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January 27, 2017

Ms. Susan Lenczewski
Executive Director
State of Minnesota
Legislative Commission on Pensions and Retirement
100 Rev. Dr. Martin Luther King Jr. Blvd.
St. Paul, Minnesota 55155

Subject: Review of July 1, 2017 Minnesota Retirement Systems' Recommended Investment Return Assumptions

Dear Susan:

Per your request we have reviewed the Minnesota retirement systems' proposed investment return assumptions (used to discount projected benefit payments, report plan liabilities and funded status, and actuarially determined contribution rates) for the upcoming July 1, 2017 actuarial valuations. It is our understanding the proposed investment return assumptions below have been approved by the respective systems. A comparison to prior valuation assumptions is included for context.

	Actual July 1, 2016		Proposed July 1, 2017	
System	FYE17	FYE18+	FYE18 - FYE22	FYE23+
Minnesota State Retirement System (MSRS)	8.00%	8.00%	7.50%	7.50%
Public Employees Retirement Association (PERA)	8.00%	8.00%	7.50%	7.50%
Teachers Retirement Association (TRA)*	8.00%	8.50%	7.50%	8.00%

**We understand that TRA is planning to conduct a thorough study of economic assumptions within the next three to five years to determine whether a long-term decrease to the investment return assumption is appropriate. After that study is completed the investment return assumption may be updated.*

Summary of Findings

We believe the proposed assumptions above are within a reasonable range for the long-term expectation of returns based on the target asset allocation of the plans and are supportable based on available information. Shifting to a more conservative investment return assumption increases actuarially determined contributions in the near-term; however, it reduces contribution rate risk and insolvency risk and is consistent with changes being made by other statewide retirement systems across the country.

While we find these assumptions to be generally reasonable, we do have a concern with the proposal of using different rates of return across the plans. Considering that assets of all three retirement systems are invested using consistent asset allocations by SBI, the inconsistency in the investment return assumption among retirement systems could be detrimental to legislative decision-making and transparency to the public. The following sections will detail our review and recommended changes to the proposed assumptions.

- 2008 – 2014 Experience Study Review of Investment Return Assumption
- Implementation of Experience Studies
- Investment Return Data Update
- Analysis
- Recommendations

2008 – 2014 Experience Study Review of Investment Return Assumption

The July 1, 2016 investment return assumptions for MSRS and PERA are based on the 2008 – 2014 Experience Study for each system (the Experience Studies). The TRA's board also recommended a change in investment return assumption resulting from their Experience Study be implemented, but that change was not effective due to Governor Dayton's veto of the 2016 Omnibus Retirement bill.

Our review of the 2008 – 2014 Experience Study (the Experience Study Review) supported the rates recommended; although, in the case of MSRS and PERA, we used supporting data outside of that provided by the retained actuary. Therefore, our approach in reviewing the proposed assumption changes is to consider data and information obtained since we last validated the retained actuaries' recommendations in the Experience Study Review, to determine if the proposed changes are supported.

The 2008-2014 Experience Studies performed by the retained actuaries of the three largest systems (MSRS, PERA, and TRA) recommended the following investment return assumptions:

System	Recommended Investment Return Assumption
MSRS	7.00% - 8.00%
PERA	7.00% - 8.00%
TRA	8.00%
SPTRFA	N/A

During our Experience Study Review a number of external data sources were considered in validating each systems' investment return assumption. Because a building-block approach was used in determining the investment return assumption, both inflation and real returns were estimated by the actuaries and reviewed by us.

Inflation

The inflation assumption was reduced from 3.00% to 2.75% effective July 1, 2016 by all systems. Our understanding is this component of the investment return assumption is not driving the proposed assumption change. Therefore, we have instead focused on the changes in real return to validate the revised investment return assumption.

Real Return

Our validation of the real return for all systems relied largely on the following source data:

- Capital market expectations of the State Board of Investment (SBI)
- Capital market expectations of external investment firms
- Assumptions of other public sector plans
- Actual SBI rates of return

Implementation of Experience Studies

Based on the Experience Studies performed for each system, a single investment return (8.00%) was approved by the respective boards effective for the July 1, 2016 actuarial valuation.

System	Board-Approved effective July 1, 2016
MSRS	8.00%
PERA	8.00%
TRA	8.00%

Both PERA and MSRS implemented the approved assumption above, while TRA was prevented from doing so when Governor Dayton vetoed the 2016 Omnibus Retirement bill.

Investment Return Data Update

A single additional year of actual returns earned by funds managed by the SBI would not significantly impact the analysis to support a long-term investment return assumption. Therefore, we have focused primarily on how, if at all, the other three data sources considered during our review of the 2008-2014 Experience Studies have changed since our initial review of those reports. A summary of external data changes since our 2008-2014 Experience Study Review of Retirement Systems dated May 2016 is provided below.

Capital Market Expectations – Callan / SBI

As noted in our Experience Study Review, the SBI provided the three largest retirement systems with a memo on July 22, 2014 outlining its asset allocation and capital market assumptions, including a 30-year expected geometric rate of return.

Since that review, Callan Institute completed an Asset/Liability Study and presented it to the Investment Advisory Panel on May 17, 2016. The time horizon for that study was shorter term, but it serves as a data point for consideration. A summary of the projected returns compared to the SBI's 30-year expected return is below.

	Real Return	Inflation	Expenses	Nominal Return (total)
SBI Capital Market Expectation	5.36%	3.00%	-0.11%	8.25%
Callan Asset/Liability Study	5.05%	2.25%	N/A	7.30%

Because Callan's study spans a different projection period and contains a different assumption regarding inflation, its primary value is in its estimate of real return. Using the systems' assumptions for inflation and the SBI's assumption for expenses, the 5.05% real return implies a nominal return of 7.69% (5.05% + 2.75% -0.11%) over the next 10 years. The study does not comment on whether it expects market returns to improve after year 10.

Another valuable data point from this study is that Callan estimated the likelihood of achieving an 8.0% investment return over the next 10 years was approximately 45%. That estimate did not include an adjustment for 'alpha', which is an estimate of excess returns above asset class benchmarks. Based on SBI's investment performance over the last several years, an adjustment for alpha could be reasonable.

Capital Market Expectations – Survey by Horizon Actuarial Services, LLC

Horizon Actuarial Services, LLC (Horizon) annually publishes a survey of investment firms' capital market expectations. Below is a summary of the survey's results in 2015 compared to 2016.

Asset Class	Average Nominal Return *		
	2015	2016	Change
US Equity – Large Cap	9.18%	9.25%	0.07%
US Equity – Small/Mid Cap	10.15%	10.40%	0.25%
Non-US Equity - Developed	9.80%	9.77%	-0.03%
Non-US Equity – Emerging	12.26%	12.46%	0.20%
US Corporate Bonds – Core	4.58%	4.75%	0.17%
US Corporate Bonds – Long Duration	5.27%	5.58%	0.31%
US Corporate Bonds – High Yield	6.93%	7.40%	0.47%
Non-US Debt – Developed	3.70%	4.01%	0.31%
Non-US Debt – Emerging	6.85%	7.20%	0.35%
US Treasuries (Cash Equivalents)	3.14%	3.18%	0.04%
TIPS (Inflation-Protected)	3.65%	4.27%	0.62%
Real Estate	7.42%	7.75%	0.33%
Hedge Funds	6.40%	6.59%	0.19%
Commodities	6.32%	6.47%	0.15%
Infrastructure	8.39%	8.26%	-0.13%
Private Equity	12.85%	12.94%	0.09%
Inflation	2.30%	2.31%	0.01%

**Expected return for the 20-year time horizon for those consultants that responded to the survey with long-term assumptions, as noted in Exhibit 14 of the Horizon Actuarial 2016 Survey of Capital Market Assumptions.*

The survey data indicates that, in aggregate, investment firms' long-term capital market expectations have improved over the last year. The magnitude of the improvement depends on the investment allocation of a pension plan. Below is our calculation of the geometric mean return based on the expected nominal returns above combined with SBI's target asset allocation:

	2015	2016	Change
Geometric Mean Return	8.27%	8.45%	0.18%

Therefore, for assets invested according to the SBI's target allocation, the capital market expectations seem to imply a small improvement (0.18%) in expected investment return over the next 20 years.

Survey of Public Sector Retirement Plans - NASRA

The National Association of State Retirement Administrators (NASRA) compiles and publishes data from 127 large public sector retirement plans. The table below shows the median investment return assumption for those plans as of today, compared to the data available when we reviewed the 2008 – 2014 Experience Study.

NASRA	FYE13	FYE14 (or later)	Change
Median Assumption	7.75%	7.62%	-0.13%

As the NASRA data illustrates, public sector plans are becoming increasingly conservative in their investment return assumptions. This does not necessarily indicate that actual investment returns have been lower than actuaries have assumed. In fact, in an Issue Brief published in February of 2016, NASRA notes that for the 25-year period ending December 31, 2015 the median actual annual public pension fund investment return was 8.30%, significantly higher than the 7.62% median noted above.

The NASRA data does not adjust for whether plans are open or closed, nor does it adjust for investment allocation. Because the SBI is managing assets for open plans with a somewhat aggressive investment approach, the plans surveyed may have reason to be more conservative with their assumptions than the Minnesota plans.

Analysis

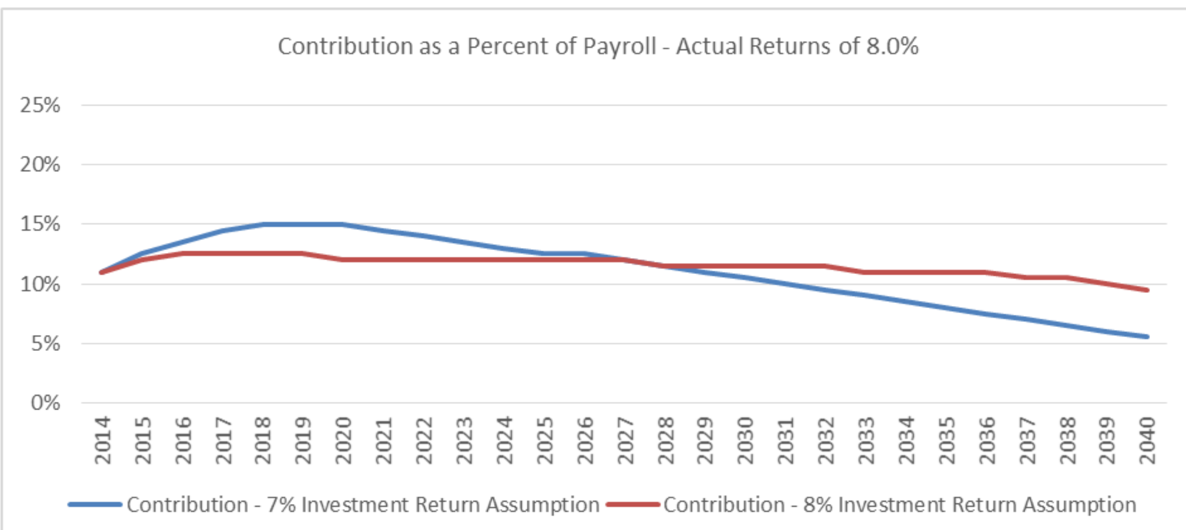
Investment Return Assumption Change Support

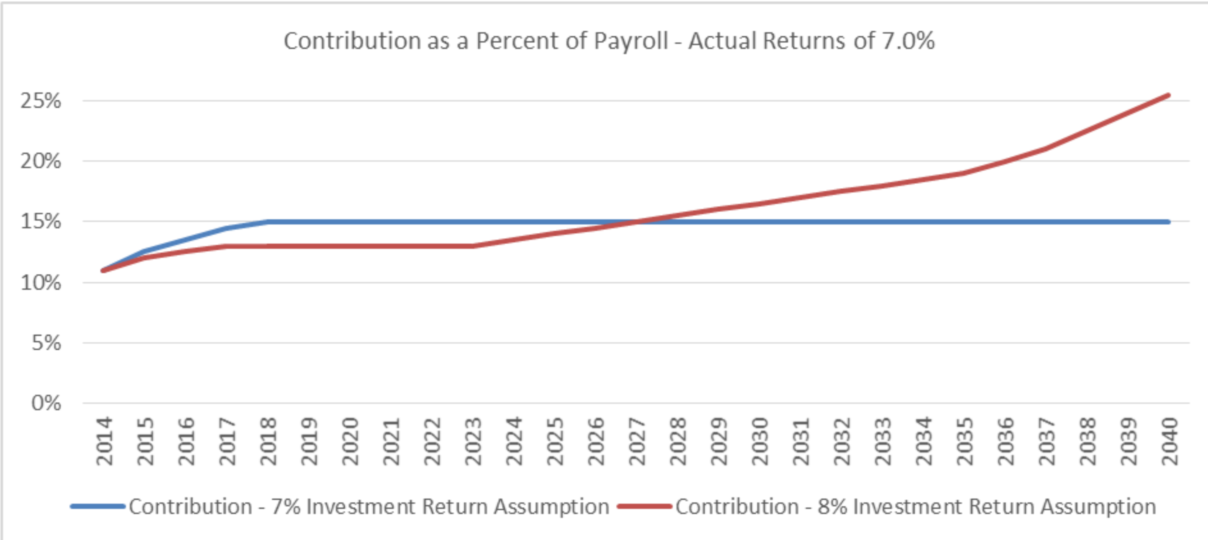
Overall, changes in the landscape of expected investment returns for public sector plans since our Experience Study Review are mixed. Capital markets broadly appear slightly more bullish, while the SBI's investment return outlook, at least in the short-term, is more bearish. Meanwhile, public sector plans continue to be more conservative in their investment return assumption. To what extent that reflects a shorter investment horizon due to closing plans, or a more conservative investment approach, is unclear.

While recent changes in investment return expectations may be generally mixed, the support provided by the retained actuaries in the Experience Studies alone could be used to justify a 7.50% investment return assumption even without a change in capital markets. The retained actuary for MSRS and PERA explicitly provided a range of 7.00% to 8.00% for MSRS and PERA. Although we disagreed with how they developed the top end of that range because it was based on an arithmetic mean of its own capital market assumptions model, we did agree that the low end, which was based on the geometric mean of that same model. And while the retained actuary for TRA made a point estimate recommendation of 8.00%, they did note that the SBI asset/liability study was in process at the date of the issuance of their report, and that they may suggest that recommendations in their study be reviewed based on the results of the asset/liability study.

Other Incentives to Reduce the Investment Return Assumption

In general, lowering the investment return assumption increases actuarially determined contributions in the near-term (assuming no funding policy changes), but reduces contribution rate risk and insolvency risk. This can be illustrated by the preliminary contribution projections we performed on the MSRS plan in 2015. Although the approximations are somewhat out-of-date, the results demonstrate that a more conservative investment return assumption reduces the likelihood and magnitude of further increases in the contribution rate over time.





Select and Ultimate Investment Return Assumption - TRA

The select and ultimate investment return assumption is specifically noted as acceptable in ASOP 27 Section 3.8.4 and we do not take issue with its use. One could argue that the somewhat lower short-term real return estimated by Callan supports this method. However, we do note that using a select and ultimate investment return assumption poses a potentially significant challenge.

Primarily, the LCPR and general public will have a more difficult task in comparing retirement plans across systems because of differing investment return assumptions. Comparison of funded status, contribution excesses and shortfalls, and overall plan health will be more challenging for the LCPR, and decision-making will become more difficult. Assets for all systems are invested uniformly by the SBI and the public may expect this to result in a uniform investment return assumption. Although we recognize that retirement systems and their retained actuaries may develop different assumptions for the same asset allocation, the LCPR must weigh the benefit of uniform reporting with the autonomy of the retirement systems.

Recommendations

Overall, we believe that the investment return assumptions selected by each of the retirement systems could individually be reasonable and supported by the data provided in each system's Experience Study and subsequent developments in the capital markets. However, we believe there is significant public benefit to aligning the investment return assumption across retirement systems. For this reason we recommend the systems work collaboratively with the SBI and LCPR to develop a single investment return assumption for application across all systems. We recognize that formally implementing this governance structure would require a change in state statute, but a less formal agreement would benefit the public interest.

I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

I am available if you have any questions or would like to discuss our review and recommendations further.

Sincerely,

Michael de Leon, ASA, EA, FCA, MAAA
Specialist Leader

cc: Rachel Barth, Minnesota Legislative Commission on Pensions and Retirement
Judy Stromback, Deloitte Consulting
Phillip Souzek, Deloitte Consulting