



**STATE OF VERMONT
OFFICE OF THE STATE TREASURER**

TO: Vermont Pension Investment Committee
FROM: Eric Henry
RE: Capital market assumptions, expected returns, actuarial assumed rates of return, and pension liabilities and contributions
DATE: January 15, 2021

As Treasurer Pearce continues her discussion of pension liabilities with stakeholder groups in anticipation of the legislative session, I thought it might be helpful to review some of the dynamics among VPIC's investment strategy and expected returns, the ultimate pension liability discount rate, and our funding approach.

VT Retirement Systems' actuary conducts actuarial valuations annually and experience studies every five years:

Annually, Segal, the actuary for the three statewide pension Plans tabulates demographic data for all members and retirees and calculates a pension liability. This is essentially 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 liability to the members and beneficiaries of the Plans that must be made up by future investment returns and current and future contributions from both members and their employers.

To illustrate the importance of investment earnings in funding public sector defined benefit Plans, we looked at funding sources for nationwide public pensions from 1998-2018 and found the following breakdown:

Investment earnings	63%
Employer contributions	26%
Employee contributions	11%

As investment earnings 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.

Actuarial factors drive portfolio design:

Annually, VPIC conducts an asset allocation study with its investment consultant to assure 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 minimal cost to taxpayers, 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 dictate prudent limits on illiquidity and risk, both of which drive investment returns.

VPIC evaluates these factors among three broad classes of investments: growth assets, downturn-hedging assets, and inflation-hedging assets. 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, and correlation to each component and runs Monte Carlo simulations. Such analysis shows VPIC how each model scenario is expected to perform on a number of metrics over the long-run and gives VPIC important insights into expected investment return, cash flows, funded status, 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 impacted by events like periods of high inflation, falling interest rates, high growth, low growth, and other abnormal trends. Further, more amplified 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 testing on the portfolios under consideration. The intent of this analysis is not to forecast any certain future trend; rather, it is to better understand the tradeoffs among alternative portfolios during different economic scenarios and market dislocations.

Capital market assumptions project the portfolio's expected return over the long run:

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

VPIC's current target portfolio, using its current consultant's (RVK) capital market assumptions, is expected to generate a long-term (10-year) return of 6.5%, again, if all of the capital market assumptions in the model come to fruition. VPIC's prior consultant's (NEPC) capital market assumptions led to a bifurcated expected return of 6.7% in the intermediate term (10-year) and a long-term (30 year) of 7.2%. The pension Plans' actuary (Segal) reviewed a representative sample of capital market assumptions throughout the industry and recommended a range of 7%-7.25%.

While there is some dispersion among the different sources of capital market assumptions, there has been a consistent downward trend lower over the past 20 years.

The actuarial assumed rate of return incorporates actuarial recommendations and capital market assumptions but is ultimately a deliberative process by the three statewide pension Plan boards and VPIC:

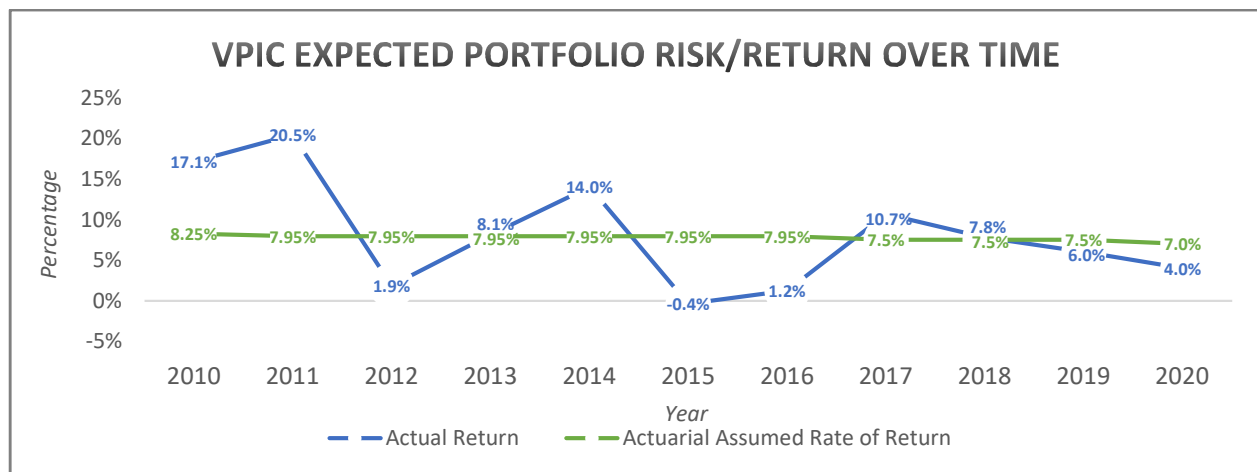
Nationwide, we have seen a gradual decline in actuarial assumed rates of return for public pension Plans. From 2002-2018, the average U.S. public pension Plan assumed rate of return declined from 8.05% to

7.22%. 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.

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). In order to effect a change to the rate, the three statewide pension Plan boards and VPIC convene jointly to receive the actuary’s analyses and recommendations, then vote separately on the recommendations. The rate can only be changed by a positive vote of all four bodies convened in a joint session.

Recent market volatility highlight returns’ end-point sensitivity:

VPIC does not view its capital market assumptions, expected rate of return, or the actuarial assumed rate of return as a forecast of future returns, especially over short periods of time. Instead, it uses these factors to better understand the tradeoffs among a variety of model efficient portfolios over varying economic 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 for the past 11 fiscal years.



To highlight this point, consider the 4.0% return for fiscal year ended June 30, 2020. While above median of peers, it fell short of the 7.5% actuarial assumption. Only five months later, on November 30, 2020, the VPIC’s one year return was 11.7%, well ahead of the 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 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 in efficient markets. Because most passive indices are investable at a very low fee, the bar is high for active managers and their higher fees. VPIC has transitioned 63% of the portfolio to low-cost index funds and takes active bets with the remainder where they have strong conviction in market returns.

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 in the terminated Allianz Structured Global Alpha product.

Illiquidity premium increases returns: Illiquid assets (e.g. private equity, private credit, and non-core real estate) have a proven ability to outperform their public market equivalent benchmarks given their illiquidity premium. Accordingly, we have targeted 23% of the fund to illiquid growth assets and are systematically building them out over a prudent number of vintage years to construct a diversified private market portfolio.

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. Illiquid assets cannot be readily monetized to pay retirement benefits, so public securities are needed 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. The VPIC allocates capital to the "downturn-hedging" asset classes for its short-term liquidity needs.

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 (average 2.5 bps), we also allocate to active managers we have conviction have the any ability to consistently 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 watch list process for dealing with those that fall short of expectations.

Conclusion:

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. Instead of just seeking to maximize investment returns, we are tasked with strategically aligning the portfolios with the pension funds' 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 VT taxpayers.