PENSION STRESS TESTING FOR STATE FISCAL DIRECTORS

NCSL LEGISLATIVE FISCAL DIRECTORS PRE-CONFERENCE
LOS ANGELES, CALIFORNIA
JULY 29, 2018

GREG MENNIS, DIRECTOR
STRENGTHENING PUBLIC SECTOR RETIREMENT SYSTEMS
After nine years of economic recovery, public retirement systems are more vulnerable than ever to the next economic downturn.

Stress testing provides state officials with a tool to understand how pension plans and state budgets will weather the next recession.

This is not an academic exercise: Five states have adopted policies since 2017. Stress test analysis prompted needed reforms in Colorado and was central to reform evaluation in Pennsylvania.
State and local pension debt as a share of GDP spiked after the Great Recession and remains at a historically high level.
CONTRIBUTIONS AS A SHARE OF OWN SOURCE REVENUE
Budget Allocation to Pensions Doubled from 2001 to 2015

Notes and Sources: State Contribution data is sourced from our Pew database. State own source revenue, State and Local own source revenue, and State and Local contributions are from the Census Annual Surveys of State and Local Government Finances.
**Pension Fund Risk Premium at Historic High**

Plan’s average assumed rate of return remains relatively stable, while bond yields have declined.

Sources: Pew analysis of comprehensive annual financial reports, actuarial valuations, and related reports from states, U.S. Treasury data, and Public Plans Database.
**Benefit Payments & Contributions for State & Local Plans**

Widening Operating Cash Flow Gap and Reduced Asset to Benefit Coverage

![Bar and line chart showing trends in benefit payments, contributions, and assets to benefit payments over time.](chart.png)

- **Benefits and Contributions, $ Million**
  - 1998: $50
  - 1999: $100
  - 2000: $150
  - 2001: $200
  - 2002: $250
  - 2003: $300
  - 2004: $350
  - 2005: $400
  - 2006: $450
  - 2007: $500
  - 2008: $550
  - 2009: $600
  - 2010: $650
  - 2011: $700
  - 2012: $750
  - 2013: $800
  - 2014: $850
  - 2015: $900
  - 2016: $950

- **Ratio of Assets/Benefits**
  - 1998: $1
  - 1999: $2
  - 2000: $3
  - 2001: $4
  - 2002: $5
  - 2003: $6
  - 2004: $7
  - 2005: $8
  - 2006: $9
  - 2007: $10
  - 2008: $11
  - 2009: $12
  - 2010: $13
  - 2011: $14
  - 2012: $15
  - 2013: $16
  - 2014: $17
  - 2015: $18
  - 2016: $19

Source: U.S. Census Bureau Annual Survey of Public Pensions

**THE PEW CHARITABLE TRUSTS**

pewtrusts.org
OVERVIEW

Goals for today:

1. Review key concepts and components of stress testing.
2. Examine benefits to the budgeting process.
3. Outline how to implement stress testing efficiently and effectively.
**What is Stress Testing?**

- Simulation technique used to assess the impact of different economic conditions on pension balance sheets and governmental finances.

- Budget tool to help policymakers plan for the next recession and better manage economic uncertainty.

- Central to new risk reporting guidelines from the Actuarial Standards Board.
EXAMPLE SIMULATION: SENSITIVITY OF ANNUAL REQUIRED CONTRIBUTIONS TO INVESTMENT RETURNS

Percentiles of 20-Year Investment Returns

- 20-5%
- 40-20%
- 50-40%
- 60-50%
- 80-60%
- 95-80%
- Expected (7%)
- Expected (6.4%)

Fiscal Year Ending

2018  2019  2020  2021  2022  2023  2024  2025  2026  2027  2028  2029  2030  2031  2032  2033  2034  2035  2036  2037

Employer Contribution Rate as a % of Payroll

0%  5%  10%  15%  20%  25%  30%  35%
Why is Stress Testing Important for Fiscal Directors?

➢ Pension systems and budgets are vulnerable to the next recession.

➢ Risk reporting for state and local pensions is coming (ASOP No. 51).

➢ Not an academic exercise: stress testing provides a framework to plan for economic uncertainty and score policy proposals.

What gets Measured gets Managed!
TIMELINE FOR PENSION RISK REPORTING
Since 2017: Actuarial Standards Published, Five States Adopt Stress Testing

- **2007**
  - Washington (State) Adopts stress testing requirements

- **2011**
  - California (CalPERS) Adopts stress testing requirements

- **2014**
  - February GASB Blue Ribbon Panel issues report with findings and recommendations
  - June GASB 68 goes into effect

- **2015**
  - May ASB Public comment deadline for first exposed draft

- **2016**
  - June ASB issues second exposure draft for ASOP No. 51
  - October ASB ends comment period for second exposure draft of ASOP No. 51

- **2017**
  - September ASB votes to adopt ASOP No. 51

- **2018**
  - March ASB issues request for public comments on exposure draft for revisions to ASOP No. 4 (determining plan costs and contributions)
  - July ASB comment period for ASOP No. 4 ends
  - November ASB ASOP No. 51 goes into effect

**Abbreviations**
- GASB: Governmental Accounting Standards Board
- ASB: Actuarial Standards Board
- ASOP: Actuarial Standards of Practice
- SOA: Society of Actuaries

**Source:** Pew Charitable Trusts
Stress Test Model for Pensions

Comprehensive model incorporates State Revenue Forecasts and measures Budget Impacts

Inputs:
- Actuarial Projections
- Capital Market & Asset Allocation Assumptions
- State Revenue Forecasts

Stochastic
Deterministic
Simulator

Outputs:
- Balance Sheet Metrics
- Cash Flow & Contribution Metrics
- Budget Impacts

Stress Test Simulation Model Foundation Structure

Comprehensive stress testing can aid officials and policymakers in:

➢ Preparing for the next recession.
➢ Planning for lower returns and higher costs over the long-term.
➢ Managing financial market volatility through the business cycle.
➢ Evaluating reform proposals in a standard fashion.
IMPLEMENTING STRESS TESTING

➢ Build on existing reporting requirements (e.g. GASB) and pension system projections (e.g. investment Asset/Liability studies).

➢ Incorporate revenue and budget forecast.

➢ Develop scenarios and a report geared to budget officials.
PEW’S ANALYTIC FRAMEWORK

Two-part lens that helps generate broad range of likely outcomes

Stress Test Simulation Model
Analytic Framework

Economic Scenarios

- Scenario 1
  - Fixed 5% Returns

- Scenario 2
  - Asset Shock

Behavioral Assumptions

- Assumption 1
  - Sustainable Budget

- Assumption 2
  - State Policy
STRESS TESTING IN ACTION:
SCORING REFORM PROPOSALS
COLORADO’S PROJECTED FUNDED STATUS BEFORE AND AFTER PENSION REFORMS

For PERA’s state division, under lower-than-expected investment returns

Note: Projections based on Colorado’s Public Employees Retirement Association (PERA) 2016 valuation. Reform projections do not include changes to the definition of payroll as outlined in the final legislation as we anticipate the effect on fiscal impact to be minor. Additionally, our model simplified the risk sharing features to be fully on in low return scenarios. Finally, a 20% take-up rate for the DC plan was assumed.

Source: Analysis by The Pew Charitable Trusts and The Terry Group, based on publicly available Comprehensive Annual Financial Reports (CAFR), actuarial reports and valuations, or other public documents, or as provided by plan officials.
Stress Testing in Action:
Planning for The Next Recession
CONNECTICUT’S PROJECTED EMPLOYER CONTRIBUTION RATES

Under plan’s assumed rate of return compared to a lower-than-expected investment return scenario

Note: Assumes actual investment returns of 5 percent and that the state adheres to the current funding policies or statutes as written (state policy).

Source: Analysis by The Pew Charitable Trusts and The Terry Group, based on publicly available Comprehensive Annual Financial Reports (CAFR), actuarial reports and valuations, other public documents, or as provided by plan officials.

pewtrusts.org
STRESS TESTING IN ACTION:
PREPARING FOR THE NEXT RECESSION
NEW JERSEY’S PROJECTED ASSETS AND CASH FLOW RATIO

Assuming lower investment returns (fixed at 5%) and state contributions are made as a fixed percentage of budget

Notes: Data for the New Jersey Public Employees Retirement System (PERS)—state portion only—and the Teacher Pension Annuity Fund (TPAF) plans.
Source: Analysis by The Pew Charitable Trusts and The Terry Group, based on publicly available Comprehensive Annual Financial Reports (CAFR), actuarial reports and valuations, or other public documents, or as provided by plan officials
Stress Testing in Action: Managing Financial Market Volatility
Projected Impact of Market Volatility on Costs for North Carolina and Wisconsin

Risk-sharing provisions limit costs and volatility for Wisconsin

Notes: Projections above are for total employer contributions as a share of total payroll over a 20-years at different returns. Source: Analysis by The Pew Charitable Trusts and The Terry Group.
CONCLUSION: KEY TAKEAWAYS

➢ US public pension funds face unprecedented vulnerability to economic downturns.

➢ Stress test analysis helps states prepare for economic uncertainty, improve existing policies, and evaluate reforms.

➢ Well designed analyses should be geared towards long-term budget planning and policy decision making.
Don’t miss out!
Visit Booth #305 in the exhibit hall to learn about The Pew Charitable Trusts’ work in all 50 states and meet our policy experts.
Public Pensions Vulnerable to Next Economic Downturn

In aggregate, state and local pension systems have never been more exposed to market volatility, based on fiscal measures and economic outlook.

State and Local Pension Debt as a Share of Gross Domestic Product

State and local pension debt as a share of GDP spiked after the Great Recession and remains at a historically high level.

Pension Fund Risk Premium at Historic High

Plan’s average assumed rate of return remains relatively stable, while bond yields have declined.

Contributions as a Share of Own Source Revenue

Budget Allocation to Pensions Doubled from 2001 to 2015

Benefits & Contributions for State & Local Plans

Widening Operating Cash Flow Gap and Reduced Asset to Benefit Coverage

Ratio of assets to benefit payments

Benefit payments

Contributions

The Pew Charitable Trusts
DISTRIBUTION OF STOCHASTIC RETURNS FOR A TYPICAL STATE PENSION INVESTMENT PORTFOLIO OVER 20 YEARS

Typical portfolio has expected return of 6.4 percent at 50th percentile

Note: Labels are for investment returns at the 10th, 25th, 50th, 75th, and 90th percentile. Typical portfolio has 51.0% stocks, 27.0% fixed income/cash, and 22% in alternatives (i.e. private equity and real estate).

Sources: The Terry Group and The Pew Charitable Trusts
Notes: United States uses national gross domestic product; there is a discontinuity in gross state product between 1996 and the rest of the time series due to a change from SIC industry definitions to NAICS industry definitions. Years highlighted in gray above include any year in which at least one quarter was in recession, according to the U.S. Federal Reserve. Sources: U.S. Census Bureau; Bureau of Economic Analysis; Moody’s Analytics.
Pennsylvania’s Projected Range of Costs Before and After Reforms

Ranges of Annual Employer Cost for New Workers (SERS + PSERS):

25th to 75th Percentile Investment Returns

Current Policy vs. Proposed New Plan Design

Source: Analysis by The Pew Charitable Trusts and The Terry Group, based on publicly available Comprehensive Annual Financial Reports (CAFR), actuarial reports and valuations, or other public documents, or as provided by plan officials.
## Risk Reporting and Other Recommended Practices for Public Pension Plans

Blue Ribbon Panel’s 2014 recommendations compared to current and proposed governmental accounting requirements and actuarial guidelines

<table>
<thead>
<tr>
<th>Blue Ribbon Panel (BRP) Category (Purpose)*</th>
<th>BRP Recommendation</th>
<th>Governmental Accounting Standards Board (GASB)</th>
<th>Actuarial Standards Board (ASB) Actuarial Standards of Practice (ASOP) No. 51 and Proposed Updates to ASOP No. 4**</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Risk Measures and Analyses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measures of Risk to Financial Position</td>
<td>(1) standard</td>
<td>Sensitivity of the net pension liabilities</td>
<td>Discount rates consistent with market yields for a bond portfolio whose cash flows match benefits</td>
<td></td>
</tr>
<tr>
<td>(Understanding Current Risk Levels.)</td>
<td>deviation of</td>
<td>to changes in the discount rate at +/- 1% vs.</td>
<td>expected to be paid; Yield for US Treasuries or fixed-income securities that receive one of the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>expected returns</td>
<td>baseline discount rate.</td>
<td>two highest ratings.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>on asset portfolio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2) plan liability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>and normal cost at risk free rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3) standardized</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>plan contribution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress Testing (Measuring Investment</td>
<td>Financial projections over 30 years using</td>
<td>Investment, Interest Rate, and Contribution</td>
<td>Comprehensive stress testing can be designed to address all three risks noted— including budget</td>
<td></td>
</tr>
<tr>
<td>and Contribution Risks.)</td>
<td>baseline investment return assumptions as well as returns at +/- 3% investment returns vs. baseline and 80 to 100% of ARC payments.</td>
<td>Risk ASOP No. 51</td>
<td>measures for assessing Contribution Risk— and incorporate Scenario and Stochastic Analysis.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhanced Disclosures</td>
<td>Disclosure of projected benefit payments for current employees to allow for independent assessment of plan obligations</td>
<td>N/A</td>
<td>N/A</td>
<td>Unit credit method in ASOP No. 4 62.11(b) uses un-discounted cash flows but does not require these calculations to be disclosed.</td>
</tr>
<tr>
<td>Un-discounted Cash Flows</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Providing data for independent assessment of plan obligations.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial and Demographic Trends</td>
<td>10 years historical data of assets, benefit payments, and liabilities to pay out, as well as recommended contributions to revenue; and actual to recommended contributions.</td>
<td>Requires 10-year schedule of historical cash flows (reconciling) changes in the total and net pension liability.</td>
<td>(a) Assets/Payroll; (b) retired liability to total liability (AAC basis); (c) Cash Flow to Assets; (d) benefit payments/ contributions; (e) duration of AAL.</td>
<td>All underlying data is typically available at the pension plan level. Cash flow measures (c) and (d) have the most direct applicability to assessing future solvency and financial risk.</td>
</tr>
</tbody>
</table>

Notes: *Recommendations for Risk Measures Analyses and Disclosures. Report also includes recommendations for Funding Principles, Role of the Actuary (actuarial methods) and plan governance. **ASOP No. 51 identifies five risks: investment, solvency/liability mismatch, interest rate, longevity, and contribution risk. ASOP 4 proposes supplemental disclosure of plan liabilities and costs at lower discount rates.