

Annual Asset Allocation Review

Asset Study Comparison: 2020 vs. 2019 Projections

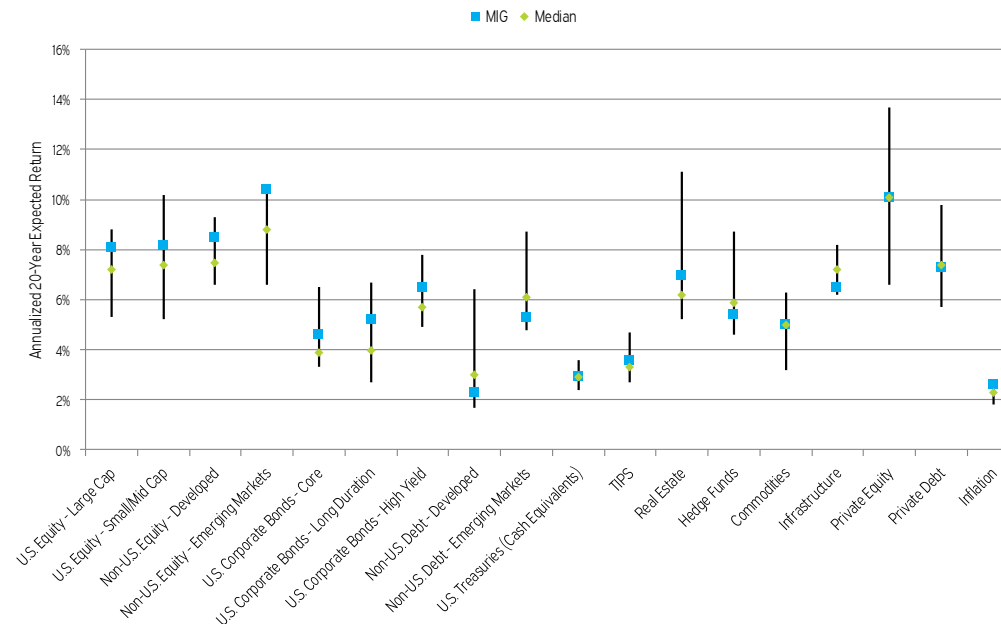
Asset Allocation Review Introduction

- The purpose of this review is to ensure the Retirement System's long-term asset allocation targets are still reasonable and prudent moving forward.
- The backbone of the analysis is based on a modeling technique called Mean Variance Optimization (MVO).
- MVO analysis seeks to predict what the long term expected return will be based on a selected asset mix.
- In the first quarter of each year, Meketa Investment Group typically prepares its capital market assumptions which serve as the backbone of the MVO analysis.
- The capital market assumptions seek to predict individual asset class returns and volatility over the next twenty year period.
- Today Meketa Investment Group will review what impact the new forecasts have on the Retirement System's asset allocation.

Peer Industry Review

- Annually the Horizon Actuarial Survey compares asset class assumptions for over 30 investment consulting firms. The analysis is a good “sanity-check” to compare Meketa Investment Group’s asset class forecasts to the forecasts of our industry peers.
- Below is the summary of last year’s survey. The 2020 version is typically released in August.

Meketa 2019 Asset Study vs. Horizon 2019 Survey



Horizon Survey Participants

- The following firms participated in the 2019 Horizon Survey.

Arthur J. Gallagher & Co.	Marquette Associates
Alan D. Biller and Associates	Meketa Investment Group
AndCo Consulting, LLC	Merrill Lynch Global Institutional Consulting
Aon Hewitt	Morgan Stanley Wealth Management
The Atlanta Consulting Group	New England Pension Consultants (NEPC)
Bank of New York Mellon	Pavilion Advisory Group
BlackRock	Pension Consulting Alliance
Callan Associates	PFM Asset Management, LLC
Cambridge Associates	RVK
CapTrust	Segal Marco Advisors
Ellwood Associates	SEI
Envestnet	Sellwood Consulting
Goldman Sachs Asset Management	Summit Strategies Group
Graystone Consulting	UBS
Investment Performance Services, LLC (IPS)	Verus
Janney Montgomery Scott, LLC	Voya Investment Management
J.P. Morgan Asset Management	Willis Towers Watson

Building our forecasts

- Our first step is to develop 10-year forecasts based on fundamental models.
 - Each model is based on the most important factors that drive returns for that asset class:

Asset Class Category	Major Factors
Equities	Dividend Yield, GDP Growth, Valuation
Bonds	Yield to Worst, Default Rate, Recovery Rate
Real Estate	Cap Rate, Yield, Growth

- The common components are income, growth and valuation.

Moving from 10-year to 20-year Forecasts

- Our next step is to combine our 10-year forecasts with the historical returns for each asset class.
 - How much we weight each depends on our confidence in them (both the model & the data).
 - The 10-year model weighting varies between 50% and 100%.
 - It only hits 100% when there is a lack of reliable historical data.
- We then infer a forecast of 10-year returns in ten years (i.e., years 11-20).
 - This allows us to test our assumptions with finance theory.
 - Essentially, we assume mean-reversion over the first ten years (where appropriate), and consistency with CAPM thereafter.
- The final step is to make any qualitative adjustments.
 - The Investment Committee reviews the output and may make adjustments.

The other inputs: standard deviation and correlation

- **Standard deviation:**
 - We review the trailing fifteen-year standard deviation, as well as skewness.
 - Historical standard deviation serves as the base for our assumptions.
 - If there is a negative skew, we increased the volatility assumption based on the size of the historical skewness.

Asset Class	Standard Deviation	Skewness	Assumption
Bank Loans	6.6%	-2.3	9.0%

- We also adjust for private market asset classes with “smoothed” return streams.
- **Correlation:**
 - We use trailing fifteen-year correlations as our guide.
 - Again, we make adjustments for “smoothed” return streams.
- Most of our adjustments are conservative in nature (i.e., they increase the standard deviation and correlation).

Current Asset Allocation Policy

	Target (%)	Ranges (%)
US Equity	30	20-40
International Developed Non-U.S. Equity	13	8-18
Emerging Markets Equity	10	5-15
Investment Grade Bonds	20	10-30
TIPS	7	2-12
High Yield Bonds	6	0-10
Foreign Bonds/EM Debt	5	0-10
Private Debt	3	0-6
Core Real Estate	6	0-10
Total	100	

Annual Asset Study

- The following table illustrates the changes in expected return for each sub asset class that the Retirement System is invested in.

Expected Return Assumptions

	2019 Study Return Assumptions (%)	2020 Study Return Assumptions (%)	Return Difference (%)	Notes
US Equity	8.1	7.4	-0.7	Higher prices
International Developed Non-U.S. Equity	8.5	7.9	-0.6	Lower dividend yields, higher prices
Emerging Markets Equity	10.4	9.1	-1.3	Lower dividend yields, higher prices
Investment Grade Bonds	3.9	3.0	-0.9	Lower yields
TIPS	3.6	2.9	-0.7	Lower real yields
High Yield Bonds	6.5	5.2	-1.3	Lower yields and much tighter spreads
Foreign Bonds/EM Debt	5.3	4.7	-0.6	Lower yields
Private Debt	7.3	6.9	-0.4	Lower yields
Core Real Estate	5.8	6.3	+0.5	Lower cost of borrowing is positive for returns
Retirement System's Expected Return¹	7.4	6.7	-0.7	

¹ Twenty year annualized forecast.

Expected Risk Assumptions

- The following table illustrates the changes in expected standard deviation for each sub asset class that the Retirement System is invested in.
 - For the 2020 Asset Study, we did not make any changes in expected standard deviation (risk).

	2019 Study Risk Assumptions (%)	2020 Study Risk Assumptions (%)	Risk Difference (%)
Public Domestic Equity	17.0	17.0	0.0
International Developed Non-U.S. Equity	19.0	19.0	0.0
Emerging Markets Equity	24.0	24.0	0.0
Investment Grade Bonds	4.0	4.0	0.0
TIPS	7.0	7.0	0.0
High Yield Bonds	11.0	11.0	0.0
Foreign Bonds/EM Debt	12.0	12.0	0.0
Private Debt	15.0	15.0	0.0
Core Real Estate	11.0	11.0	0.0
Retirement System's Expected Risk¹	11.3	11.3	

¹ Twenty year annualized forecast.

Summary

- The Retirement System generated a net return in 2019 of nearly 17% (well above typical year expectations).
- Return expectations for all assets (except real estate) decreased year-over-year as a result of a variety of factors.
 - Higher prices and valuations for public equities resulting in lower forward looking return expectations
 - Lower yields for fixed income
- Risk expectations remained the same for all asset classes.

2019 vs. 2020 Comparison

	Expectations based on 2019 Asset Study (%)	Expectations based on 2020 Asset Study (%)	Difference From Prior Year (%)
Expected Return	7.4	6.7	-0.7
Standard Deviation	11.3	11.3	0.0

Recommendation

- We would be pleased to discuss these forecasts with the Board at the February 2020 meeting.
- Despite the larger than typical change in expectations, we would not recommend increasing the return/risk profile for the System at this time.