Public Pension Plans: The Pothole-Filled Road to Retirement Security?



AMERICAN ACADEMY OF ACTUARIES ANNUAL MEETING PUBLIC POLICY FORUM

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An Overview of State and Local Pensions

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American Academy of Actuaries Washington, D.C. November 14, 2017

Public Pension Sustainability

- Wide variety exists among public pensions in terms of funding condition and required cost
- Plans sponsored by many states and cities are in good condition with manageable costs
- Plans sponsored by some states and cities face nearterm or long-term challenges



Public pensions in the U.S.

- ▲ ~\$4.1 trillion in assets
- ▲ ~14 million active (working) participants
 - ▲ 10 percent of the nation's workforce
- 10.3 million retirees and their survivors receive ~\$280 billion annually in benefits
- Annual contributions = \$192 billion
 - ▲ \$141 billion from employers; \$51 billion from employees
 - Approximately 5.0 percent of all state and local government spending goes to public pensions
- ▲ Of 6,000+ public retirement systems, the largest 75 account for 80+ percent of assets and members
- Aggregate funding level = $\sim 74\%$



Key Factors Affecting Public Pension Funding Conditions and Sustainability

Key Positive Trends

- Widespread reforms that lower employer costs and risks
- Increased use of closed or shorter amortization periods
- Improved effort to paying full required contribution

Major Challenges

- Declining projected investment returns
- Legal restrictions to altering plan design and financing structures
- Inability or refusal of plan sponsors to pay required contributions



Common Features of Well-Funded Public Pension Plans

- Consistent payment of full required actuarially determined employer contribution
- Actuarial assumptions and methods that are reasonable or conservative, such as:
 - Investment return assumption
 - Payroll growth
 - Closed amortization method
- Benefits that are funded in advance, rather than retroactively
- ▲ The ability to enact pension reform
- Required employee contributions, to offset employer costs



Common Features of Poorly Funded Public Pension Plans

- Consistent failure to pay required actuarially determined employer contributions
- Actuarial assumptions and methods that are not in line with experience or reasonable expectations
- Benefits that are not funded in advance



Distribution of public pension funding levels, FY 16



Public Plan Database, Public Fund Survey







"State and Local Government Contributions to Statewide Pension Plans: FY 15," NASRA 2017

Government spending on pensions

- Spending varies widely among states
- Pension benefit levels affect the spending number
- Social Security participation is an important factor
- ▲ Not all states contribute as much as they should
- Spending is higher for cities than for states
 - ▲ A larger portion of city budgets is spent on personnel
 - A larger percentage of municipal employees serve as public safety officers, whose retirement benefits are more expensive due to shorter careers



Distribution of spending on public pensions, by state, FY 15





"State and Local Government Spending on Public Employee Retirement Systems," NASRA 2017

Methods states are using to amortize unfunded pension liabilities

- A Pay the actuarially determined contribution
- Commit a portion of the budget surplus to the unfunded liability, either ad hoc or in statute (AK, HI, RI)
- Issue pension obligation bonds
- Establish a dedicated funding stream, such as revenue from tobacco, liquor, gambling, or severance taxes (KS, MT, OK)
- Dedicate a portion of sales, use, and/or corporate income tax revenues (OK)
- Reduce the funding amortization period/change the method
- Transfer ownership of the state lottery to the pension fund (NJ)



Pension Reforms

- ▲ In general, public workers are bearing more risk
 - Investment
 - Inflation
 - Longevity
 - Plan termination
- And earning lower benefits through greater use of hybrid plans, longer vesting periods, COLAs that are lower, suspended, or eliminated, etc.
- While contributing more toward the cost of their plan



Hybrid Plans

- New hybrid plans are being created by legislatures nearly every year
- Mostly DB-DC, some cash balance plans
- Usually apply to new hires only
- DB-DC plans maintain a DB component, with a lower benefit accrual rate
- Cash balance plans contain key features of DB plans, but also transfer some investment risk to workers



Statewide Hybrid Plans, 1995





Statewide Hybrid Plans, 2017





"State Hybrid Retirement Plans," NASRA 2016

Defined Contribution Plans

- The number of mandatory and optional DC plans as workers' primary retirement benefit has grown
- **Mandatory**:
 - ▲ District of Columbia for general employees
 - ▲ Michigan for state employees hired since 3/1/97
 - ▲ Alaska for all hires since 7/1/06
 - ▲ Oklahoma for state employees hired since 11/1/15
- Alaska has a DC plan as the primary retirement benefit, combined with non-Social Security participation
- Two states—Nebraska and West Virginia—moved away from DC plans as the primary retirement benefit



Statewide Defined Contribution Plans, 1995





For broad employee groups: teachers, general employees, and public safety personnel

Statewide Defined Contribution Plans, 2017





For broad employee groups: teachers, general employees, and public safety personnel

Flexible Employee Contributions

- Some states, like Arizona, Nevada, and Iowa, have featured flexible employee contributions for decades
- Flexible contributions adjust, as prescribed in statute or funding policies, based on actuarial experience or investment performance
- Plans in at least two states—Arkansas teachers and Pennsylvania state employees and teachers—have enacted flexible employee contributions more recently
- Most new hires in California since 2013 and new public safety hires in Arizona this year must contribute at least one-half of the normal cost of the plan, which can change



Default Defined Contribution Plans

- The default plan applies where employees have a choice of retirement plan
- The default plan is the plan employees participate in if they do not make an active election
- Among statewide plans, the default plan has been the defined benefit plan
- Studies show that most employees accept the default plan, rather than make an active election
- A This year, two states—Michigan and Florida—established the defined contribution plan as the default plan for new hires
- See also: *Decisions, Decisions*, by the National Institute on Retirement Security



States that reduced or eliminated automatic COLAs



Eliminated COLAs

- Florida eliminated all future COLA benefit accruals effective July 2011
- Michigan eliminated COLAs for teachers hired since July 2010
- Using legislation authorized in 2012, three Ohio pension boards have suspended or recommended suspension of COLAs
 - ▲ STRS, PERS, SERS
 - A Ohio public employee participants do not participate in Social Security
- Oklahoma effectively eliminated COLAs beginning in 2011



Contingent COLA

- Some plans have provided a COLA based on investment performance for many years: Arizona, Wisconsin
- More recent changes link COLAs to investment performance or the plan's actuarial funding level:
 Louisiana, Maryland, Minnesota, Montana, Rhode Island, South Dakota, Wyoming



Establishment of triggers to close plans

- The Michigan Legislature approved a new hybrid plan this year for newly hired school teachers beginning February 1, 2018.
- The bill includes a provision that closes the plan if its funding level drops below 85 percent for two consecutive years
- The Texas legislature this year included a provision in legislation switching City of Houston pension plans to hybrid plans if funding levels of the plans drop below designated thresholds (60-65 percent) after designated future dates



Transfer of mortality risk to active members

- Also in the new Michigan teacher hybrid plan:
 - A provision that will increase the normal retirement age when experience studies show an improvement in the plan's mortality experience by at least one year
 - This effectively shifts the plan's mortality risk from the employer to employees



Two Positive Case Studies: South Dakota and Wisconsin

- Statewide plans that cover most or all public employees in their state
- Consistently well-funded
- Both feature plan designs with relatively modest base retirement benefits and opportunity to benefit from strong investment performance
- Investment return assumptions traditionally have been below median
- Actuarial methods focusing on avoiding or quickly amortizing unfunded liabilities
- Strong record of paying full required contribution





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With thanks to my colleague, Yimeng Yin November 14, 2017

Introduction

- •Public pension assets: \$4 trillion (FRB)
- •Underfunded by approx. \$1.95 trillion (FRB/BEA) despite contribution increases.
- •The decline in risk-free interest rates since the 1980s and 1990s has created a very difficult investing environment for public pension plans.
- •Public plans largely maintained assumed returns, increased risk.

Employer contributions are up

Employer and employee pension contributions as % of Gross Domestic Product State and locally administered plans combined, U.S. as a whole



Contributions from U.S. Bureau of the Census Annual Retirement Systems Survey

Employer contributions "only" up ~0.13% of GDP since 1980s. What's the big deal?

- Not as small as it seems: 0.0013 x \$19 Tr.~ \$25b/year. Roughly equivalent to:
 - 6% increase in average state income or sales tax, or
 - 4% cut in school aid, or
 - 25% cut in all highway capital
 - ightarrow ightarrow politically painful, with repercussions
- Recent increase much larger: ~\$+55b since 2006→equivalent of 14% income or sales tax increase. Hard to do when incomes have been stagnant.
- Contributions are still \$12-14 billion < ARC(ADC)
- ARC(ADC) assumes ~7.5% return. A 5% assumption would add at least \$120b / year to ERC.
- Stress, and contribution increases, vary. In some places, enormous. In others, not. But risks abound.

Even after ERC increases, unfunded liability remains near record relative to economy



Source: Federal Reserve Board, Financial Accounts of the United States, Tables L.120.b and F.2 Note: Liabilities are as valued by the Bureau of Economic Analysis, not actuaries.

Unfunded liabilities relative to economy vary greatly

Unfunded liability as % of state gross domestic product, 2014

State & locally administered plans combined



Source: Federal Reserve Board Enhanced Financial Accounts https://www.federalreserve.gov/apps/fof/efa/efa-project-state-local-government-defined-benefit-pension-plans.htm These numbers differ from actuaries' estimates, and reflect discounting at 5%.

Risk-free rates fell. Public plans lowered earnings assumptions, but not by much

Assumed investment returns and risk-free returns

Public and private retirement systems



Notes:

- Public plan assumptions for 2001+ from Public Plans Database, Center for Retirement Research. Earlier years from multiple sources.

- Private plan assumptions provided via correspondence with authors of

Andonov, Aleksandar and Bauer, Rob and Cremers, Martijn, Pension Fund Asset Allocation and Liability Discount Rates (March 3, 2016). http://ssrn.com/abstract=2070054 - 10-Year Treasury yield from Federal Reserve Bank of St. Louis (FRED)

Public plans have moved into equity-like higher-risk investments



Source: Authors' analysis of Z.1 Financial Accounts of the United States, Federal Reserve Board, Tables L.118.b, L.120.b, and L.122

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Risk to Sponsors Has Increased

Riskiness of public pension portfolios relative to state and local government taxes has increased more than threefold since 1995

as % of taxes							
Pension fund fiscal year	Invested assets, (billions of 2016 \$) (A)	Volatility (risk) for a portfolio with 8% expected return (Standard Deviation) (B)	One standard- deviation risk, (billions of 2016 \$) (C = A x B)	State & local government taxes, (billions of 2016 \$) (D)	One standard- deviation risk, as % of taxes (E = C ÷ D)		
1975	\$335	3.7%	\$12.4	\$516.6	2.4%		
1985	698	2.7%	18.8	685.3	2.7%		
1995	1,719	4.3%	73.9	978.3	7.6%		
2016	3,554	12.0%	426.5	1,576.8	27.0%		
2016 / 1985	5.1	4.4	22.6	2.3	9.8		
2016 / 1995	2.1	2.8	5.8	1.6	3.6		

Potential magnitude of public pension fund investment risk

Sources and notes:

-Volatility estimates for 1975, 1985, 1995 are from Biggs (2013); 2016 is authors' assumption. There is about a 1 in 6 chance of a shortfall of 1 standard deviation or larger in a single year, under plausible assumptions.

- Invested assets from Federal Reserve Board, Financial Accounts of the United States.

- Taxes from Bureau of Economic Analysis, NIPA Table 3.3.

- Taxes and assets are in fiscal year 2016 dollars, adjusted using GDP price index.

- Risk measure is for a single year. Longer-term investment risks are larger.

Powerful consequence: Even *IF* assumptions are correct, a roller coaster path

Three individual simulations, all with 7.5% discount rate & 30-year 7.5% compound annual returns.

- Deterministic run: constant returns
- Stochastic run : high returns in early years
- Stochastic run : low returns in early years

People (politicians) interact with this system:

- Will they support 50+% contribution increases?
- Will they refrain from benefit increases and gimmicks if plan funding shoots above 100%?
 And this is when assumptions are met at 30 years.
 Most times, things will be better or worse.



Research shows U.S. public plans, with unique regulatory environment, have increased risk where private plans and Canada/Europe plans have not

- Important paper: Andonov, Bauer, Cremers (2017). Examines, among other things, how U.S. public plans, private plans, and Canadian/European plans responded to Treasury rate declines.
- Their statistical analysis shows that other plans reduced discount rates as market rates declined, but not U.S. public plans.
- "U.S. public pension funds have become the biggest risk-takers among pension funds internationally"

(They attribute the difference to GASB, but differences go beyond GASB.)

Moving into riskier assets is one way to maintain assumed returns. Less-apparent ways:

- <u>Disconnect assumed return</u> from capital market assumptions. Los Angeles Fire and Police Pensions used 7.5% in actuarial valuation but market assumptions indicated 6.2% compound return for target allocation.
- Justify long-run assumption by <u>assuming higher</u> <u>returns later</u>:
 - CalPERS 6.2% over next decade, then 7.8%
 - Ohio PERS 6.76% next 5-7 years, then 7.85%

→ Under these methods, asset volatility need not increase dramatically. Instead, plan expects to fall short of actuarial assumption, at least in the near term.

Public plans take investment risk, but do not bear investment risk

Investment risk borne by:

- •Taxpayers
- •People who use government services, infrastructure, etc.
- •Workers and, possibly, retirees
- •Future versions of the above

How can *risk-bearers*' interests be considered when risk-takers make investment-related decisions?

One way we look at risk: Graphs showing likelihood of bad outcomes. We and other nerds like this.



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Another approach, which we have found is more attractive to policymakers: Words.

"unless changes are made, it is likely that there will be a point over the next 30 years where the funded status of many plans will fall below 60%.... There is about a 15% chance that we will see funded statuses below 40%." (CalPERS, Annual Review of Funding Levels and Risks Report, 2015)

Conclusions

- •The decline in risk-free interest rates since the 1980s and 1990s has created a very difficult investing environment for public pension plans.
- •Public plans largely maintained assumed returns, increased risk.
- •Risk to sponsors and their stakeholders is much greater than before rates declined.
- •Important to consider *their* interests in risk-taking, and to communicate risks effectively.

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Pension Risks Moving From Balance Sheets to Budgets

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Agenda / Summary

- » Balance sheet unfunded liabilities at new highs
 - Unlikely to improve in coming years, even in favorable investment return scenario
- » Return expectations declining, budgetary costs accelerating
 - But contributions are still slow to react to higher liabilities
- » Pension asset performance never more important for government credit quality
 - Investment losses would materially compound already rising cost pressure



Balance sheet unfunded liabilities at new highs

"High" balance sheet leverage has been redefined

» Pension increasingly dominant in long-term liability profiles of 50 largestlocal governments



Government Fiscal Year (Median Pension Discount Rate)

Sources: Moody's Investors Service, based on government and pension plan CAFRs and actuarial valuations

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Pension Risks Moving From Balance Sheets to Budgets

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Looking out to 2019, a favorable return scenario shows pension-related credit risk flat line, not improvement

» Assumed returns applied to 56 plan sample for 2017 / 2018 / 2019 = 11% / 7% / 7%



Sources: Moody's Investors Service 56 plan sample, based on government and pension plan CAFRs and actuarial valuations

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Return expectations declining, budgetary cost burdens accelerating

Lower investment return expectations driving many US public plans to lower discount rate assumptions



Source: Milliman 2016 Public Pension Funding Study

- » US public pension funding regime links liability discounting with future return expectations
- » Many capital markets observers have lowered return expectations
 - Median expected return for same hypothetical portfolio has declined since 2000 (left)
 - 50% equities, 30% fixed income, 20% other
- » Lower discount rates produce higher liabilities, normal costs and amortization payments

Falling discount rates accelerating pension cost growth under government funding model

State of California's CalPERS pension contribution CAGR of 8% from fiscal 2017 to 2024, assuming CalPERS hits its new 7% return target each year



Source: CalPERS actuarial valuations

Costs to "tread water" would accelerate in modest downside investment return scenario

- » Downside scenario model for 2017-19: cumulative 2.2% returns
- » Government contribution paradigm is very slow to react to market losses



Sources: Moody's Investors Service 56 plan sample, based on government and pension plan CAFRs and actuarial valuations



Pension asset performance never more important for government credit quality

Relative scale of unfunded liabilities and costs are at or near historical highs

» Yet, scale of potential downside from assets remains elevated





Source: Oregon PERS

Source: Arizona PSPRS

Declines in reported US public pension discount rates are overdue

- » Even at new, lower levels, reported discount rates remain well above market interest rates
- » Callan: volatility risk required to maintain 7.5% return expectations roughly tripled from 1995 to 2015



Sources. Carrers, rederar Reserve of St. Louis, Ca

Low interest rates and reach for yield have forced public pension portfolio allocations away from fixed income

» Sample portfolio mix to produce expected return of 7.5%



Source: Callan capital markets assumptions

Recently strong investment performance is welcome news for US public pensions

But required significant allocations to volatile asset classes



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Reported net liability reflects only a portion of balance sheet pension risks

Two governments with similar unfunded liabilities may have very different scale of potential asset downside



Source: Moody's Investors Service

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Pension Risks Moving From Balance Sheets to Budgets

Moody's pension "budget shock" index measures one year probability of asset losses of 25% or more of gov't revenues

» Considers relative size of pension assets, and risk-taking, using assumed return as proxy

	New York City	Chicago	Los Angeles
ANPL as % of Operating Revenues	182%	708%	564%
Pension Assets as % of Operating Revenues	155%	155%	533%
"Shock" investment Return = 25% of Revenues	-16.1%	-16.1%	-4.7%
Assumed Rate of Investment Return	7.00%	7.50%	7.50%
Moody's Estimated Volatility, given assumed rate of return	9.70%	11.87%	11.87%
Moody's Pension Budget Shock Index : Probability of "shock return," assuming normal distribution with mean equal to assumed rate of return and standard deviation equal to Moody's estimated volatility	0.9%	2.3%	15.2%

Source: Moody's Investors Service

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