Pennsylvania Municipal Retirement System

Long-Term Expected Rate of Return on Plan Assets

GASB 68 Report: December 31, 2023 Measurement Date

The PMRS System's long-term expected real rate of return on pension plan investments was determined using a building-block method in which best-estimates of expected future nominal rates of return (net of investment expenses) are developed for each asset class. These returns are combined to produce the System's Long-Term Expected Real Rate of Return by calculating the weighted average return for each asset class using each respective target asset allocation percentage and multiplying by the expected future nominal rate of return, while also factoring in covariance across asset classes, then deducting expected inflation (2.5%). Best estimates of geometric real rates of return for each utilized asset class are included in the pension plan's target asset allocation as of December 31, 2023 and summarized in the table below labeled "System Nominal Net and Real Rates of Return by Asset Class."

System Nominal Net and Real Rates of Return by Asset Class

Asset Class	Target Asset Allocation	Nominal Net Rate of Return	Long-Term Expected Real Rate of Return
Domestic Equities (large-capitalized firms)	24.5%	7.39%	4.89%
Domestic Equities (small-capitalized firms)	8%	8.30%	5.80%
International Equities (international developed markets)	14.5%	7.68%	5.18%
International Equities (emerging markets)	3%	8.39%	5.89%
Global Equities	5%	6.61%	4.11%
Real Estate	10%	6.38%	3.88%
Timber	5%	5.75%	3.25%
Fixed Income (Core Investment Grade)	24%	5.01%	2.51%
Fixed income (Opportunistic Credit)	5%	6.95%	4.45%
Cash	1%	3.39%	0.89%
Total Portfolio	**100%**	**7.31%**	**4.81%**

Based on the aforementioned methodology, the Board established the System's Long-Term Expected Rate of Return at 7.31%.

In addition to determining the System's Long-Term Nominal Expected Rate of Return, the PMRS Board, under the laws of the Commonwealth of Pennsylvania (Act 15 of 1974), is obligated to develop and apply the Regular Interest Rate to each of the individual participating municipalities' actuarial asset accounts held by PMRS. The rationale for the difference between the System's Long-Term Nominal Expected Rate of Return and the individual participating municipalities' Regular Interest Rate is described in the following section "Discount Rate." As of December 31, 2023, this rate is equal to 5.25%.

The Board has determined the minimum acceptable confidence level for achieving the Regular Interest Rate to be 60%. The table below labeled "Confidence Levels for System Nominal Net and Real Rates of Return" identifies simulated portfolio returns at various confidence levels based on the most recent asset allocation study conducted by the Boards' investment consultant, Marquette Associates.

Confidence Levels for System Nominal Net and Real Rates of Return

Confidence Interval	Nominal Net Rate of Return	Long-Term Expected Real Rate of Return
95%	4.07%	1.57%
90%	4.87%	2.37%
85%	5.33%	2.83%
80%	5.72%	3.22%
75%	6.03%	3.53%
70%	6.35%	3.85%
60%	6.87%	4.37%

Discount Rate

While it is often common practice to establish an actuarial Discount Rate that is equal to the Long-Term Expected Nominal Rate of Return, PMRS is required by law (Act 15 of 1974) to establish a Discount Rate equal to the Regular Interest Rate (Regular Interest Rate / Discount Rate). The PMRS Board establishes the Regular Interest Rate / Discount Rate on the basis of expected stable and consistent earnings on investments to be applied to the accounts of the individual participating municipalities and includes the accounts of plan participants, municipalities, and plan retirees each year. As a starting point, the Board considers the following five quantitative factors in reviewing the Regular Interest Rate / Discount Rate:

1.) Retiree Plan liability as a percentage of total Plan liability,
2.) Active Plan participant liability as a percentage of total Plan liability,
3.) Smoothed annuity purchase rates (Pension Benefit Guarantee Corporation (PBGC) annuity rates have been used as a proxy for this)
4.) PMRS System Long-Term Expected Nominal Rate of Return, and
5.) PMRS investment expenses

A formula using these factors is as follows:

Regular Interest Rate / Discount Rate = (Retiree Liability Percentage x Smoothed PBGC Annuity Rates) + (Active Employee Liability Percentage x System Long-Term Expected Rate of Return) - (Investment Expenses as a percentage of assets)

The Board then considers the Regular Interest Rate / Discount Rate derived from the above formula against a variety of qualitative factors such as the desire to minimize Regular Interest Rate / Discount Rate volatility, probability of achieving the Regular Interest Rate, varying levels of asset allocation and liquidity, trending of annuity rates, total PMRS actuarial and market value funding ratios, feedback from existing

PMRS municipalities, and recommendations from the System's investment and actuarial consultants. The Regular Interest Rate / Discount Rate adopted by the Board and used to measure the individual participating municipalities' total pension liability was 5.25% as of December 31,2023.

The Regular Interest Rate / Discount Rate will likely be less than the System Long-Term Expected Rate of Return. Should the System experience a prolonged period of investment returns in excess of the Regular Interest Rate / Discount Rate, the Board is authorized to allocate any applicable portion of any such excess in accordance with Board policies in the form of Excess Interest as provided for in the law.

The projection of cash flows for each underlying municipal plan, used to determine if any adjustment to the Regular Interest Rate / Discount Rate was required ("depletion testing"), used the following assumptions: 1.) member contributions will be made at the current contribution rate, 2.) participating plan sponsor contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate, and 3.) the System's Long-Term Expected Rate of Return will be used in the depletion testing of projected cash flows. Based on those assumptions, the PMRS pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members.