HARVARD Kennedy School
MOSSAVAR-RAHMANI CENTER
for Business and Government

Better Measurements: Risk Reporting for Public Pension Plans

Emily Kessler
Robert Stein
Greg Mennis
Susan Banta
Thomas J. Healey
Fatima Yousofi

July 2019

M-RCBG Associate Working Paper Series | No. 128

Better Measurements: Risk Reporting for Public Pension Plans

Emily Kessler
Robert Stein
Greg Mennis
Susan Banta
Thomas J. Healey
Fatima Yousofi

Mossavar-Rahmani Center
for Business and Government
Harvard Kennedy School
Harvard University

HARVARD Kennedy School
MOSSAVAR-RAHMANI CENTER
for Business and Government

Better Measurements: Risk Reporting for Public Pension Plans

Emily Kessler
Robert Stein
Greg Mennis
Susan Banta
Thomas J. Healey
Fatima Yousofi

Mossavar-Rahmani Center
for Business and Government
Harvard Kennedy School
Harvard University

HARVARD Kennedy School
MOSSAVAR-RAHMANI CENTER
for Business and Government

Citation

This report may be cited as Kessler, Emily, Robert Stein, Greg Mennis, Susan Banta, Thomas J. Healey, and Fatima Yousofi, "Better Measurements: Risk Reporting for Public Pension Plans." (2019), Cambridge, MA: Mossavar-Rahmani Center for Business and Government, Harvard Kennedy School.

Contents

Acknowledgments

Better Measurements: Risk Reporting for Public Pension Plans reports on the findings of a conference held on September 21, 2018, at the Harvard Kennedy School's Mossavar-Rahmani Center for Business and Government. The conference was chaired by Roger B. Porter, IBM Professor of Business and Government, Harvard Kennedy School; and Thomas J. Healey, Senior Fellow, Mossavar-Rahmani Center for Business and Government, Harvard Kennedy School. Support for the conference was provided in part by The Pew Charitable Trusts.

This report was written by Emily Kessler (Society of Actuaries), with the assistance of Robert Stein (Chair of the SOA Blue Ribbon Panel on Public Pension), Greg Mennis, Susan Banta, and Fatima Yousofi (The Pew Charitable Trusts), and Thomas J. Healey. Hope Steele provided editorial support and Neil Weinberg provided layout and design.

Abbreviations

AAL	Actuarial Accrued Liability
ADEC	Actuarially Determined Employer Contribution
ARC	Annual Required Contribution
ASB	Actuarial Standards Board
ASOP	Actuarial Standards of Practice
BRP	Blue Ribbon Panel
CAFRs	Comprehensive Annual Financial Reports
COLA	Cost-of-Living Adjustment
CPI-W	Consumer Price Index for Urban Wage Earners and Clerical Workers
GASB	Governmental Accounting Standards Board
IRDM	Investment Risk Defeasement Measure
OSR	Own-Source Revenue
SDRS	South Dakota Retirement System
SERS	State Employees Retirement System
SOA	Society of Actuaries
TRS	Teachers' Retirement System

Executive Summary

As most states across the country grapple with growing public pension funding gaps, the importance of measuring and understanding the risks taken by public retirement plans has never been more critical. Against that backdrop, the Harvard Kennedy School's Mossavar-Rahmani Center for Business and Government convened a conference on September 21, 2018, entitled "Better Measurements: Risk Reporting for Public Pension Plans." This gathering of over 40 pension policy experts—including regulators, practitioners, and academics—addressed ways to better measure, report, and manage pension plan risk in a way that supports planning and decision-making not just by fiduciaries, but also by policymakers. While opinions varied, common themes and recommendations emerged around each of three questions tied to public pension risk metrics:

What Are the Objectives of Risk Measurement?

Well-defined risk management frameworks adopt clear risk measures and put in place boundaries for risk taking before problems arise, making it easier to implement politically difficult decisions in response to adverse developments. One theme on which participants agreed was the value of having improved metrics and processes in place against which plans, and their sponsoring governments, could measure and manage risk. Suggestions of ways to support better planning ranged from analyses and metrics that quantify costs under various adverse

and possibly favorable risk scenarios to robust multi-scenario-based risk management policies.

At the heart of the risk measurement and management process is a simple question: what information is needed to assess key risk factors and improve the planning and decision-making of fiduciaries, policymakers, and budget officials? Conference attendees agreed that the following items should be considered:

- **Improved risk reporting to better align incentives.** General agreement was reached that risk reporting should inform planning and decision-making not only by the plan fiduciaries who oversee the pension plan, but also by budget officials and legislators who bear the cost and risk of decisions on behalf of taxpayers. Participants recognized that a disconnect between plan funding policies and government budget appropriations can result in misaligned incentives that can ultimately drive up costs, deficits, and intergenerational inequity. Over time, these circumstances can create conflicting demands for revenue needs between plans and their sponsors.

- **Quantified metrics that are accessible to all stakeholders.** Participants agreed that risk measures should be based on existing reporting standards and provide a quantified range of likely costs for pension benefits given a variety of risk factors—chief among them investment and contribution risks. And although most participants expressed a desire for a standard set of measures for all plans—such as funded ratios under baseline and stress assumptions, costs as a percentage of payroll going forward under baseline and stress assumptions, and forecasted employer contributions as a percentage of revenue—it was acknowledged that differences in policies and designs across plans warranted some flexibility for tailored analysis.

- **Framework for disciplined decision-making.** The objective of risk measurement and reporting is to assist government officials and other stakeholders in assessing the short- and long-term impact of investment, contribution, and other risks on both government budgets and pension system solvency. At its core, risk reporting should be designed to inform pension and budget planning and provide a solid basis for actively monitoring and managing key risks and decisions that promote the fiscal health of retirement systems and their sponsoring governments.

What Is the Current State of Play?

The regulatory and standards institutions that govern public pension financial reporting include the Governmental Accounting Standards Board (GASB) and the Actuarial Standards Board (ASB). Public plans regularly produce data—including statements of fiduciary net position, measures of plan costs, and information that can be used to examine contribution adequacy—to meet GASB requirements. However, in terms of risk, only a limited rate sensitivity analysis is required. Plans also publish more comprehensive actuarial valuations on a regular basis as well as asset and liability management studies used by plan administrators and fiduciaries to inform plan investment policies. But most publicly available information is calculated using the plan's expected investment return assumption and is not designed to support decision-making by policymakers or budget officials.

Over the last decade, both the GASB and the ASB have studied the need for improved risk reporting by public retirement systems and released recommended practices or guidelines to address that need. In addition, the Society of Actuaries (SOA) chartered

a Blue Ribbon Panel on Public Pension Plan Funding in April 2013 that focused on improving plan financial management.[1]

Presentations by past and present representatives of each institution shed light on the evolution of recent improvements in risk reporting requirements as well as current limitations to enforcing robust reporting or standardization. While recent guidance from all three organizations has established a foundation for improved reporting that focuses on similar issues and practices, participants agreed that more needs to be done.

For example, GASB disclosures—which are public, and therefore accessible to all stakeholders—generally follow developments in the field and require very limited forward-looking metrics. The recent ASB guidance on assessment and disclosure of pension plan risk is specifically designed to examine the range of potential forward-looking costs caused by a host of risks. However, the guidance is broad rather than prescriptive, is designed for actuaries fulfilling their professional responsibilities as advisors to plan fiduciaries rather than for supporting policymakers' decisions, and has yet to be implemented.

Can We Agree on a Uniform Set of Best Practices?

Ultimately, the core purpose of the conference was to test the field on the question of whether a uniform set of best practices was desirable and, if so, what that might look like. The need for required risk reporting was clearly articulated by participants, as was the importance of examining a range of differing risks. Discussion centered around the five risks identified in ASB guidance; however, two of them—investment risk and contribution risk—participants identified as most the important

1 See Society of Actuaries. (2014). *Report of the Blue Ribbon Panel on Public Pension Plan Funding*. https://www.soa.org/blueribbonpanel/.

for risk assessment.[2] And although agreement on specific metrics was not universal, common themes on risk reporting standards did emerge. For example, participants agreed that risk assessments should be simple and easy to understand by nontechnicians; should be designed to bring long-term thinking to what has traditionally been a short-term budget process; should convey how plan policies drive costs; and should relate these pension costs to the rest of the budget. The policies followed by the South Dakota Retirement System (SDRS) were discussed and acknowledged to be an example of a robust risk management and reporting framework (see Appendix II).

Based on these characteristics, and on the measures and key risks identified by conference participants earlier in the proceedings, The Pew Charitable Trusts presented a strawman proposal for consideration as a starting point for standard risk reporting. The framework was designed to assess the impact of investment risk on government budgets, evaluate the impact of contribution risk on pension system solvency, and quantify the range of likely costs for current benefits given probable impacts of investment and contribution risks. Specifically, Pew's strawman proposal considers the following:

- **The effect of change in the discount rate (i.e., the rate used to measure the obligation), specifically the effect of a +/− 1 percent change in the expected rate of return.** GASB Statements 67 and 68 require the reporting of a sensitivity analysis of net pension liability at +/− 1 percent of the expected rate of return. The *net pension liability* is defined as the obligation less the plan's

2 Investment and contribution risk as cited and defined in section 3.2 of the Actuarial Standards Board (ASB), Actuarial Standard of Practice (ASOP) No. 51: *Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions* (2017). Additional risks identified in section 3.2 include: asset/liability mismatch, interest rate, and longevity and other demographic risks.

fiduciary net position, which is the market value of assets less payables (defined in the statement as the net position restricted for pensions). Many participants also supported including the Investment Risk Defeasement Measure (IRDM) as proposed in Actuarial Standard of Practice (ASOP) No. 4 Exposure Draft. The IRDM would be disclosed by actuaries in funding valuation reports measuring the plan's obligation using the unit credit funding method and a discount rate consistent with high-quality debt securities.

- **Scenario analyses based on long-term projections over a 20-year measurement period, including two scenarios: Scenario 1 assumes a fixed 5 percent rate of return and Scenario 2 assumes an asset shock.** The 5 percent nominal rate of return (or 3 percent real return) scenario is meant to mimic the 25th percentile expected return for a typical asset portfolio; plans could choose to use the 25th percentile return for their specific portfolio. For the asset shock scenario, Pew suggests using the Dodd-Frank adverse stress test scenario, followed by long-term returns of 5 percent (or the 25th percentile of expected returns). Analysis for each scenario would include measures of funded position, costs as a percentage of payroll and available revenue, and operating cash flow as a percentage of assets.

- **The effect of constraint in contributions based on revenue growth.** To assess contribution risk, Scenarios 1 and 2 would be evaluated under the following assumptions: (a) full actuarial contributions were made based on current funding policies, and (b) contributions were constrained by the rate of revenue growth (i.e., fixed as a percentage of revenue). Recent experience discussed at

the conference noted that, due to revenue constraints, plans typically fall short of making full contributions following economic downturns, and many plans have not received the full actuarial contribution during relatively good economic times.

- **The sensitivity of total normal cost and employer normal cost to different discount rates.** This sensitivity includes a +/−1 percent change in the discount rate (Scenario 1) and a discount rate based on a 5 percent nominal rate of return (or the 25th percentile of expected returns) (Scenario 2).
- **Projections that simulate the volatility of annual investment returns.** The aim of these projections is to measure the range of employer contributions, including the minimum and maximum over 10 and 20 years where the assumed rate of return is achieved, on average, over the measurement period.

Importantly, it is recommended that the essential elements for risk reporting—which by no means limit additional analysis—be applied as a decision-making framework for evaluating proposed policy changes, assessing the impact of changes already adopted, and developing more explicit policies to actively monitor and manage key risks.

Better Measurements: Risk Reporting for Public Pension Plans

Ten years after the onset of the Great Recession, public-sector pension plans continue their struggle to return to full fiscal health. Results have varied greatly across plans. For example, the best-funded plans—those whose funding level approached 100 percent in 2008—were, on average, 90 percent funded in 2017; in contrast, the worst-funded plans were only about 70 percent funded in 2008 and fell to about 55 percent funded in 2017.

This deterioration in funded status has continued despite favorable market conditions during the last 20 years: the median pension fund earned over 7 percent per annum between 1997 and 2017. Plans have struggled to improve their fiscal positions not because of unfavorable financial markets, but mainly because many public plans have not received the "full" actuarial contribution. From 2007 to 2013 (when state plans were reporting actuarial contribution rates), state pension plans were receiving just 89 percent of the actuarial recommended contribution—and the three states with the lowest-funded plans had contributions equal to just 62 percent of the actuarially required amount. Furthermore, many states that made actuarial contributions did so based on rules that did not require a level of

contribution sufficient to make progress on paying down pension debt.[1]

Investment losses during the financial market crises of 2008–09 did, of course, have a significant impact on the fiscal health of public funds: most plans experienced losses of over 20 percent. However, the best-funded plans have maintained funded ratios of over 90 percent over two decades and two recessions, and have recently rebounded to fully funded status. From this perspective, the steep decline in plan assets during the onset of the Great Recession, while significant, is not the root cause of public pension underfunding. Instead, the impact of the financial market shock has revealed the exposure facing governments that fell short of making full contributions in years past.

Looking forward, plans will face contribution risks like those revealed by recent policymaker behavior, as well as volatility and investment risk like that experienced in the first decade of the 2000s—particularly given the consensus that returns will be lower-than-historic going forward. Ultimately, without adequate risk management, states may face a continuation of the budget crowd-out many have faced since the turn of the century. For example, in 2017 across the 50 states, state pension contributions equaled 7.4 percent of state revenues; in 2007 they were only 4.9 percent.[2]

This topic has been the focus of two conferences at the Harvard Kennedy School's Mossavar-Rahmani Center of Business and Government that brought together pension experts from across the country. The first, in October 2017,

1 The Pew Charitable Trusts. (2018). *The State Pension Funding Gap: 2016*. https://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2018/04/the-state-pension-funding-gap-2016.

2 See the U.S. Census Bureau's Annual Survey of State Government Finances, available at https://www.census.gov/programs-surveys/state.html.

concluded just how difficult it is to measure public pension plan risk—and the potential cost of that risk—in a way that is accessible and understandable to all retirement system stakeholders, including budget officials and taxpayers, who ultimately bear the costs of risk.

The second conference, which is the subject of this report, was held on September 21, 2018. Entitled "Better Measurements: Risk Reporting for Public Pension Plans," it provided a forum for over 40 top pension policy experts, regulators, practitioners, and academics to address how to better measure, report, and manage pension plan risk in a way that supports planning and decision-making by policymakers as well as fiduciaries. Specifically, the event was designed to gather expert opinion on three questions surrounding public pension risk metrics:

- What are the objectives of risk measurements?
- What is the current state of play?
- Can we agree on a uniform set of best practices?

The intense discussions that took place around each of these questions crystalized the risk management challenges facing public retirement systems and their sponsoring governments today. That colloquy can be summarized as follows.

Risk Management Challenges

> The unfunded liability for many plans is scheduled to go up, based on the funding policy, over time. That's a predictable surprise. It's also a predictable surprise that at some point over the next 5 or 10 or 20 years returns will be below expectations and we'll be back here all over again. That's a likely outcome. … And I understand [these risk measures] can be expensive [to calculate] but I would just counter and say if you can't afford to look at the risk, you can't afford to hold the risk.
>
> *— Brian Septon, Actuary, The Terry Group*

Public-sector pension plans create risk management challenges in part because the entity taking the risk is not the entity bearing the risk. Public-sector pension plans are managed by trustees, who are generally drawn from plan participants, state officials, and others who are appointed to ensure the plan is run for the benefit of participants. They are deliberately separated from the public entity for whom the participants work to ensure the plan is run for the benefit of participants and is not used for political or other purposes.

The disconnect comes because the trustees overseeing the plan are not responsible for paying for the plan. Boards of trustees may include representatives from government entities participating in the plan, but the trustees as a body do not pay the contributions or manage the taxpayer funds used to pay the contributions. Thus, if the plan trustees decide to take a risk—for example, to increase investment in risky assets (or increase benefits when funding is temporarily high)—that decision may provide higher returns during periods of strong market performance; but it also leads to increased volatility, which increases costs and may significantly offset the expectation of higher returns. The cost of that risk is not borne by the trustees, it is borne by the state and local governments contributing to the plan. And, in jurisdictions where elected officials set policy, most often the information provided to them does not adequately identify risk or quantify the potential costs of their decisions. The taxpayers represented by these government entities benefit (through lower taxes or increases in other services) if the investments return as expected or better and pay more (through increased taxes or decreases in other services) if investments do not bear fruit.

From a risk management perspective, this can cause misaligned incentives. First, risk-taking creates a perceived short-term benefit: the higher the expected return/discount rate, the

better funded the plan will appear, thus decreasing contributions. But an aggressive investment assumption brings with it more risk and a greater likelihood that the assumption will not be met, necessitating future contribution increases. One conference participant described this as the dietary equivalent of "eat more, lose weight." Second, it creates barriers to de-risking: taking less risk results in a lower-funded status, which will typically drive up the short-term cost to taxpayers, based on the standard manner in which actuarial assumptions and funding formulas are applied. Third, in an era of mature plans in which outflows are greater than inflows, lower-return environments create particularly strong incentives for increasing asset/liability mismatch (i.e., increasing allocations to risky, volatile assets) because the fund's return on assets takes priority over considerations of cash flow and variability in contributions. Collectively, all of these factors increase the risk to which the plan is exposed.

So, why don't state and local governments perform risk analysis for the plans they fund? Two factors were discussed: a lack of access to data and the challenge of synthesizing complex information in a manner that will add value to the decision-making process. Proper risk analysis requires access to data, and those data are held by the plan, its fiduciaries, and the plan's actuary. And while those parties often do conduct risk analyses, they are designed for the specific purpose of managing the plan and are not always widely distributed.

Conference participants discussed how budget officials' inability to perform risk assessments for public pension funds is unusual relative to other aspects of the state budget, on which downside scenario analyses are often conducted. There was strong agreement among participants that risk measurement and management is critical to planning and decision-making—not only for fiduciaries, but also for government policymakers and budget officials as well. Participants also recognized that risk

analysis should be understandable to non-experts and developed based on clear objectives.

Objectives of Risk Measurement

> One of the biggest risks that I see is the lack of an umbilical cord between decision makers and an actuary. The reality is that many [state and local budget officials] have to go through our pension plan systems in order to get a whole bunch of scenarios done … we don't have at our fingertips all these what-if scenarios to understand the implications and the weight of changes. We do it for revenue forecasting. We do it for prison population forecasting. We do it for Medicaid benefits forecasting. We have that at our fingertips. We have all the tools, all the data and we run the numbers all the time. We don't do that for pensions, but we should.
>
> *— John Hicks, Executive Director, National Association of State Budget Officers*

Conference participants generally agreed that risk management should support more-effective investment and funding strategies that create more resilience from the inevitable adverse economic experience. And the risks of running a pension plan must be understood by all stakeholders, not just fiduciaries. The 2008 financial crisis and the on-going difficulty in recovering to a solid financial position since that time has impressed upon the current generations of trustees, state officials, and policymakers the importance of risk management. Many plans are also very large relative to other state and local obligations; they are also mature, resulting in negative cash flows. These factors also increase the importance of proper risk management.

Trustees have historically spent significant time analyzing investments; however, until recently, only one measure of pension obligation has typically been provided by most plans: total liability discounted at the plan's assumed rate of return. But proper risk measures tie the estimation of the obligation to

the underlying investment risk—particularly a range of downside outcomes—to help trustees, officials, and state and local policymakers understand the long-term implications of policy decisions. And although the Actuarial Standards Board (ASB) identifies five risk areas for assessment—investment, asset/liability mismatch, interest rate, longevity, and contribution risk—a large majority of conference participants identified investment risk and contribution risk as those most in need of examination.

Second, there was strong agreement that risk and reporting frameworks should provide key metrics on the potential budget impact of risks to aid in planning and decision-making. Participants noted that budget officials, particularly at the state level, run scenarios and consider "what ifs" for many of their budgetary obligations; those what-if exercises should apply to pensions as well. Specifically, plan liabilities and costs at different discount rates, standard deviation of expected returns, and stress test analysis (or what-if scenarios) are essential information for decision makers.

Conference participants sought to ensure that downside risks were well understood: consequences can be significant when bad things happen, and state and local governments cannot abnegate responsibility for benefit payments during downturns. However, although the downside risk was clearly identified as important, other participants argued that measures should also quantify the upside benefits of risk taking as well.

At the heart of the exercise is a simple question: what information is needed to improve planning and decisions of fiduciaries, policymakers, and budget officials? Suggestions ranged from metrics that quantify costs under various adverse—and possibly favorable—risk scenarios to robust multi-scenario-based risk management processes based on a clearly defined risk appetite. Such processes define specific actions—in advance—that will be taken if there is a likelihood of exceeding

the pre-determined risk appetite. It was noted that risk appetite frameworks have the benefit of driving policy decisions that are politically difficult if the boundaries have been set before a problem arises. The policies followed by the South Dakota Retirement System (SDRS) were presented here as an example of a robust risk management and reporting framework (see Appendix II for more detail).

Conference participants focused on three principles for sound risk management:

1. **Improved risk reporting to better align incentives.** General agreement was reached that risk reporting should build on existing plan analyses and reporting practices but be tailored to inform planning and decision-making not only by the plan fiduciaries who make funding decisions, but also by budget officials and legislators who bear the cost of risk of decisions on behalf of taxpayers. Participants recognized that a disconnect between plan policies and government budget appropriations can result in misaligned incentives that could ultimately drive up costs, deficits, and intergenerational inequity over time. Providing information that highlights future contribution demands in relation to forecasts of Own-Source Revenue (OSR) was discussed as being critical to bridging the gap between fiduciaries and those with appropriation responsibilities, and to understanding potential budget crowd-out from increasing pension costs.[3]

3 *Own-Source Revenue* (OSR) is a standard benchmark for state or local budget capacity, although in some cases (e.g., state-sponsored plans in which municipalities share costs) OSR may not be consistently applicable and other measures of budget capacity may need to be applied. *OSR* is defined as revenues raised directly by state and local governments, generally excluding funds from intergovernmental transfers (i.e., all dollars received from government grants, shared taxes, or loans) as well as revenues from state-operated liquor stores, utilities, and social insurance trusts (including pension system trusts). For a more detailed discussion of using

2. **Quantified metrics that are accessible to all stakeholders.** Participants agreed that risk measures should be based on existing reporting standards and provide a quantified range of likely costs for pension benefits given a variety of risk factors—chief among them investment and contribution risks. And although many participants expressed a desire for a standard set of measures for all plans, such as funded ratios under baseline and stress assumptions, costs as a percentage of payroll going forward under baseline and stress assumptions, and forecasted contributions as a percentage of revenue, it was acknowledged that differences in policies and designs across plans warranted some flexibility for tailored analysis.

3. **Framework for disciplined decision-making.** The objective of risk measurement and reporting is to assist government officials and other stakeholders in assessing the short- and long-term impact of investment, contribution, and other risks on government budgets and the impact of investment, contribution, and other actuarial risks on pension system solvency. At its core, risk reporting should be designed to inform pension and budget planning and provide a basis for decisions that promote the fiscal health of retirement systems and their sponsoring governments.

OSR as a benchmark for budget capacity, see Mennis, G., Banta, S., & Draine, D. (2018). *Assessing the Risk of Fiscal Distress for Public Pension: State Stress Test Analysis*. Harvard Kennedy School Mossavar-Rahmani Center for Business and Government Working Paper No. 92.

Current State of Play

> In my early days of budgeting, all we wanted to know was what was the employer contribution rate and how much did it change from last year because we're putting budgets together. And in most cases the answer was very slight. And so, because it wasn't a problem then, you didn't dig into it.
>
> *— John Hicks, Executive Director, National Association of State Budget Officers*

Conference participants discussed existing accounting and actuarial standards at length, with an eye to determining whether current reporting structures should be modified to include further risk reporting. Table 1 on pages 12–14 presents a summary of current approaches outlined by relevant regulatory and association bodies, organized using the recommendations of the Blue Ribbon Panel, and was provided to participants as a guide to that discussion.

The regulatory institutions that govern public pension financial reporting include the Governmental Accounting Standards Board (GASB) and the ASB. Over the last decade, both organizations have studied the growing need for improved risk reporting by public retirement systems. And both have released revised practices or guidelines to address that need. In addition, the Society of Actuaries (SOA) chartered a Blue Ribbon Panel (BRP) on Public Pension Plan Funding in April 2013 that focused on improving plan financial management.

Presentations by past and present representatives of these institutions shed light on the evolution of recent improvements in risk reporting requirements, beginning with the June 2012 release of GASB Statements 67 and 68.[4] The GASB's new

4 GASB Statement No. 67 was effective for fiscal years beginning after June 15, 2013; GASB Statement No. 68 was effective for fiscal years beginning after June 15, 2014. See https://www.gasb.org/jsp/GASB/Page/GASBSectionPage&cid=1176160042391.

disclosures were established to "enhance the decision-usefulness of the financial reports of these pension plans, their value for assessing accountability, and their transparency by providing information about measures of net pension liabilities and explanations of how and why those liabilities changed from year to year."[5]

Specifically, GASB Statements 67 and 68 widened plan disclosure requirements to include a 10-year history of expense and contributions, as well as sensitivity of the obligation to a 1 percent change in the discount rate. They also severed the link between the contribution and the accounting expense by defining a standardized accounting expense definition that all plans must use and requiring plans to recognize a balance sheet obligation (or asset) for any unfunded (or surplus) obligation.

The Blue Ribbon Panel's report, released in February 2014, furthered public debate on risk reporting by recommending "actions to strengthen financial and risk management practices by providing new information to trustees, funding entities and their elected officials, employees and their unions, taxpayers and other stakeholders."[6]

Recommendations in the BRP report fell under four broad categories including [effective] *Funding Principles; Recommended Risk Measures, Analyses and Disclosures; Recommendations Regarding the Role of the Actuary;* and *Recommendations Regarding Plan Governance.* The *Recommended Measures, Analyses and Disclosures* called for several new disclosures to provide more information on (a) measures of risk to the plan's financial position to

5 See GASB Statement No. 67, *Financial Reporting for Pension Plans* (2012) p. vi. https://www.gasb.org/jsp/GASB/Document_C/DocumentPage?cid=1176160220594&acceptedDisclaimer=true?

6 *Report of the Blue Ribbon Panel on Public Pension Plan Funding: An Independent Panel Commissioned by the Society of Actuaries* (February 2014); see p. 6 for a summary of recommendations. https://www.soa.org/globalassets/assets/files/newsroom/brp-report.pdf.

Table 1. Approaches to Measuring Risk for Public Pensions

SOA Blue Ribbon Panel's 2014 Recommendations Compared to Current and Proposed Accounting Requirements and Actuarial Guidelines

Blue Ribbon Panel Report Category (Purpose)[a]	Blue Ribbon Panel Recommendation	Governmental Accounting Standards Board (GASB)
	Risk Measures and Analyses	
Measures of Risk to Financial Position (Understanding Current Risk Levels)	(1) standard deviation of expected returns on asset portfolio; (2) plan liability and normal cost at risk free rate; (3) standardized plan contribution.	Sensitivity of the net pension liabilities to changes in the discount rate at +/− 1% vs. single discount rate.[b] Single (blended) discount rate is determined by comparing projections of the plan's fiduciary net position to projected benefit payments.[c]
Stress Testing (Measuring Investment and Contribution Risks)	Financial projections over 30 years using baseline investment return assumptions as well as returns at +/− 3% investment returns vs. baseline and 80 to 100% of ARC payments.	10-year schedules comparing actual contribution amounts with actuarially determined contribution requirements and ratios of actual contributions to payroll allows tracking of the past impact of investment and contribution risks.[d]
	Enhanced Disclosures	
Un-Discounted Cash Flows (Providing Data for Independent Assessment of Plan Obligations)	Disclosure of projected benefit payments for current employees to allow for independent assessment of plan obligations.	N/A
Financial and Demographic Trends	10 years historical data of assets, benefit payments, and liabilities to payroll, as well as recommended contributions to revenue; and actual to recommended contributions.	10-year schedule of changes to the net pension liability by source.[e]

Blue Ribbon Panel Report Category (Purpose)[a]	Actuarial Standards Board (ASB) Actuarial Standard of Practice (ASOP) No. 51 and Proposed Revisions to ASOP No. 4[f]	
	Area of Risk	Method for Assessing Risk
Risk Measures and Analyses		
Measures of Risk to Financial Position (Understanding Current Risk Levels)	Investment Risk Defeasement Measure (included in exposure draft of proposed changes to ASOP No. 4) supplement disclosure of obligation (plan liability) measures to reflect the cost of defeasing investment risk.[g]	Calculating liabilities using discount rates consistent with market yields for a bond portfolio whose cash flows match benefits expected to be paid; based on yield for U.S. Treasuries or fixed-income securities that receive one of the two highest ratings.
Stress Testing (Measuring Investment and Contribution Risks)	Investment, Interest rate, & Contribution risk (ASOP No. 51); Definition of Contribution Risk cites instances "where contributions are not made in accordance with funding policy."	Stress testing, scenario, and stochastic analysis
Enhanced Disclosures		
Un-Discounted Cash Flows (Providing Data for Independent Assessment of Plan Obligations)	N/A	Unit credit method in ASOP No. 4 §3.11(b) uses undiscounted cash flows but does not require these calculations to be disclosed.
Financial and Demographic Trends	Longevity and other demographic risks (ASOP No. 51 §3.2); Plan maturity measures (ASOP No. 51 §3.7) five ratios:	(a) Assets to payroll; (b) retired liability to total liability (AAL basis); (c) cash flow to assets; (d) benefit payments to contributions; (e) duration of AAL.

(Notes and sources on the following page.)

Table 1. Approaches to Measuring Risk for Public Pensions

Notes and Sources

[a] Recommendations for Risk Measures Analyses and Disclosures. The Blue Ribbon Panel's 2014 Report also includes recommendations for Funding Principles, the Role of the Actuary (actuarial methods), and Plan Governance. See https://www.soa.org/globalassets/assets/files/newsroom/brp-summary.pdf.

[b] See GASB Statement No. 67, *Financial Reporting for Pension Plans (2014),* which revised previously existing guidance in Statement No. 2, *Disclosures Specific to Single-Employer and Cost-Sharing Pension Plans* ¶31(b)1. G (i) and (ii). Single discount rate is determined by comparing projections of the plan's fiduciary net position to projected benefit payments. Other discount rate related disclosures include: assumed asset allocation of the plan's portfolio, long-term expected real rates of return for each class, assumptions about projected cash inflows and outflows, and how the long-term expected rate of return was determined, including significant methods and assumptions. See https://www.gasb.org/cs/ContentServer?c=Document_C&cid=1176160220594&d=&pagename=GASB%2FDocument_C%2FDocumentPage.

[c] See GASB Statement No. 67 *Measurements of the Net Pension Liability,* Discount ¶ 41 "Comparing projections of the pension plan's fiduciary net position to projected benefit payments."

[d] See GASB Statement No. 67 ¶ 106 "Information about Actuarially Determined Contributions."

[e] Additional financial and demographic disclosures include a 10-year schedule of ratios (e.g., plan net position divided by total pension liability, net pension liability divided by payroll) and a 10-year schedule of annual money-weighted rate of return on plan investments.

[f] See Actuarial Standards Board (ASB), *Actuarial Standard of Practice No. 51: Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contribution (2017),* Transmittal Memo and proposed revision of *Actuarial Standard of Practice No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions,* Transmittal Memo. ASOP No. 51 §3.2 identifies five risks areas: investment, asset/liability mismatch, interest rate, longevity, and contribution risk. Revisions to ASOP No. 4 proposes supplemental disclosure of plan liabilities and costs at lower discount rates. See http://www.actuarialstandardsboard.org/asops/assessment-disclosure-risk-associated-measuring-pension-obligations-determining-pension-plan-contributions-3/.

[g] See the proposed revision of *Actuarial Standard of Practice No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions,* Exposure Draft. The ASB and its Pension Committee will be reviewing public comments and responses submitted for the exposure draft and deciding on next steps. See http://www.actuarialstandardsboard.org/asops/measuring-pension-obligations-and-determining-pension-plan-costs-or-contributions-proposed-revision-march-2018/.

AAL =Actuarial Accrued Liability; ARC =Annual Required Contribution; ASB = Actuarial Standards Board; ASOP = Actuarial Standard of Practice; GASB = Governmental Accounting Standards Board.

understand current levels of risk; (b) stress testing to measure [future] investment and contribution risks; (c) undiscounted cash flows to provide an independent assessment of plan obligations; and (d) [historical] financial and demographic trends to assess the implications of these trends on the plan's financial positions and participant profile. These four categories of risk disclosure were used to benchmark current and proposed governmental accounting requirements under the GASB and recommended actuarial standards of practice issued by the ASB.

The significance of the BRP recommendations was considerable: the recommendations were among the first to recognize the disconnect between plan fiduciaries and the sponsoring entity, and to call for substantial forward-looking public disclosures focused on systemic risk. Of particular note was the recommendation to stress test pension funds to quantify likely investment and contribution risks, and provide those findings to a broad range of stakeholders.

Likewise, the actuarial profession is changing their Actuarial Standards of Practice (ASOPs) to increase the amount of information required from public plan actuaries. Most notably, **ASOP No. 51, Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions,** which was released in 2017, requires disclosure of risk for funding and pricing valuations. It instructs actuaries to identify and assess risks that "may be reasonably anticipated to significantly affect the plan's future financial condition"; examples cited include investment risk, asset/liability mismatch risk, interest rates, longevity risks, and contribution risks.[7] It requires the plan to disclose certain plan maturity measures, including the ratio of assets to payroll,

7 ASOP No. 51, sections 3.2 and 3.3 http://www.actuarialstandardsboard.org/asops/assessment-disclosure-risk-associated-measuring-pension-obligations-determining-pension-plan-contributions-3/.

the ratio of cash flows to assets, and the ratio of benefit payments to contributions.[8] Although the form of the analysis is not prescribed and numerical calculations are not required, methods suggested include scenario tests, sensitivity tests, and stress tests.[9] This standard is effective for funding or pricing valuations with a measurement date on or after November 1, 2018; as a result, no valuation reports had been produced under that standard at the time of the conference.

The introduction of ASOP No. 51 was followed in 2018 by a proposed revision of **ASOP No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions.** The ASOP No. 4 revisions propose a requirement that all actuaries disclose an Investment Risk Defeasement Measure (IRDM) when performing a funding valuation; this would estimate plan liabilities using an interest rate on high-quality debt instruments as a risk-free discount rate,[10] and would also estimate plan liabilities using the unit credit actuarial cost method.[11] As an exposure draft, this standard of practice is not currently in effect.

---

8 Section 3.7, op cit.

9 Section 3.4, op cit.

10 3.11.c "Discount rates consistent with market yields for a hypothetical bond portfolio whose cash flows reasonably match the pattern of benefits expected to be paid in the future. For this purpose, the actuary should use either of the following: 1. U.S. Treasury yields; or 2. rates at which the pension obligation can be effectively settled. The actuary may use yields of fixed-income debt securities that receive one of the two highest ratings given by a recognized rating agency:" http://www.actuarialstandardsboard.org/asops/measuring-pension-obligations-and-determining-pension-plan-costs-or-contributions-proposed-revision-march-2018/.

11 The unit credit cost method sets the liability equal to the value of benefits accrued (earned) to date. Most public sector plans use the entry age normal cost method for funding and the GASB requires that method in its calculations. The entry age normal and unit credit cost methods produce the same value for retired and deferred vested populations. All other things being equal, the entry age normal cost method will generally produce a higher liability than the unit credit cost method for active participants with final pay benefits, because the entry age normal cost method recognizes anticipated future pay increases in the liability.

While recent guidance from the GASB, the ASB, and the BRP has established a basis for improved reporting that focuses on similar issues and practices, conference participants agreed that more needs to be done, and acknowledged that most plans disclose few if any risk measures beyond the liability sensitivity analysis required by the GASB. Moreover, despite the common themes of guidance from all three organizations, no standard or consistent reporting requirements for comprehensive risk measurement have yet emerged. Finally, and perhaps most significantly, though most plans conduct these types of analysis internally, there is little or no risk reporting provided to or designed for non-fiduciaries.

Participants recognized that the knowledge and ability to conduct effective risk management is readily available, but raised the important question: why is it not being widely done? There was some discussion among conference participants about whether the GASB or rating agencies should strengthen their reporting standards to require risk management metrics and practices; however, this tactic was not seen as feasible, for several reasons.

First, the GASB is currently in a monitoring mode with Statements 67 and 68. Both statements were issued in 2012; Statement 67 was effective as of June 15, 2013 while Statement 68 was effective by June 15, 2014. The GASB is currently working to provide implementation support and to understand how the statements are being used.

At the conference, GASB representatives noted that constructing new statements is a time-consuming process requiring significant due process to ensure the standard meets users' needs. The GASB expended two years on research plus four years on due process before Statements 67 and 68 were issued. Given the long lead time necessary to create a new statement, review projects typically do not begin until a standard has been

in effect for five years and research for a potential new standard is not begun until ten years after a standard's effective date.

Rating agencies have no leverage with pension systems because the pension systems do not issue debt. Rating agencies rate the debt of the state and local governments responsible for paying the contributions. The plan trustees, as the plan's governing body, make decisions on risk taking and risk management.

Most critically, rating agencies and the GASB are not the right places to provide the information for risk measurement and analysis because the goals of those agencies do not align:

> I don't think that from the state policy making perspective that using either rating agencies [reports] or GASB standards [as] the stick that makes policymakers do the right thing is a viable course. First of all, nobody really cares about the organizational-wide balance sheet when you go into the halls of legislators or frankly even in budget offices. … GASB is backward looking. It says this is where the organization was last year, last quarter or what have you. And I think if anything we can take out of the early comments is we should be looking at where are we now and over the next 10 and 20 years. …
>
> The rating agencies are in a very similar position [in that] they are candidly reflecting [how] your credit relates to the comparable credits in the marketplace which is not again a particularly valuable starting point for making decisions about how to improve your [plan's] circumstances over a time horizon that's beyond the interest of the municipal finance markets.
>
> — *Benjamin Barnes, State of Connecticut, Secretary of Policy and Management*

For example, GASB disclosures—which are public, and therefore accessible to all stakeholders—generally follow developments in the field and require very limited forward-looking metrics. Risk management is largely beyond the GASB's scope of responsibility. And while recent revisions to ASB guidance

examine the potential forward-looking impacts of a host of risks—clearly recognizing risk management as within their scope—reporting under the guidance has yet to be implemented by most plans. In addition, the conforming analyses may not be readily available to non-fiduciaries: ASOP No. 51 focuses on the funding valuation, which is delivered to the plan trustees. Their risk management concerns may be different than those of the state and local governments responsible for funding plan contributions.

Ultimately, ASOP No. 51 is expected to play a critical role in how public plan stakeholders think about risk management. Conference participants discussed how the actuarial field will respond and suggested that, while adherence to ASOP No. 51 is expected, the interpretation and application of the standard may vary from plan to plan. As experience with the guidance plays out and practices evolve, participants recognized a clear opportunity for including budget decision makers and elected officials in their capacity serving the government plan sponsor, as well as representing taxpayers. Engagement with public-sector plan stakeholders outside the actuarial profession, including with boards of trustees, was identified as critical to the robust application of ASOP No. 51, whose responsibilities include ensuring that plan actuaries comply with the guidance.

Uniform Set of Best Practices

> When I worked on governmental budgets, we often had a phrase: "the world ends in thirteen months." You are at the month before the budget starts and you are scrambling and all you care about is having enough cash to get through the next thirteen months. And you're dealing with fundamental long-term issues [in pension risk]. … Contribution policy is often designed to ensure that next year is not a problem, the year after is not a problem; but the long-term problems cannot be escaped. So, one of the key problems is dealing with the short-term decision-making and the short- term perspective with a long-term issue [such as pension risk]. And so, whatever you do for risk reporting and measurement and communication must try to encourage a longer-term view and make [that view] easier to think about.
>
> *— Donald Boyd, Economist, Center of Policy Research, Rockefeller College, University at Albany*

As discussed above, conference participants were in reasonably strong agreement on both the recommended goals of risk management and the outcomes stronger metrics should promote. There was also general agreement on the need for some level of standardized metrics. Characteristics of well-constructed risk measures were discussed at some length, and key themes emerged:[12]

- **Keep it simple.** At a minimum, measures should be well communicated. Actuaries, investment advisors, plan administrators, and other key staff and consultants must thoroughly understand the complex technical detail. Their duty to trustees, policymakers, and other decision makers and advisors is to ensure that technical detail be provided to decision makers in a simple and accessible manner that illustrates the impact of risk and uncertainty

12 For a detailed description of participant discussion on these characteristics, see Appendix II.

on plan funding, plan sponsor budgets, and participant benefits.

- **Bring long-term thinking to short-term processes.** Contributions for pensions are considered within the context of the state and local government budgeting process, which is inherently short term. Pensions are a long-term cost that is budgeted annually as part of payroll; however, unlike other payroll items, it is sticky and cannot easily be changed. Processes that define specific actions to address unexpected costs have the benefit of driving policy decisions before a problem arises.

- **Relate it to the rest of the budget.** One item discussed at length was the value of showing the cost for pensions in relationship to the rest of the budget, typically as a percentage of OSR. For example, the same economic cycles that lead to 5 percent returns for the pension fund could also strain revenues at a time when there are more demands on state services. These crowding out effects are critical to understand, even though they may be difficult to quantify precisely for those funds with multiple contributing entities.

- **Demonstrate how policy affects cost attribution.** Most risk measures focus on what happens under negative circumstances: for example, a stress test under an asset shock or low-return scenario. While it is important to understand what happens during those events, plans should also consider whether their funding mechanisms are well suited to normal risk taking (e.g., the impact of market volatility even in the event that long-term target rates of return are met should be taken into account), or whether existing policies could lead to unintended consequences.

- **Standardization with some flexibility.** The majority of participants believed standardized risk metrics were important for these reasons. However, some participants wanted any new standards to allow for some flexibility by identifying certain standard measures for all plans, to promote comparability; and other measures that would apply to plans based on their size, the nature of benefits, and the level of risk to be managed (e.g., how underfunded they are).

Participants recognized the benefit of standardized metrics applicable to all plans, with the understanding that those standards be based on the characteristics of individual plans and that additional analyses may be appropriate. It was also recognized that the recommended simplicity and accessibility of risk reporting should not impede the rigor with which the underlying analysis is conducted. In particular, the presentation of stochastic analysis—a sophisticated modeling technique widely recognized as the best method for simulating the volatility and risk of real market conditions—was identified by even the most sophisticated participants as essential to the process but challenging to make accessible to an educated lay person.

A Proposed Strawman for Public Pension Risk Reporting

Based on the characteristics above, a specific strawman proposal from The Pew Charitable Trusts was presented for consideration as a foundation for standard risk reporting. The foundation was drafted to also account for the desire to balance standardization and flexibility on the one hand, and simplicity and rigor on the other. The proposal does this by focusing on investment and contribution risks using simple scenarios as well as stochastic simulations, but presents results using metrics that will benefit the broadest set of stakeholders in every case. Furthermore, it was designed to provide a standardized starting point for risk reporting while acknowledging that officials and administrators would tailor the proposal to plan-specific characteristics and by no means limit the analyses or reporting provided by any system.

The foundation was built around questions concerning four key fiscal risks identified during the convening:

- How can we better measure existing obligations and the cost of current benefits given the uncertainty inherent in actuarial assumptions?

- What happens when rates of return fall below expectations (either because of an asset shock or because future returns are lower than historical results)?
- What happens if employers do not pay the full actuarial contribution?
- How does volatility in investment returns affect the pattern of costs?

Appendix I provides the reporting framework as modified by participant discussion and feedback provided after the event. Each proposed scenario or analysis considers how specific measures—including funded ratios, contributions as a percentage of payroll and revenue, and the ratio of operating cash flow to plan assets—change.

Specifically, the resulting framework would consider the following items:

- **The effect of change in the discount rate (i.e., the rate used to measure the obligation) on plan liabilities, specifically the effect of a +/− 1 percent change in the expected rate of return.** GASB Statements 67 and 68 require the reporting of a sensitivity analysis of net pension liability at +/− 1 percent of the expected rate of return. The *net pension liability* is defined as the obligation less the plan's fiduciary net position, which is the market value of assets less payables (defined in the statement as the net position restricted for pensions).[13]

Conference participants also discussed the IRDM as proposed in the ASOP No. 4 Exposure Draft. The IRDM would

13 GASB Statement 67, paragraph 21, defines the *fiduciary net position* as "Assets, plus deferred outflows of resources, less liabilities, less deferred inflows of resources at the end of the pension plan's reporting period should be reported as *net position restricted for pensions*" [emphasis original].

be disclosed by actuaries in funding valuation reports measuring the plan's obligation using the unit funding method and a discount rate consistent with high-quality fixed-income debt securities.[14]

- **Scenario analyses based on long-term projections over a 10- to 20-year measurement period, including two scenarios: Scenario 1 assumes a fixed 5 percent rate of return and Scenario 2 assumes an asset shock.** The 5 percent rate of return scenario is meant to mimic the 25th percentile expected return for the typical asset portfolio; plans could choose to use the 25th percentile return for their specific portfolio. For the asset shock scenario, Pew suggested using the Dodd-Frank 2017 adverse stress test scenario, followed by long-term returns of 5 percent (or the 25th percentile of expected returns).[15]
- **The effect of constraint in contributions due to revenue growth.** To assess contribution risk, Scenarios 1 and 2 would be evaluated considering both (a) full actuarial contributions that were made based on current funding policies, and (b) contributions that were constrained by the rate of revenue growth (i.e., fixed as a percentage of revenue). Recent experience quoted in the prior section noted that most plans have not received the full actuarial contribution during relatively good economic times.

14 Per Proposed Revision of ASOP No. 4—Measuring Pension Obligations and Determining Pension Plan Costs or Contributions, (March 2018) section 3.11 "Discount rates consistent with market yields for a hypothetical bond portfolio whose cash flows reasonably match the pattern of benefits expected to be paid in the future." The definition cites as examples U.S. Treasury yields and "yields of fixed-income debt securities that receive one of the two highest ratings given by a recognized ratings agency."

15 These scenarios were designed for fixed-rate deterministic analysis; however, they may also be evaluated using stochastic simulations.

- **The sensitivity of total normal cost and employer normal cost to different investment return assumptions.** This sensitivity includes a +/– 1 percent change in the discount rate (Scenario 1) and a 5 percent rate of return (or the 25th percentile of expected returns) (Scenario 2).

- **Projections that simulate the volatility of annual investment returns.** The aim of these projections is to measure the range of employer contributions, including the minimum and maximum over 10 and 20 years, where the assumed rate of return is achieved over the measurement period.

After this framework was refined, it was then distributed to conference attendees for comments by Pew. The final version of the document, called "Foundation for Public Pensions Risk Reporting," focuses on measuring and assessing investment and contribution risks for public plans—areas where there appeared to be a strong measure of consensus in terms of importance—to inform planning and decision-making. Recognizing that not everyone will agree on every detail, this final document reflects changes in response to most of the substantive suggestions that were received by Pew from conference participants. These suggestions are intended to serve as a starting point for standard risk reporting and were endorsed by the conference organizers.[16]

16 See Appendix I for the full document, "Foundation for Public Pensions Risk Reporting." The full document can also be found at https://www.hks.harvard.edu/sites/default/files/centers/mrcbg/programs/Foundation%20for%20Pensions%20Risk%20Reporting%20(Strawman).pdf.

Conclusion

Pension underfunding and exposure to financial market risk has had a significant impact on state and local governments over the last two decades. Participants in the conference on "Better Measurements: Risk Reporting for Public Pension Plans" agreed on the need for improved risk measurement and further agreed that, to this end, the most essential factors to analyze are investment and contribution risk. With this perspective in mind, conference participants discussed the objectives for better measurement, reviewed current reporting standards, and discussed a strawman proposal for uniform practices that was subsequently endorsed by the conference organizers.

Conference participants generally agreed that a key objective for risk measurement is to support long-term planning and decision-making—not just for fiduciaries, but for government policymakers and budget officials as well. At its core, risk reporting should be designed to inform pension and budget planning and should provide a basis for decisions that promote the fiscal health of retirement systems and their sponsoring governments.

New actuarial standards for pension risk reporting may help to achieve these objectives. In particular, recent standards published by the Actuarial Standards Board in 2017 offers comprehensive guidance on measuring investment, contribution and other actuarial risk factors. The guidance, however, is designed for the actuarial profession to fulfill their duties in support of plan fiduciaries, and it is not prescriptive in terms of requiring uniform practices. Taking this into consideration, conference

participants identified the need for coordination among the broader public plan community—including policymakers and budget officials as well as administrators, board trustees, and their actuaries—for the effective implementation of improved risk measurement.

In considering implementation, conferees generally agreed on the types of measures and methods that could be employed, although opinions varied as to whether and how uniform practices could be established. Most conferees agreed, for example, that stress test and sensitivity analysis of established actuarial and financial measures—including funding, cost, and cash flow ratios—would be useful. However, a number of participants emphasized the need to consider plan-specific circumstances and policies, as well as to allow for discretion in developing and performing risk analysis. The need to balance analytic rigor while providing information that is accessible to non-experts—including the challenge of explaining the results of stochastic simulation—was also discussed.

With these discussions in mind, representatives from Pew presented a strawman for risk reporting that focused on investment and contribution risk to provide a starting point that could be tailored to the features of individual plans and would by no means limit further analysis. The framework was developed taking the objective of long-term planning and decision-making into account and was designed to measure the impact of practical issues that are of concern to both government plan sponsors and fiduciaries of public pension plans. For example, issues concerning the potential impacts on plan fiscal health and government budgets in an economic downturn or falling short on making actuarial contributions were considered.

The "Foundation for Public Pensions Risk Reporting," revised based on extensive feedback from conferees, and is attached as Appendix I. Recognizing that not everyone will agree

on every detail, this final document reflects changes in response to most of the substantive suggestions that were received from conference participants. The conference organizers endorse the foundation as a robust and reasonable starting point for pension risk reporting and recommend it for adoption by all public plans and their sponsoring governments.

Appendix I

Resulting Foundation for Public Pension Risk Reporting

November 30, 2018

Foundation for Public Pensions Risk Reporting

Risk reporting for public pensions should be accessible to all stakeholders and designed to inform planning and decision-making. As a starting point, standard risk reporting should be based on government accounting and actuarial standards, and focused on investment and contribution risks to help policymakers plan for adverse economic conditions.[1]

Specifically, risk reporting should assist government officials and other stakeholders in assessing the impact of investment risk on government budgets; evaluating the impact of contribution risk on pension system solvency; quantifying the range of likely costs for current benefits; and assessing the impact of market volatility on expected employer contributions.[2] Risk assessment and reporting should be tailored to the individual features of the pension plan and include:

1. Sensitivity analysis of plan liabilities which incorporates disclosures required by the Governmental Accounting Standards Board (GASB); and the Investment Risk Defeasement Measure as outlined in proposed changes to Actuarial Standard of Practice (ASOP) No. 4 (currently in draft).[3, 4]

2. Scenario analysis that provides forward-looking projections of at least 10–20 years including (a) a low return scenario assuming a fixed 5 percent rate of return (or the 25th percentile of projected returns) on assets; and (b) an asset shock scenario followed by long-term returns of 5 percent (or the 25th percentile of projected returns).[5, 6, 7]

3. To assess contribution risk, projections and measurements for the scenarios above, assuming (a) full actuarial contributions based on current funding policies; and (b) contributions that are constrained by the rate of revenue growth (i.e., fixed as a percentage of revenue).[8]

4. Sensitivity of total normal cost and employer normal cost for new benefits earned under a range of different investment return assumptions.[9]

5. Projections that simulate the volatility of annual investment returns above and below the expected rate of return in order to measure the range of employer contributions that would be required in scenarios where the expected rate of return is achieved.[10]

This starting point for risk reporting can also be applied as a decision-making framework for evaluating proposed policy changes, assessing the impact of changes already adopted, and to develop more explicit policies to actively monitor and manage key risks.[11]

Notes

1 Investment and contribution risk as cited and defined in §3.2 of the Actuarial Standards Board (ASB), Actuarial Standard of Practice (ASOP) No. 51, *Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions* (2017). Additional risks identified in §3.2 include: asset/liability mismatch, interest rate, and longevity risks.

2 Analysis should be based on the individual features of the pension plan, including benefit design, financing arrangements, and legal framework. Measurements for scenario analysis should include, at a minimum: assets, liabilities, and funded ratios; employer contributions as a share of payroll and as a share of revenue; and total contributions, benefit payments, and the ratio of operating cash flow to assets.

3 GASB Statement No. 67, *Financial Reporting for Pension Plans* (2014), requires disclosures of net pension liabilities, calculated using the plan's discount rate as well as discount rates that are 1-percentage-point lower and 1-percentage-point higher than the current rate.

4 The Proposed Revision of ASOP No. 4. *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions* (March 2018), introduces an Investment Risk Defeasement Measure. The measure is defined as a calculation of liabilities based on benefits accrued as of the measurement date using a discount rate consistent with market yields for a hypothetical bond portfolio with cash flows that reasonably match future benefit payments. ASOP No. 51, adopted in September 2017 and currently in effect, suggests a comparison of a similar measure to a funding or pricing measure as a potential risk assessment method, but leaves the use and calculation of such a measure up to the professional judgment of the actuary.

5 The 5% nominal return assumption is designed to provide a reasonably likely downside scenario that equates to a 3% real return, plus 2% for expected inflation, based on current Congressional Budget Office estimates. Using the 25th percentile return allows the low-return scenario to be modeled based on the plan's specific asset allocation, investment assumptions, and expected volatility in returns. Scenario analysis of lower long-term rates of return using stochastic simulation can provide similar information while also reflecting real-world market volatility.

6 Economic and financial market assumptions included in the Federal Reserve's *2017 Supervisory Scenarios for Annual Stress Tests Required under the Dodd-Frank Act Stress Testing Rules* may be used for asset shock analysis. The resulting scenario generates an initial loss in asset value of approximately 20–25% for the typical public fund portfolio, followed by a three-year market recovery period with annual returns of about 11–12% on average over that time frame.

7 Additional scenarios may include projections at +/−1% of the assumed rate or an asset shock scenario, followed by a period of market recovery, where the long-term rate of return averages to the expected rate of return over time. Baseline projections, where all investment and actuarial assumptions are met, can be applied to provide a point of comparison for all scenarios.

8 As a supplemental disclosure, plans that have not received the full Actuarially Determined Employer Contribution (ADEC) from plan sponsors in a given year should also be required to disclose an explanation for the shortfall, and an estimate of its fiscal impact based on a consistent methodology developed by the plan actuary and/or budget officials.

9 Investment return assumptions may include, for example, +/−1% of the expected rate of return and a 5% rate of return (or the 25th percentile of projected returns). Sensitivity of normal cost should incorporate the effects of any risk-sharing policies built into the plan design including variable Cost-of-Living Adjustments (COLAs) and employee contribution rates.

10 Stochastic analysis can be designed to provide multiple trial simulations—based on the fund's actual investment policy and asset allocation—in which the long-term returns match the expected rate but annual returns over the forecast period vary.

11 Policies to actively monitor and manage key risks could include setting thresholds, or "risk boundaries," for specific measures (e.g., funded status) and requiring corrective actions (e.g., increased contributions) if a plan falls below these thresholds. Risk boundaries can be as simple as minimally acceptable funded ratios or contribution levels, or more complex measures based on the likelihood of breaching these boundaries.

Appendix II

Characteristics of Well-Constructed Risk Reporting

Conference participants were in reasonably strong agreement on the recommended goals of risk management and the outcomes that stronger metrics should promote. There was also agreement on the need for standardized metrics. Characteristics of well-constructed risk measures were discussed at some length, and key themes emerged:

- *Keep it simple*
- *Bring long-term thinking to short-term processes*
- *Relate to the rest of the budget*
- *Demonstrate how policy affects cost attribution*
- *Provide limited flexibility*

Keep it Simple

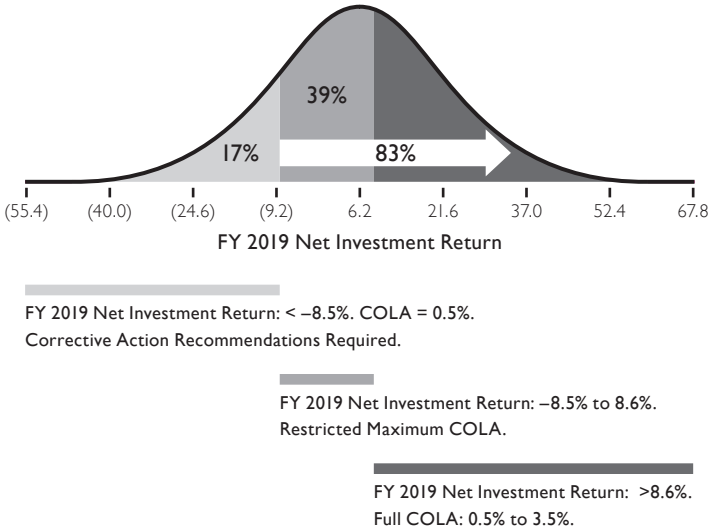
First and foremost, measures must be well communicated. "Keep it simple, stupid" is a useful mantra when considering how to convey the complexity inherent in pension plan risk. Actuaries, investment advisors, plan administrators, and other key staff and consultants must comprehensively understand the complex technical detail. Their duty to trustees, policymakers, and other decision makers and advisors is to ensure that the trends, downsides, and upsides emerging from that detail are clearly understood by those decision makers.

One challenge is that risk taking involves probabilities that must be assessed—probabilities that things could go very well or very badly, with a spectrum of possibilities in between. The other inherent challenge is that decisions made today may have only minor impact on today's outcomes but could have significant impact (good or bad) in the future. Actuaries, investment advisors, and others with deep technical knowledge typically use stochastic forecasts or similar tools that play out the multiple possibilities into the future. While the stochastic forecast can be useful for understanding likely outcomes, well-communicated results should be boiled down into key statistics that are easy to grasp.

For example, Figure 1 is used by the South Dakota Retirement System (SDRS). The SDRS has a variable Cost-of-Living Adjustment (COLA). If the fund is fully funded and projected to remain so, it pays out a COLA based on the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W); if the fund is not fully funded, that COLA is restricted, but not less than 0.5 percent. Figure 1 shows what happens to projected 2020 COLA payments if the fund earns different rates of return in 2019. While the underlying analysis is clearly based on a probabilistic analysis of the fund's asset allocation and asset class investment statistics, the results are shown in a way that allows decision makers to understand key points:

- There is a 44 percent chance the fund would be able to pay the full COLA.
- There is a 39 percent chance the fund would pay a restricted COLA, but not less than 0.5 percent, with no other corrective actions required.
- There is a 17 percent chance the fund might have to both restrict the COLA and take other corrective actions.

Figure 1: SDRS Illustration of Projected 2020 COLA Range



Notes: ■ negative outcomes; ■ slightly positive outcomes; ■ more positive outcomes. SDRS = the South Dakota Retirement System.

Source: Rob Wylie, Executive Director of the South Dakota Retirement System, Presentation at the Better Measurements: Risk Reporting for Public Pension Plans Conference, Mossavar-Rahmani Center for Business and Government Harvard Kennedy School, September 21, 2018.

- Color coding helps draw users' attention to positive outcomes (83 percent chance of a restricted or full COLA with no other corrective actions) and negative outcomes (17 percent chance of only a minimum COLA payment and more corrective actions required). Rob Wylie noted that they use this chart every year so trustees and policymakers working with the SDRS understand how to read it and use it.

Another example of "keep it simple" comes with choosing downside scenarios. For example, The Pew Charitable Trusts

presented stress test results under a scenario in which a plan earns a long-term rate of return of 5 percent. Five percent was chosen because it was close to the 25th percentile return for most public plans under Monte Carlo simulations, and thus has a valid statistical basis under current economic conditions and the typical public plan investment portfolio. Five percent is also reasonably close to the return many plans have seen over the last 10 years, so for trustees and policymakers it is backed up by recent experience.[1]

Bring Long-Term Thinking to Short-Term Processes

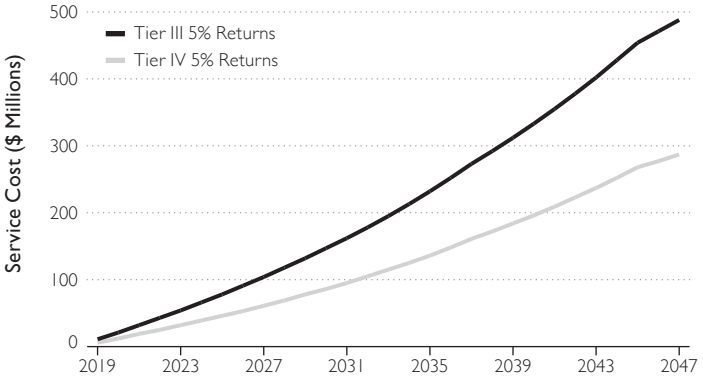
Contributions (and contribution policy) for pensions are considered within the context of the state and local government budgeting process, which is inherently short term. When state and local governments take on long-term projects, they are often funded through a bonding process or other means of earmarked funding. Pensions are a long-term cost that is budgeted annually as part of payroll. Unlike other payroll items, it is sticky and cannot easily be changed. Processes that define specific actions to address unexpected costs have the benefit of driving policy decisions before a problem arises.

For example, eliminating a position will eliminate future salary costs for that position but there may still be a pension cost for the person who previously held the position.[2] And as plans have gotten larger relative to the size of the revenues (net of

1 In the 2017 Public Fund Survey, done by the National Association of Retirement Plan Administrators (NASRA), Figure L shows 10-year returns of 5.2 percent and 5.7 percent for plans with 12/31 and 6/30 fiscal ending dates, respectively. https://www.nasra.org/publicfundsurvey.

2 If the person who held the eliminated position was vested at the time of job termination, he or she has a right to a future benefit payment. If the obligation for that benefit is fully funded, there will be essentially zero cost for pensions, as no additional benefits are being earned. But if the obligation was not fully funded, then the state or local government must pay for the unfunded cost of benefits earned, even though that person no longer works for the state or local government.

Figure 2: Pew Illustration: Projected Service Cost for New Hires: Pre and Post Reform (Connecticut SERS)



Note: The graph shows Connecticut's normal cost for pre-reform retirement benefits (Tier III) compared to post-reform benefits (Tier IV) for the State Employees Retirement System (SERS).

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

intergovernmental transfers), it has become more important to understand that sticky cost in order to manage both the trajectory of the cost and its variability.

One way to bring long-term thinking to a short-term world is by illustrating how levers of change affect long-term costs. Figure 2 shows an example cited by Pew during the conference of work done with the state of Connecticut, showing how changing the benefits for current hires will create long-run savings in benefit expenditures. Illustrations such as this can show policymakers how decisions with little short-term benefit can change the long-term trajectory and vulnerabilities to risk.

Note that Figure 2 isolates one change: how changing benefits for new employees affects long-term trajectory of service cost. Connecticut has severely underfunded plans. Changing benefits for new hires does not solve the underfunding for

previously accrued benefits. But by isolating the impact of one change it shows how it can have a positive long-term effect on cost trajectory.

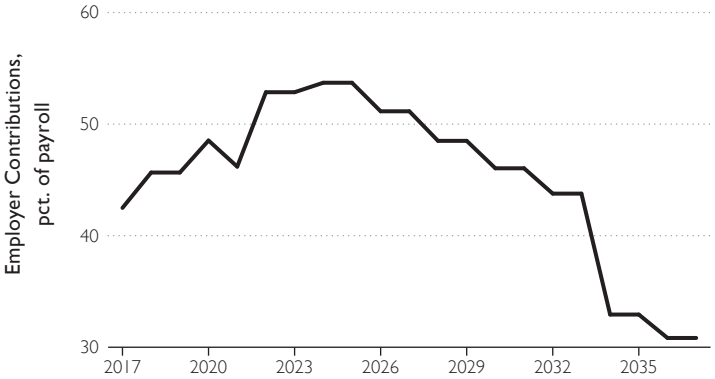
Relate it to the Rest of the Budget

One item discussed at length was the value of showing the cost for pensions in relationship to the rest of the budget. This can be difficult to do because plans are often funded by multiple state and local government entities so that there is no single source for funding. Contributing entities could have very different budget situations (e.g., tech-driven boom vs. declining manufacturing base).

Nevertheless, local budget officials may appreciate seeing generic scenarios they can use to build their expectations—for example, what if local revenues for all contributing entities grow only by X percent per year and thus all contributions only grow by X percent per year as well.

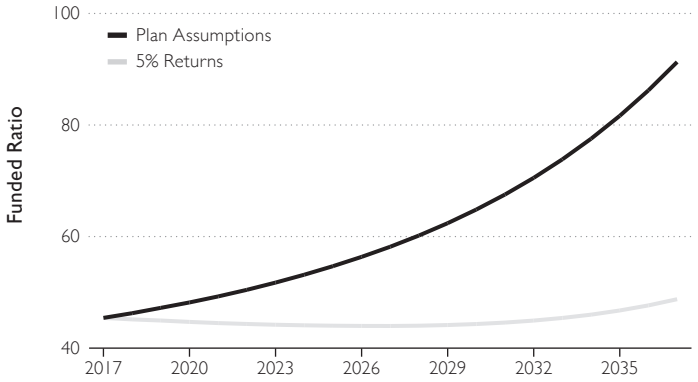
For example, Figure 3 shows a contribution projection for the Connecticut State Employee Retirement System (SERS), assuming the fund returns 5 percent. In this case, the state continues to make contributions per policy, even though contributions grow to over 50 percent of payroll over the period. Figure 4 shows what happens to the funded status of Connecticut SERS and Teachers' Retirement System (TRS) combined, if contributions are constrained by revenue growth. If the plans earn their blended actuarial rate of return (7.43 percent) then the plans' funded status will continue to grow over the 20-year period. But if the plans' returns are only 5 percent, the combined funded ratio will hover around 45 percent, growing slightly toward the end of the 20-year projection period. While a low, stable funding ratio may not be the best news to policymakers, it does show that a long period of low returns does not send the plans into insolvency and pay-as-you-go status.

Figure 3: Pew Illustration: Employer Contribution Rates State Policy, 5% Returns (Connecticut State Employees Retirement System)



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

Figure 4: Funded Ratio, Connecticut SERS & TRS Combined, Revenue Constrained Discounted at Actuarial Rate



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

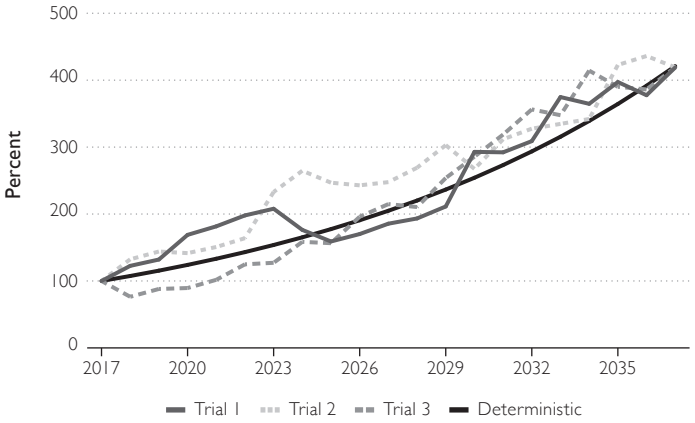
One important reason to relate this to budgeting cycles is that states and municipalities may see downturns in revenues during the same economic cycles that decrease returns to pension plans. For example, the same economic cycles that lead to 5 percent returns for the pension fund could also strain revenues. Moreover, the same economic cycles that strain revenue may also put more demands on state services. It is critical to understand these crowding out effects, even though they may be difficult to quantify precisely for those funds with multiple contributing entities.

One caution: the most common way to relate the cost to the budget is to look at cost as a percentage of payroll. As noted earlier, the last 10 years has seen public-sector payrolls grow more slowly than GDP. One conference participant observed that many of the projections made during that period missed the fact that payrolls were flat or even declining for some jurisdictions, distorting the cost. Looking at the cost of pensions as a percentage of payroll has been a key budgeting tool. However, to the extent that state and local governments shrink or slow the growth in payroll—for example, through shifts to technology, downsizing to trim costs, or retirements—there may need to be scenarios that consider what happens when payrolls do not grow. Most workers who leave employment will still have pension obligations to be paid in the future.

Demonstrate How Policy Affects Cost Attribution

The consequences of risk taking can be difficult to foresee. Pension plans are complex financial systems that take in contributions and distribute payments, both in service of an underlying obligation that changes over time (as new benefits are earned and obligations are discharged through payments). Plans are subject to many underlying risks, the primary of which is

Figure 5: Aggregate Returns (Connecticut)



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

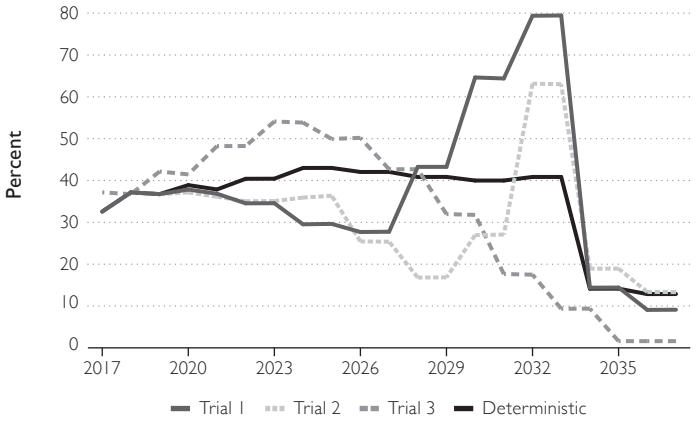
investment risk, which is heightened by a general mismatch between the assets and obligations.[3]

Most risk measures focus on what happens under negative circumstances: an asset shock or a period of low returns. While it is indeed important to understand what happens during those events, plans should also consider whether their funding mechanisms are well suited to normal risk taking—for example, variability in returns for a portfolio heavily invested in equities.

Figures 5 and 6 illustrate the variation that can occur even if long-term returns meet investment targets and how that can greatly impact contribution rates. These were done for the state of Connecticut and show results in aggregate for SERS

3 As stated earlier, most plans are mature; one sign of this is that benefit payments exceed contributions. The principles of asset-liability match suggest that a higher allocation should be made to high-quality fixed-income assets. In the current low interest rate environment, fixed-income assets do not generate high returns, which means most U.S. public-sector pension plans elect to fund with equities and other risky assets.

Figure 6: Employer Contribution Rates using Figure 5 Return Scenarios (Connecticut)



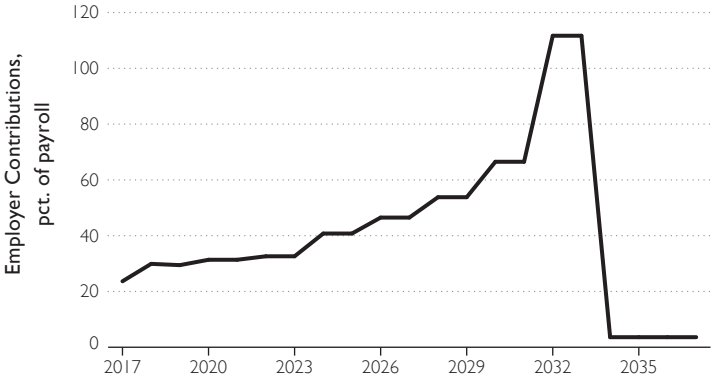
Note: Trials 1, 2, and 3 are stochastically generated return scenarios, where investment performance varies year by year, but the 20-year return is 7.43 percent (the weighted average of the assumed rates of return used by SERS and TRS). The deterministic scenario shows fixed annual investment returns of 7.43 percent.

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

and TRS. Figure 5 shows three stochastically generated return scenarios and one deterministic scenario that each generate compounded returns of 8 percent for TRS and 6.9 percent for SERS per year over a 20-year projection period, matching the plans' assumed rate of return.

Figure 6 shows that even though each scenario overall represents the same rate of return, they lead to very different contribution patterns, depending on the timing of gains and losses over time. Two of the three trials had contributions exceeding 60 percent of payroll in a scenario where long-term performance hit the plans' assumed rate of return. This is an example of how "normal" variability—not a downside

Figure 7: Pew Illustration: Employer Contribution Rates State Policy, 5% Returns (Connecticut's Teachers' Retirement System)



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

scenario—can lead to increasing contribution rates that could be difficult to manage.

Stress testing can also show whether existing policies can lead to unintended consequences. Figure 7 shows the Connecticut TRS with a 5 percent return, similar to Figure 3 for SERS. In this case, the TRS contribution policy leads, during a period of low returns, to sharply increasing contributions. Stress testing in this case helps trustees and policymakers understand how policies that work well in normal circumstances can create unintended consequences during stressful situations.

Another example considers how long-term assumptions relate to near-term plan experience. One key part of contribution policy is setting a discount rate for assumed future returns.

The United States is currently in a period of low interest rates, which means it is very difficult for a plan to earn the median rate of return of 7.5 percent.[4] One conference participant noted that it is important for projections of cost to factor in realistic returns, factoring in the current economic landscape, even if that differs from the long-term assumption. Trustees and policymakers should understand the difference between the likely near-term results and what the long-term is assumed to produce. Assumptions can be conservative, middle-of-the-road, or optimistic relative to current economic expectations; this positioning of the assumptions is part of the risk taking that policymakers and trustees should understand to put information into context. Understanding these assumptions can be particularly critical for plans that are in a negative cash flow situation, because in those cases the plans are already drawing down plan assets to help pay benefits, and thus are more sensitive to asset underperformance.

Provide Limited Flexibility

Using consistent measures from year to year can help policymakers and trustees learn how to use these specific measures, and using standard metrics across plans can help the public and media better respond to new developments. Nearly all participants believed standardized risk metrics were important for these reasons. However, some participants wanted any new standards to allow for some flexibility by identifying certain standard measures for all plans, to promote comparability; and other measures that would applicable to plans based on their size, the nature of benefits, and the level of risk to be managed (e.g., how underfunded they are).

4 2017 NASRA Public Fund Survey, Figure M. https://www.nasra.org/publicfundsurvey.

For example, plans have varying abilities to change how benefits accrue. Some, like that of South Dakota, have the ability to vary parts of the benefit; other have constitutional restrictions or legal precedents that do not allow any benefit formulas to be changed for existing employees. Plans with less ability to vary benefits should consider strong risk management measures, as their inability to change what the plan is due makes them more reliant on contributions and investment return.

Mossavar-Rahmani Center for Business and Government
Harvard Kennedy School
Harvard University
79 John F. Kennedy Street, Weil Hall
Cambridge, MA 02138
http://www.ksg.harvard.edu/m-rcbg/rpp