Asset/Liability Study

Introduction

Texas Municipal Retirement System
Asset/Liability Studies

Introduction

- Section XIII. B. 1. c) of the TMRS Investment Policy Statement states that a formal pension financial (asset-liability) study will be conducted at least every 5 years. The last study was presented to the Board in September 2011.

- These studies are typically completed every 3 to 5 years, or when major changes occur in:
  - Capital markets
  - Liability structures
  - Contribution policies
  - Benefit changes

- This presentation is an introductory overview of what Asset/Liability Studies are, why a plan should conduct one, what is included, and what to expect.
Investment Decision Process

- Total Plan Assets vs. Plan Liabilities
- Funding Ratio
- A/L Study
- Total Plan Assets (100%)
- AA Study
- US Equity (X%)
- Structure Study
- Large Cap (X%)
  - Manager X ($) - Manager Y ($) 100%
- Small Cap (X%)
- International Equity (X%)
  - Structure Study
  - Developed (X%)
  - Manager X ($) 100%
  - Manager Y ($) 100%
- Emerging (X%)
- Fixed Income (X%)
  - Structure Study
  - Investment Grade (X%)
  - Manager X ($) 100%
  - Manager Y ($) 100%
- High Yield (X%)

50% 50% 50%
Asset/Liability Studies

What are they?

- Asset/Liability Studies are:
  - A tool to examine how well alternative investment strategies (differing asset allocations) address the objectives served by the fund – the fund’s “liabilities”.
  - A “guidepost” for the target asset allocation of the fund.
  - The gold standard for assessing the health of a pension plan (or prefunded long-term financial commitment).
Asset/Liability Studies
What are they?

• Asset/Liability Studies are **not**...
  – An actuarial study.
  – A prescription for plan benefits.
  – An assessment of the affordability of contribution levels.
  – An implementation plan for specific asset classes.
  – The sole determinant of the final asset allocation adopted by a fund.
  – A determinant of the target rate of investment return, but may be
    one of the factors that influence it indirectly.
Asset/Liability Studies

What are they?

- Asset/Liability Studies are the only standard analysis that fully link all three aspects of a Plan’s key financial drivers – Investment Policy, Contribution Policy, and Benefit Policy.
Asset/Liability Studies

Why Conduct One?

• To help determine the appropriate risk and return levels the Plan should target when setting asset allocation targets

• If the Plan suffers a sustained period of lower returns in the capital markets (and thus for the Plan’s assets)

• If the Plan experiences material changes in contribution policy or benefit levels

• If the Plan faces liquidity and cash flow issues
Asset/Liability Studies

What are the objectives?

- Objectives of Asset/Liability Studies
  - To present projected valuation results of the Plan with respect to the funded status of the Plan, including minimum required contributions, but particularly in the context of current and alternative expected long-term fund returns.
  
  - To present projected benefit payments of the Plan, but particularly in the context of current expected and alternative long-term fund returns.
  
  - To estimate liquidity demands on the Plan’s assets in the context of current expected and alternative long-term fund returns.
  
  - To investigate asset allocation mixes to determine those which best serve to protect or increase funding levels, while providing adequate liquidity for benefit payments and minimizing associated risks.
# Comparison

## Asset/Liability vs. Asset Allocation vs. Experience Studies

<table>
<thead>
<tr>
<th></th>
<th>Asset/Liability Studies</th>
<th>Asset Allocation Studies</th>
<th>Experience Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td>Guide in the Selection of a Target Allocation</td>
<td>Select a Target Allocation</td>
<td>Set Demographic and/or Economic Actuarial Assumptions</td>
</tr>
<tr>
<td><strong>Portfolios Modeled</strong></td>
<td>Guideposts for Directionality Impact of Changing Risk/Return Profile of Portfolio</td>
<td>Specific Recommended Target Allocations</td>
<td>Target and/or Current Allocations (as they relate to investment return assumption)</td>
</tr>
<tr>
<td><strong>Liabilities Modeled</strong></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Range of Possible Outcomes Modeled</strong></td>
<td>Investment Returns, Funded Ratios, Contributions, Liquidity Demands</td>
<td>Investment Returns Only</td>
<td>Projected Change in Liabilities and Associated Costs</td>
</tr>
<tr>
<td><strong>Typical Frequency</strong></td>
<td>Every 3 to 5 Years</td>
<td>Every 1 to 3 Years</td>
<td>Every 3 to 5 Years</td>
</tr>
<tr>
<td><strong>Asset Allocation Implementation Specificity</strong></td>
<td>Low</td>
<td>High</td>
<td>None</td>
</tr>
</tbody>
</table>
Asset/Liability Studies
What do they consist of?

• Deterministic Forecast
  – Provides an analysis of Plan assets, liabilities, funded status, and benefit payments based on a fixed set of future assumptions.

• Stochastic Forecast
  – Analyzes Plan assets, liabilities, funded status, and benefit payments under many capital market environments based on expected asset returns, inflation, and their expected volatility.

  – Answers questions about the best/worst case outcomes along with the probability of such outcomes.
Asset/Liability Studies

Deterministic Analysis

• Uses the same assumptions as the Plan’s actuary to project the future status of the Plan assuming no uncertainty.

• Some of the variables analyzed include:
  – Demographics – Active and inactive participant counts
  – Benefit Payments
  – Contributions
  – Asset Values
  – Actuarial Liabilities
  – Payout Ratio
  – Funded Ratio
Asset/Liability Studies

Deterministic Analysis

• Deterministic’s virtues are that it is simple and that the findings reflect what will happen if the future turns out to be precisely as forecasted—no better, but also no worse.

• It is useful for gauging the general direction of change and associated consequences.

• It also allows for sensitivity analysis such as assuming lower returns or higher contributions.
Asset/Liability Studies

Stochastic Analysis

• Introduces uncertainty to the projections...
  – Future rates of return and inflation based on RVK’s most recent capital market assumptions.

• Analyzes most likely outcomes based on Monte Carlo simulation as well as the likelihood and severity of worst case and best case outcomes.
  – 4 to 6 potential target allocations identified for the Plan to consider.

• Focuses on funding ratios and payout ratios.

• Analyzes probability of full funding and insolvency in 20 years.

• This analysis is helpful in making asset allocation decisions.

• Stochastic analysis is more complex but also more realistic and offers insights into the range of potential outcomes.
Asset/Liability Studies

Stochastic Analysis

• A wide range of investment portfolios are tested because at the heart of the Plan’s situation is a simple question that is difficult to answer: whether the Plan is better off following a strategy that:

  (A) Falls in the general category of higher prospective return with greater risk (i.e. potential for more widely varying outcomes – good or bad), or

  (B) Falls in the general category of lower prospective return with concomitantly lower risk (i.e. a tighter band of likely outcomes).
Asset/Liability Studies

Stochastic Analysis

Essential to answering this question is to ask precisely how the Plan’s broader constituencies define what “better off” means. The metrics we use for each to determine whether the Plan is “better off” under one approach versus another are:

1. The effect on funding ratio (and thus on contribution rates which decline with higher funding ratios).

2. The effect on Plan liquidity (i.e. the Plan’s ability to pay annual benefits without major disruption of its strategic asset allocation, the driver of its investment strategy).

3. The effect on the trend line and stability of annual contributions.

4. The risk of large, sudden, and highly disruptive short-term declines in the Plan’s assets over the course of time and the associated effects on contributions and potentially investment decisions.
## Asset/Liability Studies

### Proposed Project Timeline

<table>
<thead>
<tr>
<th>Activity Description</th>
<th>Responsible Party</th>
<th>Time to Complete</th>
<th>Cumulative Duration</th>
<th>Proposed TMRS Timeline</th>
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<tbody>
<tr>
<td><strong>Receive Data</strong></td>
<td>Client / Actuary</td>
<td>4 Weeks</td>
<td>0 Weeks</td>
<td>4/15/2016</td>
</tr>
<tr>
<td><strong>ProVal Liability Programming</strong></td>
<td>RVK Actuary</td>
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<tr>
<td><strong>Review With RVK Actuary</strong></td>
<td>RVK / RVK Actuary</td>
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<tr>
<td><strong>Compare To Valuation</strong></td>
<td>RVK / RVK Actuary</td>
<td></td>
<td></td>
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<tr>
<td><strong>Resolve Discrepancies</strong></td>
<td>RVK / RVK Actuary</td>
<td></td>
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<tr>
<td><strong>ProVal Modeling</strong></td>
<td>RVK</td>
<td>2 Weeks</td>
<td>8 Weeks</td>
<td>5/30/2016 6/10/2016</td>
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<tr>
<td><strong>Capital Market</strong></td>
<td>RVK</td>
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<tr>
<td><strong>Deterministic</strong></td>
<td>RVK</td>
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<tr>
<td><strong>Stochastic</strong></td>
<td>RVK</td>
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<tr>
<td><strong>Logic Check Results</strong></td>
<td>RVK</td>
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<tr>
<td><strong>Export Raw Data to Excel</strong></td>
<td>RVK</td>
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<td><strong>Excel Data Customization</strong></td>
<td>RVK</td>
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<td><strong>Deliverable Generation</strong></td>
<td>RVK</td>
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<tr>
<td><strong>Generate and Assemble Data Template Outputs</strong></td>
<td>RVK</td>
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<tr>
<td><strong>Draft Report Text</strong></td>
<td>RVK</td>
<td></td>
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<tr>
<td><strong>Draft Conclusions/Executive Summary</strong></td>
<td>RVK</td>
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<tr>
<td><strong>Asset Liability Team Review</strong></td>
<td>RVK / RVK Actuary</td>
<td>1 Week</td>
<td>12 Weeks</td>
<td>7/4/2016 7/8/2016</td>
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<tr>
<td><strong>RVK AL Team</strong></td>
<td>RVK</td>
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<td><strong>RVK Consulting Actuary</strong></td>
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<tr>
<td><strong>Client Service Team Review</strong></td>
<td>RVK</td>
<td>2 Weeks</td>
<td>14 Weeks</td>
<td>7/11/2016 7/22/2016</td>
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<td><strong>Staff/Client Actuary Review</strong></td>
<td>RVK / Actuary</td>
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<tr>
<td><strong>Cumulative Duration</strong></td>
<td></td>
<td></td>
<td></td>
<td>12 Weeks</td>
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</table>

**Timeline Notes:**

- **Cumulative Duration** represents the total time frame after all activities.