Funding Strategies in the Corona Economy

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Discussion Topics

- The Corona Economy
- Ways the Corona Economy May Impact Your Plan
- STRS Ohio experience/views
- NYSTRS experience/views
- Questions
The Corona Economy - 2020

Investment Returns for Fiscal Year Beginning July 1, 2019

- S&P 500
- Agg Bond
- 60/40

Great Crash of 2008

Disbelief, and a punter reaches

QUARANTINE

NCPERS
Unemployment Trends June 2000 – June 2020

Source: Bureau of Labor Statistics
Unemployment Trends June 2000 – June 2020

Source: Bureau of Labor Statistics
Unemployment Trends June 2000 – June 2020

Source: Bureau of Labor Statistics
Unemployment Trends June 2000 – June 2020

Source: Bureau of Labor Statistics
Unemployment Trends June 2000 – June 2020

Relative Employment Levels

Source: Bureau of Labor Statistics
The Corona Economy - 2021
COVID-19 State Budget Shortfalls Could Be Largest on Record

Total state budget shortfall in each fiscal year, in billions of 2020 dollars

2001 Recession
'02 '03 '04 '05
-$60 -$105 -$110

Great Recession
'09 '10 '11 '12 '13
-$130 -$150 -$120 -$60

COVID-19*
'20 '21 '22
-$110 -$155 -$290

* Estimated based on CBPP calculations
Source: Pre 2014: CBPP survey; 2020 and following: CBPP calculations

CENTER ON BUDGET AND POLICY PRIORITIES | CBPP.ORG
What to Expect?

Economic Recession

Relative Change (inflation adjusted) in state and local government tax revenue

Source: NASRA
FUNDING STRATEGIES IN A CORONA ECONOMY
Ways the Corona Economy May affect Your Plan

- Plan Sponsor revenue shortfalls → Reduced pension funding?
- Potential Liability Impacts
  - Layoffs, furloughs, permanent reduction in force, hiring freezes
  - Mortality impact
  - Pay increases
  - Presumptive in line of duty disability and death benefits
Funding Strategies in a Corona Economy?

Resist, Resist, Resist

Be Flexible and Collaborate

Cartoon courtesy of Pensions & Investments
What to Expect?

Cartoon courtesy of Pensions & Investments
What to Expect?

PUBLIC FUND SURVEY
Jun-20

% Plans Using Closed Amortization
Average Amortization Period

Closed

Years
28
26
24
22
02 04 06 08 10 12 14 16 18
40%
50%
60%
70%
Lower Payrolls = Lower Contributions
Declining Funding Ratios
2019 AVR: Pre Covid-19 valuation results

25% reduction in contribution rate for 2 years

3% and (10%) investment return in FY20 and FY21

25% Contribution reduction-2 years and 3%, -10% returns

6 years of lower returns and 25% reduction in funding
Negative Cash Flows
(“Asset Burn Rate”)

\[
\text{ASSET BURN RATE} = \frac{\text{Contributions} - \text{Benefits}}{\text{Assets}}
\]
Asset Burn Rate

• The greater it is the more vulnerable a plan is to short term investment volatility
• Pandemic will result in many plan sponsors unable to meet the plan’s ADC
• This only serves to increase the plan’s asset burn rate
Both sets of Returns
Average 7% over the ten year period
With a 0% Asset Burn Rate

Asset Burn Rate 0%
Burn Rate Trend 0%
Market Cycle downup

=Actual

=Assumed

Investment Returns

Assets

$0 $200 $400 $600 $800 $1,000 $1,200 $1,400 $1,600 $1,800 $2,000

1 2 3 4 5 6 7 8 9 10

1 2 3 4 5 6 7 8 9 10

Investment Returns

Returns

Reported

Actual

6.50%

Asset Gain/(loss) 0% 0%

0%
With a -5% Asset Burn Rate
## Reported vs. Actual Returns

<table>
<thead>
<tr>
<th>Year</th>
<th>Starting Assets</th>
<th>Return</th>
<th>Ending Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>1,000</td>
<td>-50%</td>
<td>500</td>
</tr>
<tr>
<td>Year 2</td>
<td>500</td>
<td>50%</td>
<td>750</td>
</tr>
</tbody>
</table>

Reported Return = 0 %

Actual Return = -13.4 %
With a -5% Asset Burn Rate That’s Getting Worse

Asset Burn Rate: -5%
Burn Rate Trend: 5%
Market Cycle: down, up

=Actual
=Assumed

RETURNS
Reported Actual
6.50% 4.16%

Asset Gain/(loss) 0% -28%

Investment Returns

Assets

$0 $200 $400 $600 $800 $1,000 $1,200

1 2 3 4 5 6 7 8 9 10

-15% -10% -5% 0% 5% 10% 15% 20% 25%
Conclusions

• Given the pandemic and economic situation, the future is very uncertain
• Revenue losses and the resulting budget implications are more likely to have an immediate impact on pensions than investment returns
• Many pension plans can be flexible, while others will need to resist any reduction to contributions
• If contributions are reduced, plans should seek to recover those contributions over as short a period as possible
• COVID-19 has broad effects across all aspects of society; various attributes of a pension plan can make it more or less sensitive to these impacts

• Relevant factors for STRS Ohio include:
  • Plan maturity – STRS Ohio is 100 years old, and benefits have exceeded contributions for more than 25 years now
  • Teacher system – impact is different depending on industry type
  • Aggressive investment portfolio – equity exposure>75%
  • Fixed benefits – no adjustable elements
  • Fixed contributions – not an actuarially determined contribution
COVID Impacts

• Results are impacted for...
  • Investments
  • Mortality, especially for retirees
  • Separation from service and retirements
  • Payroll growth
  • Contributions

• I’ll touch on all of these, but one is clearly much more important than the others
An Analogy

• You’re trapped in a small conference room with two other occupants for an hour
  • One of the others is your friend, Bob, who is chain-smoking cigars
  • The other is Bob’s pet monkey, Zeke, who is playing with a shotgun

• Both represent a real threat to your long-term well-being
• Should your first priority be to get Bob to put out the cigar?
• Investment losses can hurt you a lot more, and a lot faster, than the other risks we will touch on
For a pension, medium-term is something in the neighborhood of 10 to 20 years.

For a mature system, if returns fall short of the discount rate over this period the effects are traumatic.

For STRS Ohio, the effective duration of the benefit payments is less than 15 years.

- Over the next 20 years, we expect to pay around $154 Billion in benefits, while collecting only $88 Billion in contributions. The difference of $66 Billion is just short of our current assets of about $72 Billion. Since neither contributions nor benefits are adjustable, the funded status of the system in 20 years is almost entirely dependent on investment returns between now and then.
- And the returns over the first 10 years matter a lot more than those in 11-20.

Interest rates and future return expectations have fallen dramatically, discount rates much less so.
Medium-term return risk illustration

If returns fall short in the near future, it requires MUCH higher returns to make up for that shortfall.

To ‘catch up’ to the constant 7.45% return over 20 years, you’d have to make 9.07% in years 11-20 after earning 6.50% in years 1-10.
Investment risk – short-term

• It is obvious that an investment loss hurts if it is not offset by a gain shortly afterwards, however even that may not be enough

• A bad enough return in the short term (say, -15% or -20% over 12 to 18 months) will permanently damage the system even if markets largely recover over the next few years

• With significantly negative cash flows (say, 4% of assets or more), the sequence of returns matters a lot

• Even if markets quickly bounce back, if you are forced to sell in a market trough because of liquidity constraints, the damage is permanent
Using the monthly returns from the last two years and a simple model, approximate the ending market value for four different sequences of return:

- Actual (shown on left): $72.5B
- Average return every month (0.46%): $73.3B
- Best sequence (high to low): $73.9B
- Worst sequence (low to high): $70.7B

The difference between the best and worst sequences is about $3.2B, and the difference between the (volatile) actual and the (constant) average is about $800 million.

To put that into perspective, actual annual contributions are about $3.3 Billion:

- Volatility drag cost the equivalent of 3 months of contributions
- Risk from sequencing is about equal to a full year’s contributions

These risks don’t decrease with time, they accumulate.
Mortality risk

- COVID-19 is causing excess mortality, particularly among the older segments of the population.
- The societal impact is devastating, but the financial impact is fairly small relative to the overall liabilities of the system.

Approximate liability reduction due to excess mortality amongst beneficiaries in an adverse scenario (all $ in Billions):

<table>
<thead>
<tr>
<th>Age</th>
<th>Count</th>
<th>% of Count</th>
<th>Approx. Liability</th>
<th>% of Liability</th>
<th>Assumed Excess Mortality</th>
<th>Unexpected Liability Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;60</td>
<td>8724</td>
<td>6%</td>
<td>$4.3</td>
<td>7%</td>
<td>0.5%</td>
<td>&lt;$0.1</td>
</tr>
<tr>
<td>60-69</td>
<td>52,134</td>
<td>33%</td>
<td>$27.9</td>
<td>42%</td>
<td>1.0%</td>
<td>$0.3</td>
</tr>
<tr>
<td>70-79</td>
<td>61,599</td>
<td>39%</td>
<td>$26.8</td>
<td>40%</td>
<td>2.0%</td>
<td>$0.6</td>
</tr>
<tr>
<td>80-89</td>
<td>34,482</td>
<td>22%</td>
<td>$7.5</td>
<td>11%</td>
<td>5.0%</td>
<td>$0.4</td>
</tr>
<tr>
<td>Total</td>
<td>156,939</td>
<td></td>
<td>$66.4</td>
<td></td>
<td></td>
<td>$1.3</td>
</tr>
</tbody>
</table>

Liability reduction of about $1.3 Billion on a $100 Billion liability.
We regularly see members who are eligible for unreduced retirement who choose to continue to work. This behavior has been surprisingly stable in recent years.

It’s hard to imagine retirements among this group will not increase.

However, even if only 40% continue to work instead of 80%, a one-time increase in retirements of at ages 65+ of a few thousand only has a small financial impact.

<table>
<thead>
<tr>
<th>Age</th>
<th>Count</th>
<th>Continued Employment</th>
<th>% Continuing</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>2989</td>
<td>2347</td>
<td>79%</td>
</tr>
<tr>
<td>66</td>
<td>2237</td>
<td>1845</td>
<td>82%</td>
</tr>
<tr>
<td>67</td>
<td>1802</td>
<td>144</td>
<td>80%</td>
</tr>
<tr>
<td>68</td>
<td>1436</td>
<td>1160</td>
<td>81%</td>
</tr>
<tr>
<td>69</td>
<td>1029</td>
<td>807</td>
<td>78%</td>
</tr>
<tr>
<td>70</td>
<td>756</td>
<td>596</td>
<td>79%</td>
</tr>
<tr>
<td>71</td>
<td>520</td>
<td>416</td>
<td>80%</td>
</tr>
<tr>
<td>72</td>
<td>392</td>
<td>326</td>
<td>83%</td>
</tr>
<tr>
<td>73</td>
<td>319</td>
<td>263</td>
<td>82%</td>
</tr>
<tr>
<td>74</td>
<td>245</td>
<td>190</td>
<td>78%</td>
</tr>
<tr>
<td>75+</td>
<td>747</td>
<td>598</td>
<td>80%</td>
</tr>
<tr>
<td>Total</td>
<td>12,472</td>
<td>9,992</td>
<td>80%</td>
</tr>
</tbody>
</table>
Payroll Growth

• Impact will vary quite a bit by industry
• Even within the educational sector, we expect to see very different impacts on K-12 versus Higher Education
• The key question is to what degree will payrolls bounce back to the previous trajectory after COVID?
• The higher your amortization period, and the higher your payroll growth assumption, the more sensitive you are to misses on payroll growth
Payroll growth – 10 year amortization, 2% growth

Payroll growth disruption increases amortization period from 10 years to just under 11 years
Payroll growth – 25 year amortization, 2% growth

Payroll growth disruption increases amortization period from 25 years to just under 29 years
Payroll growth – 25 year amortization, 4% growth

Payroll growth disruption increases amortization period from 25 years to more than 55 years.
Contributions

• While there are many downsides to having a contribution rate that is fixed rather than actuarially determined, there is also some upside – with a long history of always making the fixed rate contribution, we can be fairly confident this will continue

• For systems facing a potential contribution shortfall, the impact will be similar to the impact from payroll growth
  • If the shortfall is quickly made up (over 5 years or less, perhaps), the damage is mitigated
  • If your amortization period is long (and/or you have negative amortization), the damage is greater
  • If you assume contributions will escalate over time due to rate smoothing and/or payroll growth, the damage is greater
New York State Teachers’ Retirement System (NYSTRS)

- Founded in 1921
- Covers teachers and administrators throughout NYS, except for the five boroughs of NYC (NYCTRS)
- Service/FAS based formula DB plan
261,000 active members
173,000 retirees and beneficiaries
434,000 total membership (6/30/20)
Assets – Market Value of Assets (MVA) = $119.9 B (6/30/20)
Funded ratio = 101.2% (6/30/19, MVA-based)
NYSTRS (cont’d)

- Six tiers of membership. T6:
  - Ret age = 63 (early ret at 55, but heavy benefit reductions)
  - EEC rate: 3% - 6% of salary, depending on salary level
  - Benefit at age 63, 30 yrs service = 55% of FAS5
Members contribute at 0%, 3%, 3.5%, up to 6% (tier dependent)

Later tiers contribute at higher rates

Tier 6 designed to be 50% EE funded/50% ER funded
NYSTRS Funding

- **Employers** contribute at the actuarially determined rate
- Actuarial valuation completed annually resulting in a new ECR
- NYSTRS has collected the actuarially determined contribution for the last 35+ years
Employer Contribution Rate (ECR)

- Aggregate Cost Method
- Assumed rate of return = 7.10%
- Funded over active future working lifetime - approx. 13 years
- Contrib. requirement in statute
- Contrib. taken out of state aid
Current ECR = 9.53% of pay
Average ECR over the last five years = 10.11%
Over last 30 years, lowest ECR was 0.36%; highest was 17.53%
Bargain compared to other NYS/NYC Ret Systems
Breakdown of Income Sources for 30 Year Period
7/1/1990 – 6/30/2020

Net Investment Income: 84%
Employer Contributions: 14%
Member Contributions: 2%
NYSTRS Actuaries

- NYSTRS – small internal actuarial staff – 6 actuaries
- Perform all actuarial valuations, cost, and disclosure work
- Current opening
Funded Ratio is the ratio of plan assets to accrued liabilities

<table>
<thead>
<tr>
<th>FYE</th>
<th>Funded Ratio Based on MVA</th>
<th>Funded Ratio Based on AVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/30/2015</td>
<td>104.1%</td>
<td>94.2%</td>
</tr>
<tr>
<td>6/30/2016</td>
<td>98.4%</td>
<td>97.9%</td>
</tr>
<tr>
<td>6/30/2017</td>
<td>99.8%</td>
<td>97.7%</td>
</tr>
<tr>
<td>6/30/2018</td>
<td>100.9%</td>
<td>99.2%</td>
</tr>
<tr>
<td>6/30/2019</td>
<td>101.2%</td>
<td>99.6%</td>
</tr>
</tbody>
</table>
COVID Risks/Concerns

- Period of low investment returns
- Active and retired member deaths
- Spike in retirements
- Spike in withdrawals
- Spike in the required employer contribution rate
- Employers can’t afford the contributions
NYSTRS Asset Allocation

- Allocation = **72%** risky assets (equities, real estate, private equity);
  **28%** fixed income (bonds, private debt, cash)
- Equities primarily indexed
- Live and die with the stock market
Future Investment Returns

- Fixed income returns barely above zero
- Stock market return projections falling
- What does it mean?
- How much to react?
- Retirement Systems lowering their rate of return assumptions
ASOP 51 Risk Analysis – Plan Maturity Measures

Ratio of Benefit Payments to the Market Value of Assets*

*Assets prior to 1994 are valued at book value
ASOP 51 Risk Analysis – Plan Maturity Measures

Contributions, Benefit Payments and their Ratio

- Employer and Member Contributions in millions
- Benefit Payments including Administrative Expenses in millions
- Ratio of Benefit Payments to Contributions

Ratio

ASOP 51 Risk Analysis – Plan Maturity Measures

*Assets prior to 1994 are valued at book value
ASOP 51 Risk Analysis – Plan Maturity Measures

• The higher the Asset Volatility Ratio (AVR), the more prone the plan is to large swings in the ECR due to large asset gains and losses.
• AVR of 7.3 implies that a 10% loss in assets has an impact of 73% on the member paybase.
• But due to asset smoothing and liability spreading this does not imply a 73% increase in the ECR.
ASOP 51 Risk Analysis – Plan Maturity Measures

• But, a higher AVR is also indicative of a higher level of assets, which is certainly preferable to a lower level of assets.

• Higher AVR is indicative of a mature, well-funded plan.
NYS Reaction to COVID

- Enhanced death benefit payable on account of COVID-related deaths
- Early retirement incentive bills (nothing passed)
- Potential 20% reduction in state aid to schools
NYS – The Future

- NYS schools cleared to re-open with in-person instruction
- Do COVID cases rise?
Questions?