonable minimum or maximum allocations to each asset class or groups of asset classes.

It is worth noting that the model determines optimal portfolios by considering not only the return and volatility of all asset classes individually, but also the correlations between the asset classes. Because correlation amongst asset classes is what determines the efficiency of a portfolio, another way of describing the process of minimizing volatility is maximizing diversification.

Efficient Allocations

The table below shows the range of possible optimal allocations given the selected asset classes and constraints listed under "Min" and "Max." This range illustrates the tradeoff between return and risk; additional return can only be achieved by undertaking additional risk.

Frontier 1

	Min	Max	1	2	3	4	5	6	7	8	9	10	Target*
Broad US Equity	0	30	30	23	16	16	17	19	20	22	25	30	23
Broad International Equity	0	30	3	10	16	16	17	19	20	22	25	30	20
Emerging Markets Debt (Hard)	0	5	5	5	5	5	5	5	5	5	0	0	4
Private Equity	5	12	5	5	6	8	8	8	8	8	10	12	10
Private Credit	5	12	12	12	12	12	12	12	12	12	10	8	10
Non-Core Real Estate	0	5	5	5	5	5	5	5	5	5	5	5	3
US Agg Fixed Income	15	25	25	25	25	25	25	21	18	15	15	15	20
Core Real Estate	0	8	8	8	8	8	8	8	8	8	8	0	5
TIPS	0	5	5	5	5	2	0	0	0	0	0	0	3
Private Core Infrastructure/Farmland	0	3	2	2	2	3	3	3	3	3	3	0	2
Total			100	100	100	100	100	100	100	100	100	100	100
Capital Appreciation			60	60	60	62	64	68	71	74	74	85	70
Capital Preservation			25	25	25	25	25	21	18	15	15	15	20
Alpha			0	0	0	0	0	0	0	0	0	0	0
Inflation			15	15	15	13	11	11	11	11	11	0	10
Expected Arithmetic Return			5.12	5.28	5.44	5.61	5.77	5.93	6.09	6.26	6.42	6.58	5.89
Expected Risk (Standard Deviation)			8.77	8.89	9.08	9.41	9.83	10.32	10.81	11.30	12.01	13.32	10.90
Expected Compound Return			4.76	4.91	5.05	5.19	5.32	5.43	5.54	5.66	5.75	5.76	5.33
Expected Return (Arithmetic)/Risk Ratio			0.58	0.59	0.60	0.60	0.59	0.57	0.56	0.55	0.53	0.49	0.54
RVK Expected Eq Beta (LCUS Eq = 1)			0.51	0.51	0.51	0.53	0.55	0.58	0.61	0.64	0.69	0.78	0.63
RVK Liquidity Metric (T-Bills = 100)			63	63	61	59	59	59	59	60	62	70	64

Target*

Broad US includes 4% Large Cap Target weight, 3% Small Cap Target weight, and 56.5% of the 29% Global Equity Target weight.

Broad International Equity includes 5% International Large Cap Target weight, 2% International Small Cap Target weight, and 43.5% of the 29% Global Equity Target weight.

Group Constraints

TIPS + Core RE + Infra/Farm <= 15%

NCRE+PE+PC <= 25%

Broad Intl <= 50% Broad US + Broad Intl

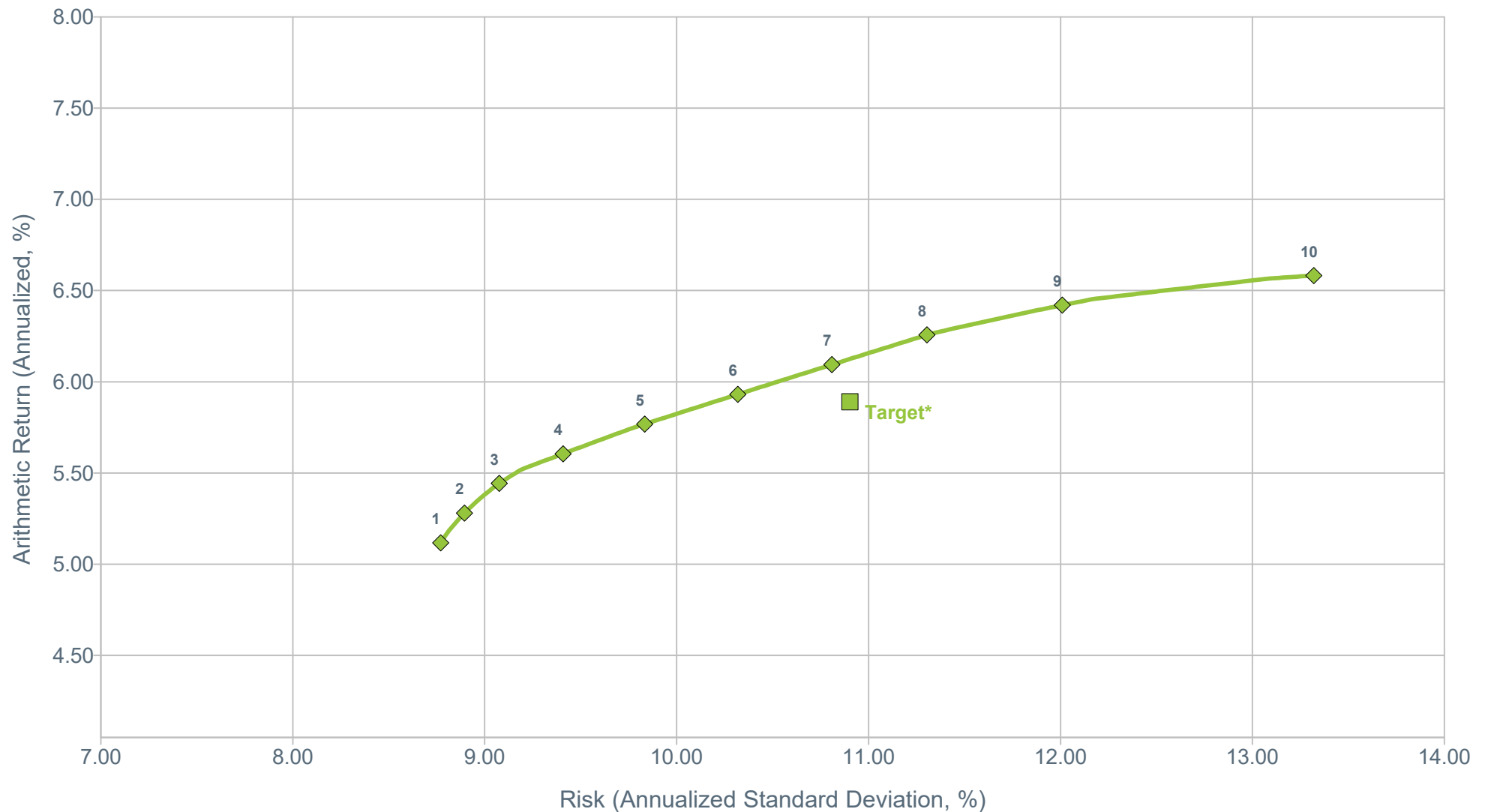
Please see the Glossary for statistics descriptions.



Efficient Frontier

The figure below illustrates the relationship between risk and return. The risk of each alternative allocation is plotted against the horizontal axis, while the return is measured on the vertical axis. The line connecting the points represents all the optimal portfolios subject to the given constraints and is known as the "efficient frontier." The upward slope of the efficient frontier indicates the direct relationship between return and risk.

Frontier 1



The table below shows the possible optimal allocations for a "new" frontier that considers a more detailed equity breakdown and introduces several additional portfolios for consideration.

Frontier 2

	Min	Max	1	2	3	4	5	6	7	8	9	10	Actual 03/31/2021	Interim Target	Target	P1	P2	P3
Large/Mid Cap US Equity	0	8	8	5	5	5	4	2	2	2	0	4	5	4	4	4	4	4
Small Cap US Equity	0	5	0	0	0	0	1	3	3	3	5	5	3	3	3	3	3	3
Global Equity	25	40	25	25	25	25	25	25	28	31	36	40	40	33	29	29	29	29
Dev'd Large/Mid Int'l Equity	0	8	5	5	3	5	6	8	8	8	8	8	8	7	5	7	7	7
Dev'd Small Int'l Equity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
Emerging Markets Debt (Hard)	0	5	5	5	5	5	5	5	5	5	0	0	4	4	4	4	4	4
Private Equity	0	12	0	3	7	7	8	8	8	8	8	12	5	8	10	10	10	10
Private Credit	5	12	12	12	12	12	12	12	12	12	12	8	3	7	10	10	10	10
Non-Core Real Estate	0	5	5	5	5	5	5	5	5	5	5	5	2	3	3	3	4	5
US Agg Fixed Income	15	25	25	25	25	25	23	21	18	15	15	15	24	21	20	20	19	18
Core Real Estate	0	8	8	8	8	8	8	8	8	8	8	0	4	5	5	5	4	5
TIPS	0	5	5	4	2	0	0	0	0	0	0	0	3	4	3	3	3	3
Private Core Infrastructure/Farm/la	0	3	2	3	3	3	3	3	3	3	3	3	1	2	2	2	3	2
Total			100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Capital Appreciation			60	60	62	64	66	68	71	74	74	82	69	68	70	70	71	72
Capital Preservation			25	25	25	25	23	21	18	15	15	15	24	21	20	20	19	18
Alpha			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inflation			15	15	13	11	11	11	11	11	11	3	7	11	10	10	10	10
Expected Arithmetic Return			5.23	5.37	5.51	5.64	5.78	5.92	6.05	6.19	6.32	6.46	5.63	5.74	5.86	5.85	5.92	5.97
Expected Risk (Standard Deviat			8.76	8.93	9.24	9.56	9.92	10.30	10.72	11.14	11.72	12.92	10.97	10.72	10.85	10.80	10.89	10.91
Expected Compound Return			4.87	4.99	5.11	5.21	5.32	5.42	5.51	5.61	5.68	5.68	5.06	5.20	5.31	5.30	5.36	5.41
Expected Return (Arithmetic)/Risk			0.60	0.60	0.60	0.59	0.58	0.57	0.56	0.56	0.54	0.50	0.51	0.54	0.54	0.54	0.54	0.55
RVK Expected Eq Beta (LCUS Eq			0.49	0.50	0.52	0.54	0.56	0.58	0.60	0.63	0.67	0.75	0.64	0.62	0.62	0.62	0.63	0.62
RVK Liquidity Metric (T-Bills = 100			66	63	60	59	58	58	58	58	60	66	76	68	63	63	62	62

The pacing studies model the Private Equity, Private Credit, and Non Core Real Estate allocations at approximately 8%, 7%, and 2.8% respectively in the year 2022, assuming no extraordinary market events that might affect the actual allocations to other asset classes.

Group Constraints

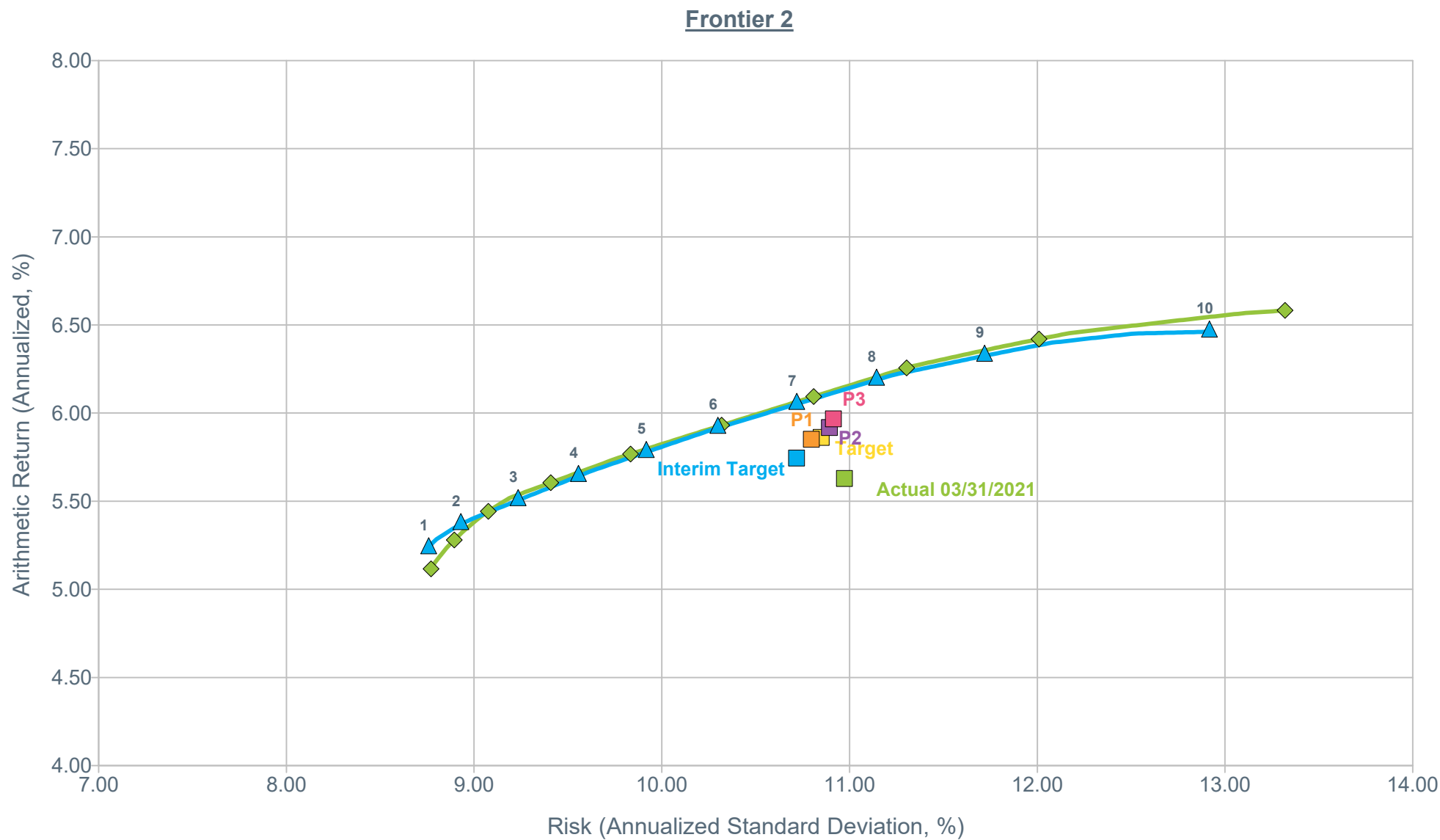
Large/Mid Cap US Equity + Small Cap US Equity >= 5%

TIPS + Core RE + Infra/Farm <= 15%

NCRE+PE+PC <= 25%

Please see the Glossary for statistics descriptions.

The "new" efficient frontier (blue) has been added to show the new set of efficient portfolios, compared to those on the original frontier.



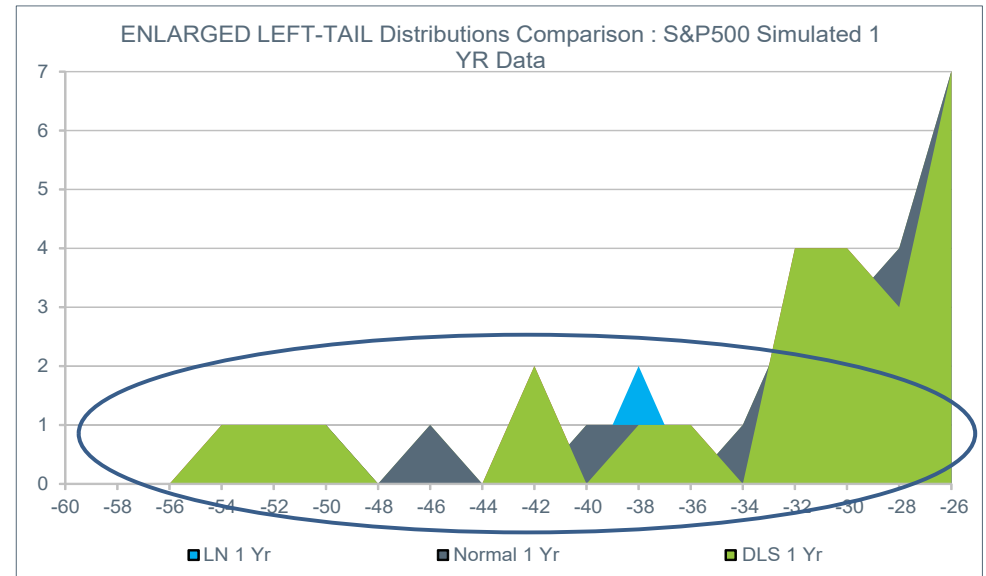
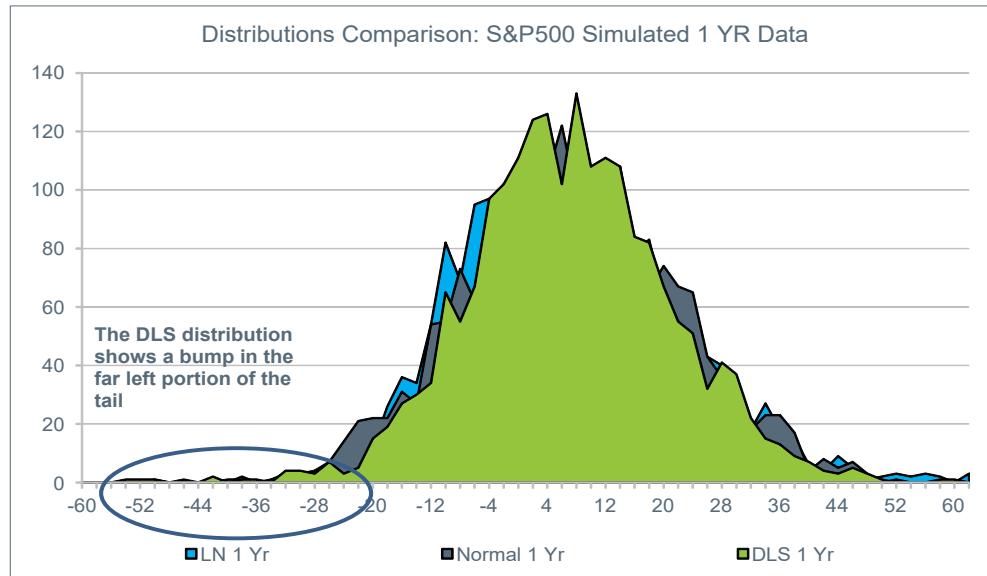
Monte Carlo Simulation

Monte Carlo simulation uses a random sampling of asset class returns, based on the probability distribution implied by the empirical returns, to create several thousand estimates of portfolio performance. Undergoing a Monte Carlo simulation provides insight into the performance of the asset allocation by examining many randomly sampled return outcomes.

An asset allocation study allows for the construction of an "efficient," or return-maximizing, portfolio of asset class investments at each given level of portfolio volatility. These calculations are based on expected return, risk, and correlations for each asset class. The asset allocation process provides a snapshot of portfolio performance that is highly dependent on the mean return expectations. A Monte Carlo simulation process "stress tests" these assumptions and asset allocation recommendations that stem from them through thousands of independent samplings of portfolio returns, based on the assumptions and indicated asset allocations. Through the Monte Carlo simulation process, we are better able to ascertain the real-world probability of achieving various return targets over time.

Our Monte Carlo simulation model assumes a non-normal (downside log-stable (DLS), or "fat-tailed") distribution of returns for equity asset classes (as well as high yield fixed income and bank loans), which we believe provides a more realistic representation of historical market experience than the typically used normal or log-normal (LN) distribution. Given this non-normal distribution of random returns derived from our assumption inputs and empirical return dispersion, we can estimate the potential return for a given portfolio over the indicated time period. The charts below illustrate the differences between the above mentioned distributions.

It is important to note that the output that follows refers to geometric (compound) return, rather than the arithmetic return assumptions used in the asset allocation analysis. The geometric return of a portfolio will be less than (or equal to) its arithmetic return over time, because geometric return accounts for the dampening effect of volatility on the portfolio's compound returns.



The table below shows the expected return by percentile for each portfolio on Frontier 1 for the 1, 3, 5, and 10 year periods.

1 Year	1	2	3	4	5	6	7	8	9	10	Target*
1st Percentile	-15.39	-15.22	-14.92	-15.80	-17.17	-18.97	-20.22	-21.83	-24.61	-29.48	-21.66
5th Percentile	-7.00	-6.63	-6.48	-6.88	-7.50	-8.18	-8.87	-9.53	-11.40	-13.94	-9.76
25th Percentile	0.51	0.69	0.85	0.82	0.70	0.55	0.41	0.26	-0.36	-1.21	-0.03
50th Percentile	5.23	5.37	5.56	5.75	5.93	6.11	6.29	6.41	6.57	6.73	6.07
75th Percentile	10.15	10.27	10.39	10.84	11.32	11.84	12.38	12.92	13.89	15.14	12.45
95th Percentile	17.67	17.76	17.77	18.48	19.48	20.48	21.54	22.54	24.60	27.46	21.94
99th Percentile	23.84	23.66	23.73	24.95	26.45	27.73	29.02	30.52	33.74	38.26	30.03
3 Years											
1st Percentile	-6.94	-6.67	-6.58	-7.13	-7.79	-8.69	-9.55	-10.40	-12.62	-15.81	-10.57
5th Percentile	-2.49	-2.31	-2.07	-2.33	-2.74	-3.16	-3.54	-3.97	-5.21	-7.07	-4.27
25th Percentile	2.25	2.46	2.60	2.62	2.59	2.55	2.49	2.43	2.11	1.59	2.13
50th Percentile	5.06	5.27	5.46	5.60	5.78	5.89	6.04	6.20	6.24	6.41	5.84
75th Percentile	7.91	8.03	8.18	8.50	8.84	9.21	9.54	9.87	10.44	11.21	9.48
95th Percentile	12.12	12.23	12.31	12.75	13.40	14.01	14.67	15.29	16.60	18.14	14.89
99th Percentile	15.32	15.40	15.45	16.11	16.88	17.63	18.36	19.22	21.30	23.66	18.98
5 Years											
1st Percentile	-4.23	-4.10	-4.02	-4.42	-4.95	-5.68	-6.38	-7.04	-8.85	-11.94	-7.30
5th Percentile	-1.04	-0.82	-0.66	-0.85	-1.11	-1.44	-1.77	-2.08	-3.14	-4.53	-2.40
25th Percentile	2.71	2.89	3.07	3.10	3.08	3.06	3.02	2.97	2.68	2.26	2.67
50th Percentile	4.99	5.17	5.34	5.51	5.65	5.79	5.92	6.04	6.13	6.16	5.68
75th Percentile	7.20	7.37	7.53	7.78	8.07	8.36	8.66	8.95	9.42	10.00	8.60
95th Percentile	10.49	10.63	10.74	11.15	11.65	12.16	12.68	13.19	14.16	15.41	12.79
99th Percentile	12.81	12.89	12.98	13.55	14.22	14.92	15.64	16.34	17.74	19.48	15.93
10 Years											
1st Percentile	-1.32	-1.16	-1.01	-1.23	-1.53	-1.86	-2.23	-2.61	-3.80	-5.89	-3.05
5th Percentile	0.70	0.89	1.05	0.95	0.79	0.58	0.38	0.14	-0.61	-1.80	-0.17
25th Percentile	3.24	3.43	3.59	3.64	3.66	3.66	3.67	3.67	3.41	3.01	3.32
50th Percentile	4.90	5.06	5.23	5.38	5.50	5.64	5.76	5.88	5.96	5.95	5.51
75th Percentile	6.56	6.70	6.86	7.09	7.33	7.58	7.82	8.06	8.40	8.80	7.70
95th Percentile	8.85	8.99	9.14	9.49	9.88	10.29	10.71	11.14	11.88	12.82	10.74
99th Percentile	10.62	10.76	10.93	11.33	11.86	12.33	12.90	13.40	14.35	15.66	12.98

The table below shows the **percentage** chance of achieving or exceeding the given return for each portfolio on Frontier 1 for the 1, 3, 5, and 10 year periods.

1 Year	1	2	3	4	5	6	7	8	9	10	Target*
Target 0%	77	78	79	79	78	77	76	76	74	71	75
Target 4%	57	58	59	60	60	60	60	60	60	59	59
Target 6.5%	43	44	45	46	47	48	49	50	50	51	48
Target 7%	40	41	42	43	45	46	47	48	49	49	46
Target 7.5%	38	38	39	41	42	43	44	45	47	48	44
Target 10%	26	26	27	29	30	32	34	35	37	40	34
3 Years											
Target 0%	88	89	89	89	88	87	87	86	84	81	85
Target 4%	60	62	64	64	65	65	65	65	64	63	63
Target 6.5%	37	38	40	42	43	45	46	48	49	49	45
Target 7%	32	34	35	37	39	41	43	44	46	47	42
Target 7.5%	28	29	31	33	35	37	39	41	43	44	38
Target 10%	12	13	14	16	18	20	22	24	27	30	22
5 Years											
Target 0%	92	93	93	93	92	91	90	90	87	84	89
Target 4%	62	64	66	67	67	67	68	68	67	65	65
Target 6.5%	33	35	36	39	41	43	44	46	47	48	43
Target 7%	27	29	31	33	36	38	40	42	43	44	38
Target 7.5%	22	24	25	28	31	33	35	37	39	41	34
Target 10%	7	7	8	9	11	13	15	18	21	25	15
10 Years											
Target 0%	97	97	98	98	97	97	96	95	93	91	94
Target 4%	64	67	69	70	71	71	71	72	70	68	68
Target 6.5%	26	28	30	33	36	38	41	42	44	45	38
Target 7%	19	21	23	26	29	32	34	37	39	40	32
Target 7.5%	14	16	17	20	23	26	28	31	33	36	27
Target 10%	2	2	2	3	5	6	8	10	13	17	8

The table below shows the expected return by percentile for each portfolio on Frontier 2 for the 1, 3, 5, and 10 year periods.

1 Year	1	2	3	4	5	6	7	8	9	10	Actual 03/31/2021	Interim Target	Target	P1	P2	P3
1st Percentile	-16.14	-16.19	-16.58	-17.65	-18.62	-19.82	-21.06	-22.11	-25.12	-30.92	-26.49	-23.61	-22.88	-22.49	-22.71	-22.45
5th Percentile	-7.13	-7.10	-7.30	-7.74	-8.23	-8.79	-9.42	-9.99	-11.66	-14.64	-12.41	-10.86	-10.49	-10.30	-10.45	-10.15
25th Percentile	0.50	0.60	0.63	0.54	0.43	0.28	0.11	-0.03	-0.51	-1.55	-1.21	-0.59	-0.33	-0.30	-0.33	-0.22
50th Percentile	5.34	5.49	5.64	5.80	5.95	6.10	6.23	6.35	6.50	6.62	5.78	5.86	6.02	6.01	6.09	6.14
75th Percentile	10.34	10.57	10.84	11.22	11.64	12.12	12.56	12.97	13.76	15.22	13.11	12.64	12.63	12.57	12.75	12.71
95th Percentile	18.00	18.27	18.68	19.43	20.20	21.05	21.85	22.71	24.63	27.85	24.13	22.71	22.44	22.29	22.69	22.51
99th Percentile	24.13	24.48	24.98	26.08	27.34	28.71	30.01	31.12	33.84	38.75	33.42	31.42	31.05	30.92	31.27	30.74
3 Years																
1st Percentile	-7.18	-7.28	-7.42	-7.97	-8.58	-9.46	-10.36	-11.15	-13.08	-17.00	-14.15	-12.14	-11.56	-11.35	-11.62	-11.29
5th Percentile	-2.52	-2.52	-2.59	-2.88	-3.20	-3.61	-4.00	-4.40	-5.46	-7.57	-6.21	-5.10	-4.76	-4.69	-4.80	-4.58
25th Percentile	2.30	2.39	2.47	2.45	2.42	2.36	2.32	2.27	1.93	1.26	1.26	1.71	1.95	1.97	1.97	2.06
50th Percentile	5.22	5.38	5.51	5.63	5.77	5.90	6.01	6.11	6.23	6.27	5.54	5.68	5.79	5.78	5.86	5.90
75th Percentile	8.09	8.25	8.45	8.72	8.99	9.31	9.61	9.91	10.38	11.16	9.72	9.55	9.59	9.55	9.68	9.66
95th Percentile	12.30	12.52	12.82	13.31	13.82	14.43	14.94	15.51	16.59	18.38	15.96	15.26	15.19	15.09	15.31	15.26
99th Percentile	15.50	15.71	16.05	16.63	17.28	18.02	18.76	19.46	21.16	23.81	20.76	19.68	19.37	19.27	19.51	19.39
5 Years																
1st Percentile	-4.39	-4.49	-4.72	-5.09	-5.61	-6.25	-6.89	-7.59	-9.35	-12.79	-9.88	-8.38	-7.89	-7.73	-7.91	-7.74
5th Percentile	-1.06	-1.08	-1.09	-1.28	-1.50	-1.82	-2.12	-2.45	-3.34	-5.21	-4.01	-3.09	-2.83	-2.78	-2.85	-2.67
25th Percentile	2.76	2.86	2.95	2.95	2.93	2.88	2.83	2.79	2.54	1.94	1.87	2.33	2.50	2.54	2.54	2.60
50th Percentile	5.12	5.25	5.40	5.52	5.64	5.76	5.87	5.98	6.02	6.03	5.34	5.51	5.65	5.64	5.70	5.74
75th Percentile	7.39	7.54	7.72	7.94	8.19	8.45	8.69	8.95	9.35	9.92	8.67	8.58	8.65	8.62	8.71	8.71
95th Percentile	10.70	10.90	11.20	11.59	12.00	12.45	12.90	13.34	14.22	15.58	13.57	13.09	13.04	12.96	13.09	13.08
99th Percentile	12.98	13.23	13.62	14.08	14.61	15.35	16.00	16.65	17.85	19.79	17.05	16.37	16.26	16.25	16.49	16.42
10 Years																
1st Percentile	-1.46	-1.49	-1.55	-1.77	-2.00	-2.32	-2.66	-3.08	-4.09	-6.39	-4.96	-3.91	-3.59	-3.47	-3.62	-3.39
5th Percentile	0.67	0.73	0.74	0.62	0.49	0.32	0.12	-0.10	-0.73	-2.15	-1.48	-0.70	-0.46	-0.40	-0.46	-0.31
25th Percentile	3.30	3.41	3.48	3.51	3.52	3.51	3.50	3.48	3.27	2.72	2.55	2.97	3.15	3.17	3.18	3.27
50th Percentile	5.00	5.13	5.26	5.38	5.49	5.59	5.68	5.79	5.84	5.78	5.14	5.33	5.46	5.47	5.51	5.57
75th Percentile	6.69	6.84	7.01	7.19	7.40	7.61	7.81	8.02	8.31	8.72	7.63	7.63	7.71	7.70	7.79	7.81
95th Percentile	9.06	9.25	9.47	9.78	10.12	10.51	10.86	11.21	11.84	12.85	11.18	10.89	10.93	10.88	11.00	10.99
99th Percentile	10.83	11.06	11.31	11.74	12.17	12.60	13.05	13.51	14.41	15.72	13.70	13.15	13.19	13.07	13.27	13.23

The table below shows the **percentage** chance of achieving or exceeding the given return for each portfolio on Frontier 2 for the 1, 3, 5, and 10 year periods.

1 Year	1	2	3	4	5	6	7	8	9	10	Actual 03/31/2021	Interim Target	Target	P1	P2	P3
Target 0%	77	78	78	77	77	76	75	75	73	71	71	73	74	74	74	74
Target 4%	57	58	59	59	59	59	60	60	59	58	57	58	58	58	59	59
Target 6.5%	44	45	46	47	47	48	49	49	50	50	47	47	48	48	48	49
Target 7%	41	42	43	44	45	46	47	47	48	49	45	45	46	46	46	46
Target 7.5%	38	39	40	41	43	43	44	45	46	47	44	43	44	44	44	44
Target 10%	27	27	28	30	31	32	34	35	37	39	35	34	34	34	34	34
3 Years																
Target 0%	88	88	88	87	87	86	86	85	83	80	80	83	84	84	84	84
Target 4%	62	63	63	64	64	64	64	64	64	62	60	61	62	62	63	63
Target 6.5%	38	39	41	42	44	45	46	47	48	49	44	44	45	45	46	46
Target 7%	34	35	36	38	40	41	42	44	45	46	41	41	42	42	42	42
Target 7.5%	30	31	32	34	36	37	39	40	42	43	38	38	38	38	39	39
Target 10%	13	14	15	17	19	21	23	24	27	30	23	23	23	22	23	23
5 Years																
Target 0%	92	92	92	92	91	90	89	89	87	83	84	86	87	88	88	88
Target 4%	63	64	65	66	66	66	66	67	66	64	60	63	64	64	64	65
Target 6.5%	34	36	38	40	41	43	44	45	46	47	41	42	43	43	43	43
Target 7%	29	31	32	34	36	38	39	41	42	44	37	37	38	38	39	39
Target 7.5%	24	25	27	29	31	33	35	36	38	40	33	33	34	34	34	35
Target 10%	7	8	9	11	12	14	16	18	21	25	17	16	16	16	16	16
10 Years																
Target 0%	97	97	97	97	96	96	95	95	93	89	90	93	94	94	94	94
Target 4%	66	67	69	69	70	70	70	70	69	66	62	65	67	67	67	68
Target 6.5%	27	29	32	34	36	38	40	42	43	43	35	36	38	38	38	39
Target 7%	21	23	25	27	29	32	34	36	38	39	31	31	32	32	33	33
Target 7.5%	16	17	19	21	24	26	28	30	32	35	26	26	27	27	28	28
Target 10%	2	3	3	4	5	7	9	10	13	16	9	8	9	8	9	9

Appendix

Definition of terms used in this analysis:

Asset Allocation is a systematic analysis of the properties of specified asset classes to determine the allocation of those assets that meet the return targets of a portfolio.

Correlation is a statistical measure of the relationship between asset class returns. A value of 1.00 is a perfect correlation; that is, the asset classes always move in the same direction. A value of -1.00 indicates a perfect negative correlation, in which the asset classes always move in opposite directions of each other. A value of 0 indicates there is no relationship between the direction of returns of the two asset classes. Correlation calculations only consider the direction of changes relative to two variables and not the magnitude of those changes.

The **Efficient Frontier** is the set of portfolios that minimizes risk at given target levels of return. This process takes into account the risk, return and correlation of the asset classes to arrive at the most efficient set of portfolios.

Expected Equity Beta is a measure of the sensitivity of a portfolio to movements in the Large/Mid Cap US Equity market. It is a measure of a portfolio's non-diversifiable or systematic risk.

Performance Expectation is the best estimate of the average annual percentage increase in the value of an asset class over the next ten years.

Risk is quantified by the *standard deviation* of returns. Also known as the volatility of returns, it provides a statistical range of performance relative to the average expectations. With this measure, we can establish a level of "confidence" about the expected range of returns for the portfolios.

RVK Liquidity Metric is a qualitative method for determining the relative amount of liquidity in a portfolio. The characteristics considered when determining relative liquidity include trading volume, gates for redemption, leverage, nature of transactions, and pricing mechanisms. The RVK Liquidity Metric is calculated using investment weights applied to each corresponding asset class liquidity rating. See next page for more details.

Thematic Classification - Represents dedicated manager allocations; as such, thematic allocations are approximations. RVK categorizes asset classes as Alpha, Capital Appreciation, Capital Preservation, and Inflation as displayed in the table on the next page.

Custom Index Definitions:

Custom Diversified Inflation Strategies Index = 1/3 Bloomberg US TIPS + 1/3 Bloomberg Commodity + 1/3 MSCI Global Real Estate (Gross)

Custom GTAA Index = 60% MSCI ACW IMI (Gross) + 40% Bloomberg US Aggregate Bond Index

Custom Infrastructure/Farmland Index = 50% S&P Global Infrastructure + 50% MSCI World Real Estate (Gross)/NAREIT Equity REITS TR

Asset Class	Thematic Bucket	RVK Liquidity Metric
Broad US Equity	Capital Appreciation	95
Large/Mid Cap US Equity	Capital Appreciation	95
Broad International Equity	Capital Appreciation	90
Dev'd Large/Mid Cap Int'l Equity	Capital Appreciation	90
Global Equity	Capital Appreciation	90
Dev'd Small Cap Int'l Equity	Capital Appreciation	85
Emerging Markets Equity	Capital Appreciation	85
Small Cap US Equity	Capital Appreciation	85
Emerging Markets Debt (Local and Hard)	Capital Appreciation	50
High Yield Fixed Income	Capital Appreciation	5
Private Credit and Senior Secured Direct Lending	Capital Appreciation	5
Private Equity	Capital Appreciation	5
T-Bills and Treasurys	Capital Preservation	100
Cash Equivalents	Capital Preservation	98
US Aggregate Fixed Income	Capital Preservation	85
Long Duration Fixed Income	Capital Preservation	85
Low Duration Fixed Income	Capital Preservation	85
Non-US Dev'd Sovereign Fixed Income UH	Capital Preservation	50
GTAA	Alpha	88
Funds of Hedge Funds	Alpha	35
Multi-Strategy Hedge Funds	Alpha	35
Commodities	Inflation	98
TIPS	Inflation	95
Diversified Inflation Strategies	Inflation	93
Global REITs	Inflation	85
MLPs	Inflation	85
Bank Loans	Inflation	50
Core Real Estate	Inflation	25

PORTLAND

BOISE

CHICAGO

NEW YORK

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STATE OF VERMONT
VERMONT PENSION INVESTMENT COMMISSION

Attachment C: Pension Plan Funding Overview

Vermont Pension Investment Commission
Annual Report
Pension Plan Funding Overview

	VT State Teachers' Retirement			VT State Employees' Retirement			VT Municipal Employees' Retirement		
	6/30/21	6/30/20	Change	6/30/21	6/30/20	Change	6/30/21	6/30/20	Change
Fiscal Year Investment Return	24.75%	4.10%	20.65%	24.59%	3.90%	20.69%	24.32%	3.90%	20.42%
Actuarial Metrics									
Actuarial funded percentage	52.91%	51.29%	1.62%	67.56%	66.39%	1.17%	77.93%	75.80%	2.13%
Actuarial accrued liability	\$ 2,543,876,588	\$ 2,411,640,367	\$ 132,236,221	\$ 2,034,378,826	\$ 1,838,530,387	\$ 195,848,439	\$ 1,074,167,813	\$ 1,004,560,034	\$ 69,607,779
Actuarially determined employer contribution	\$ 205,161,651	\$ 196,206,504	\$ 8,955,147	\$ 125,938,400	\$ 119,967,769	\$ 5,970,631	11.31%	10.67%	0.64%
Funding policy contribution rate (VMERS only)	n/a	n/a	n/a	n/a	n/a	n/a	6.42%	6.14%	0.28%
Assumed rate of return	7.00%	7.00%	0.00%	7.00%	7.00%	0.00%	7.00%	7.00%	0.00%
Inflation assumption	2.30%	2.30%	0.00%	2.30%	2.30%	0.00%	2.30%	2.30%	0.00%
Smoothing period (years)	5	5	-	5	5	-	5	5	-
Remaining amortization period	17	18	(1)	17	18	(1)	17	18	(1)
Actuarial Gains and (Losses):									
Investment	\$ 57,785,688	\$ (21,306,964)	\$ 79,092,652	\$ 52,180,733	\$ (23,939,803)	\$ 76,120,536	\$ 21,858,431	\$ (11,255,517)	\$ 33,113,948
Net turnover	(10,518,767)	(21,770,846)	11,252,079	3,446,914	(2,812,974)	6,259,888	(1,910,229)	(6,643,287)	4,733,058
Retirement	(16,872,089)	(24,972,035)	8,099,946	(19,015,951)	(8,892,489)	(10,123,462)	(2,674,401)	(4,895,347)	2,220,946
Mortality	1,761,346	(3,335,043)	5,096,389	(4,440,365)	3,692,473	(8,132,838)	515,840	(3,822,241)	4,338,081
Disability retirements	(560,942)	(53,881)	(507,061)	(158,342)	(434,494)	276,152	(192,529)	(108,472)	(84,057)
Salary increases and service increases	9,493,027	10,408,437	(915,410)	(4,448,937)	(3,697,977)	(750,960)	1,670,345	5,013,461	(3,343,116)
COLA experience	(22,593,555)	8,838,015	(31,431,570)	(35,588,639)	23,969,841	(59,558,480)	(4,281,130)	3,060,227	(7,341,357)
Miscellaneous	(6,407,934)	(6,226,388)	(181,546)	(3,195,329)	(2,407,484)	(787,845)	407,804	(2,305,236)	2,713,040
Net experience gain/(loss)	\$ 12,086,774	\$ (58,418,705)	\$ 70,505,479	\$ (11,219,916)	\$ (14,522,907)	\$ 3,302,991	\$ 15,394,131	\$ (20,956,412)	\$ 36,350,543