Discussion: Risky Choices: Simulating Public Pension Funding Stress with Realistic Shocks by James Farrell and Daniel Shoag

Byron Lutz
Board of Governors of Federal Reserve

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The opinions expressed are those of the author and do not necessarily express the opinion of the Board of Governors of the Federal Reserve.
Very Nice Contribution

1. Previous work on S&L pensions has tended to focus on liability side

2. Asset side is important, particularly for "mature" plans (Munnell et. al. 2013)
   - Assets are large relative to funding base
   - Cash flows are negative
   - Significant share of plan participants are retired and no longer contributing
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2. Asset side is important, particularly for "mature" plans (Munnell et. al. 2013)
   - Assets are large relative to funding base
   - Cash flows are negative
   - Significant share of plan participants are retired and no longer contributing
3. Important not only for individual government finances and retirees, but economy more broadly
Increase in required contribution mostly due to asset returns which were 1.5% per year lower than assumed.
## Major Impact on S&L Gov. Budgets

### Annualized Growth 2001-2015
(nominal $)

<table>
<thead>
<tr>
<th>Category</th>
<th>Annual Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual Total Pension Contributions</td>
<td>7.4%</td>
</tr>
<tr>
<td><strong>Actual Employer Contributions</strong></td>
<td>9.0%</td>
</tr>
<tr>
<td>Actual Benefits paid out</td>
<td>7.0%</td>
</tr>
<tr>
<td>Tax receipts</td>
<td>3.9%</td>
</tr>
<tr>
<td>GDP</td>
<td>3.9%</td>
</tr>
<tr>
<td>Workforce</td>
<td>0.3%</td>
</tr>
<tr>
<td>Construction</td>
<td>2.6%</td>
</tr>
</tbody>
</table>
4. Policy relevant
   - Gives sense of stress on annual budgets
   - Risk is difficult to think about, yet paper provides very accessible results
   - Exercises which show how different policy maker choices—discount rates and annual contributions—interact with risk
Two Similar Papers on Same Topic

- Fortunate to have two very high quality papers that come to broadly similar conclusions
- Provides opportunity to compare and contrast
Distribution of Asset Returns

- Assumptions over distribution of asset returns is most important difference between two papers
- F&S paper uses annual data from 1986-2013 to construct a nuanced baseline distribution. E.g.
  - Correlation in return across asset classes
  - Variation in individual fund performance relative to benchmark
  - "Thick tails"
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  - Correlation in return across asset classes
  - Variation in individual fund performance relative to benchmark
  - ”Thick tails”
- B&Y paper assumes a normal distribution and uses a mean and variance consistent with plan assumptions and past studies
Asset Returns in F&S and B&Y

- In principle the F&S approach has a lot to recommend it in terms of realism, nuance and counterfactuals it allows.
- In practice, though, I worry a bit that the F&S assumptions may be overly optimistic.
Asset Returns in F&S and B&Y

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- In practice, though, I worry a bit that the F&S assumptions may be overly optimistic.
- Risk-free rate of return has been trending down.
- Boston College PPD database has realized assumptions closer to B&Y for a more recent period.

<table>
<thead>
<tr>
<th>Baseline Return Assumptions</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F&amp;S</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>B&amp;Y</td>
<td>8%</td>
<td>12%</td>
</tr>
</tbody>
</table>
Different Asset Return Distributions Yield Different Conclusions in Some Instances

- F&S end up with a fairly rosy scenario in their base case.
Different Asset Return Distributions Yield Different Conclusions in Some Instances

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- B&Y finds only moderate improvement in funding status at median

As can be seen in the graph, under this simulated distribution of returns, amortization and shortfall payments are steadily declining at the median of the distribution. This is due to the rate of return generally exceeding the discount rate and steady payment of the amortization cost. This finding deviates from Boyd and Yin (2016), who find that a typical level-percent, open amortization method plan, starting at 75% funded, would only reach 85% after 30 years. The driver for this difference lies in the simulation assumptions, namely the difference between the discount rate and asset returns. Boyd and Yin’s simulation assumed a discount rate equal to the mean of expected asset returns, while this model assumed a plan-provided discount rate that is well below the simulated asset returns. While the contributions of open amortization...
Different Asset Return Distributions Yield Different Conclusions in Some Instances

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![Graph showing simulated distribution]

- B&Y finds only moderate improvement in funding status at median
- Encourage both sets of authors to explore alternative return assumptions more thoroughly
Amortization Method

• F&S assume a open 30 year level-percent payoff amortization method
• Very sensible choice if using only one method, but it is very liberal
Amortization Method

- F&S assume a open 30 year level-percent payoff amortization method
- Very sensible choice if using only one method, but it is very liberal
- B&Y explore a number of different methods, including shorter horizons (15 years), closed window, level dollar
- Dramatically different outcomes
- Amortization very likely provides a frame of reference that alters funding behavior
• Both papers are heavily focused on asset side, but have a sophisticated machinery for the liability side
• Both papers base their simulations on a single plan that is very reasonably viewed as representative – Texas ERS (F&S) and Arizona SRS (B&Y)
• Plans often have very different projected benefit cash flows - e.g. Texas Teachers and Illinois Teachers
• Do conclusions of analysis change for plans with different paths for cash flows?
Texas Teachers Projected Benefit Cash Flows

Ratio of Benefit Payments to Payroll

- Retired
- Actives
- Inactives
- New Hires
- Total
Illinois Teachers Projected Benefit Cash Flows

**Ratio of Benefit Payments to Payroll**

- **Retired**
- **Actives**
- **Inactives**
- **New Hires**
- **Total**

The graph illustrates the ratio of benefit payments to payroll for different categories over time. The x-axis represents time, and the y-axis shows the ratio. The graph demonstrates how the ratio changes for retired, active, inactive, new hire, and total categories over a period.