

Risk Management and Public Plan Retirement Systems

Prepared by the Public Plans Practices Task
Force of the American Academy of
Actuaries

Chair: David Sandberg

Kenneth Kent

W. (Paul) McCrossan

Jeffrey Petertil

James Rizzo

Emily Kessler

Alan Milligan

Anna Rappaport

Table of Contents

Table of Contents	i
Introduction and Executive Summary	1
Public Plans, Actuaries, and Risk Management.....	5
The Control Cycle and Risk Management.....	8
The Framework.....	9
Identifying Participants/Stakeholders	11
Defining the Objectives	14
Establishing the Risk Budget.....	16
Evaluating Risk Mitigation Alternatives	20
Maintaining an Effective Feedback Process.....	23
Conclusions & Recommendations	29
Appendix A – Background	34
Appendix B – Discussion of Stakeholders	41
Appendix C – Risk Exposures of Public Pension Plans	45
Appendix D –Retiree Health Benefits	51

Introduction and Executive Summary

The Task Force

The Public Plans Practices Task Force of the American Academy of Actuaries (Academy) was created to report to the Board of Directors of the American Academy of Actuaries on its charge to objectively examine a broad range of actuarial issues and practices related to public-sector retirement systems.

The task force's initial charge was to:

1. Examine the research and work product of relevant standard-setting bodies that guide practices in support of public-sector retirement systems.
2. Conduct its own research into current accounting and actuarial practices, as necessary.
3. Examine funding levels and the rules guiding them, disclosure requirements and practices, plan design and other relevant topics.
4. Determine ways in which current practices support (or do not support) the public interest – and how practices that do not support the public interest can and should be addressed.

This task force was appointed by (and reports to) the President of the Academy on October 7, 2008. The task force's findings and recommendations are presented to the President and the Board for consideration and action, as appropriate.

The goal of the task force

The recent economic crisis, spurred by financial institution failures, has heightened public interest in the long-term viability of all financial promises and strengthened the case for more comprehensive risk management in a wide range of financial systems. There have been discussions within the actuarial profession on how to better contribute to the resolution of the financial issues impacting public pension funds, whose stakeholder structures can differ significantly from private pension funds. Our findings regarding public pension systems, however, are independent of the financial crisis and encompass risks unlikely to go away with economic recovery.

Actuaries, with their unique skill set can be key contributors to a discussion of the financial risk inherent in these plans. In this report, we discuss the need for the actuary to function as a risk advisor in the public plan sector and make recommendations as to ways actuaries can influence the operation of public plans so as to strengthen the risk management of those plans. The actuary's role should be seen as one which defines the level of risks being taken (and options to manage that risk) so that those with a stake in the plan can decide what is the appropriate level of risk to be taken by the plan and whether the plan can access the expertise (and necessary resources) to manage those risks. The latter is especially relevant given the typical constraints on public plan funding resources.

Early on in our work, the task force identified the 4th charge, "to determine ways in which current practices support (or do not support) the public interest – and how practices that do not support the public interest can and should be addressed," as contributing the greatest potential value to the debate, and thus focused our efforts on it. There is already a vast amount of literature and diversity in designs, disclosures and practices. In 2009, the Governmental Accounting Standards

Board (GASB) began a review of public plan accounting standards and the relevant Academy committees have been addressing those issues. The third charge, to examine funding levels, required data gathering capabilities beyond the scope of this task force. Thus, the task force chose to examine how current practices in the public plan sector support or hinder the public interest and to do so from a perspective of emerging risk management concepts and techniques. The focus is on pension plans, although recommendations could also apply to other retirement benefits for public sector employees, such as retiree health insurance coverage. *Ultimately, the task force, through this report, recommends initiatives to strengthen the management of public pension and post retirement health plans through incorporating an actuarial application of emerging risk management techniques. A continuous risk management practice is an essential component for a sound public employee retirement system.*

Use of a professional risk framework

One of the tools the task force used to organize the risk management techniques that are recommended for public plan actuarial practice was a draft Risk Management Framework (see Framework Section) that came out of the July 2009 Academy Financial Risk Summit. This was developed into a template to evaluate the sustainability of any risk transfer or social insurance system, which template we have used throughout this report.

In using the risk management framework, we considered the competing needs and incentives of the key stakeholders (or principals) in public plans, including taxpayers, plan participants, public employee unions, government employers and elected officials, who may have incomplete information, or a lack of full understanding of the long-term consequences of decisions that each might make with respect to a public sector plan.

In February of 2010, the Organization for Economic Co-operation and Development (OECD) issued a paper, “Pension Funds’ Risk-Management Framework: Regulation and Supervisory Oversight” also noted as OECD Working Papers on Insurance and Private Pensions (No. 40). It too, emphasizes the critical role of a sound risk management framework to address investment, operational and governance risks. The paper points to the role the regulator can and should play to ensure this. While the actuarial role cannot replace that of a regulator in the public pension plan arena, the profession can make a significant contribution by exploring and recommending the review and understanding of the needed processes to manage the risks of a retirement program.

Executive Summary for Public Pension Plans – Understanding the Risks

There is a need for sound risk evaluation and management in public pension plans. The current economic downturn has reduced the level of governmental revenues from sources such as property, sales and income taxes. Concerns about the potentially precarious financing of state governments and their pension plans need to be addressed through proactive risk management. Today, there is, in many cases, a lack of aligned stakeholder incentives and a lack of reliable risk information for the stakeholders and their agents. There is a gap between actuaries providing needed funding information for public retirement systems and the need for communication of a robust risk management framework so public institutions can control their commitments and future financing needs. This gap needs to be bridged to better understand and manage the risks of these long-term promises. Fiduciaries, lawmakers, the media, and the general public should look to actuaries to assess risks, identify steps to avert future financial crises, and understand how and when risk taking can add value that offsets the risk being taken. While it would be desirable for these parties to look to the actuary for that information on risk, there is no regulatory or legal

provision for that role to be fulfilled by the actuary. This is in contrast to roles prescribed to the actuary by states implementing National Association of Insurance Commissioners (NAIC) model laws and by the federal government under the Employee Retirement Income Security Act (ERISA).

Public sector pension plans differ in design and operation from those in the private sector in some significant ways. These include:

- Less federal oversight, and thus more discretion is left to state and local jurisdictions
- Differences in the budgeting process and the applicable accounting standards.¹
- Design issues, such as the need to make up for the lack of Social Security participation and coverage, the ability to have tax deductible member contributions and the earlier mandatory retirement ages for police and firefighters.
- The higher degree of public transparency that accompanies governmental decision making²

While the financial risks faced by private and public plans are the same, the operational and governance differences heighten the need for a risk management process in public plans to strengthen the ability to balance, one, the fulfilling of the promise of deferred compensation to retiring employees with, two, the need to maintain reasonable workforce compensation (pay and benefits) and three, reasonable tax assessment.

The task force's major conclusions flow from the following three observations:

1. Risks of public pension plans must be understood and managed better.
2. A risk evaluation, management and reporting framework is needed to identify and manage those risks. In particular it should:
 - a. Identify moral hazards in the structural incentives for stakeholders and agents.
 - b. Inform decision-makers of the risk levels and potential range of consequences inherent in current and proposed benefits, investments and governance structures.
 - c. Identify possible stresses/breakdowns that could occur in the future and action steps that will be followed should they occur.
3. Actuaries will be integral to the application of such a framework to public pension plans.

The focus of this report is to explain the essential elements needed for a robust risk reporting framework. As such we have focused on what key elements should be reported on and recommend that specific ways (applications) be developed by those committees and boards already responsible for setting standards and improving practice.

The task force's intent with this paper is to present a discussion of public pension plans in light of the evolving economy and evolving thinking about retirement plans. It presents an actuarial

¹ For more information on the differences between public sector and private sector, refer to the White Paper prepared by the Governmental Accounting Standards Board, titled: "Why Governmental Accounting and Financial Reporting is -- and should be different".

² The transparency of information is very different than the question of risk transparency. There is insufficient transparency in the amount of risk that has been taken. `

perspective on the general topics of risk management and illuminates major issues with regard to public sector retirement. This perspective should help policy makers assess and implement needed changes to public sector retirement policies.

Please note that this paper does not judge the appropriateness of risk taking in a pension plan. It simply provides a framework for actuaries to analyze and communicate the implications of risk taking to facilitate discussions with stakeholders. Actuaries can help stakeholders understand the value of benefits, how risk-taking strategies change the expected cost to employees and taxpayers (current and future generations), and the downside risk (and upside potential) to any risk-taking strategy.

We recommend that the American Academy of Actuaries' Board of Directors encourage and coordinate the development of a risk evaluation, management and reporting framework for public pension plans. Ideally, such a framework would encompass a methodology for coordinating the risks facing public pension plans, would be expandable to encompass retiree health benefits, and would require the integration of non-actuarial risks such as: political risk, reputation risk, legal risk, information security risks, etc. The actuarial profession can start with (and build on) our expertise in managing the financial and behavioral risk (through hedging and pooling methods as used in insurance). *Given the experience that actuaries have in assessing and managing risks in general, and their experience in the key role of financial and investment risks, the actuarial profession is well-suited to lead in the development of this risk framework.*

Understanding and addressing the financial risks involved with retirement promises and disclosing how those risks have been addressed serves the public interest and will contribute to the day when pensions are a less controversial aspect of civil governance.

Public Plans, Actuaries, and Risk Management

Almost every public pension plan uses an actuary to calculate liabilities and funding requirements. For many years the role of the actuary has been part of the cadre of professionals (agents) who advise legislative bodies and assist plan administrators in their management of the plan. Pension plans are an insurance system in that they pool economic, demographic and behavioral risks to provide a standardized deferred compensation income benefit, for a group of individuals, contingent on their continued existence. This paper discusses how actuarial practice can be enhanced to strengthen the management of short-and long-term risks associated with these plans beyond their current condition.

Public plans, reflecting the demographic aging of its members, and of society, are reaching a point of maturity. The impact of maturity on the management of plan risk is a critical one.³ State and local workers were excluded from Social Security, at its inception, and thus, subsequently, many states and local governments endeavored to establish plans. Over half of the large public retirement systems that exist today were established between 1931 and 1950, and by 1961, 45 states had established defined benefit plans.⁴ US Census Bureau data showed that, in 2008, public plans covered almost 26 million active workers and retirees. Size and coverage of public plans vary widely; Table 1 shows that, in general, the very large state systems, which only comprise 9% of the total number of systems, cover 88% of the membership of public employee systems. For fiscal year 2008, public sector plans reported holding \$3.2 trillion in assets, with \$180 billion in payments to plan participants (mostly in payments to retirees and beneficiaries), and \$119 billion in contributions (\$37 billion from employees and \$82 billion from state and local governments); see Table 1, Appendix A for more information.

Type of Plan	Number of plans	Number of members (in 000s)			
		Total	Active	Inactive	Retirees and beneficiaries
State	218	23,620	13,073	4,142	6,405
Local	2,332	3,030	1,628	254	1,148
Total	2,550	26,651	14,701	4,396	7,553

These plans are well established within the public sector. The most recent comparable data available from the U.S. Department of Labor Employee Benefit Survey showed 90% of public sector employees were covered by defined benefit plans in 1998, with comparable coverage of

³ Discussed in more detail on page 18 and Appendix C (pages 46-51).

⁴ From Clark, Robert L., Craig, Lee A., and Ahmed, Neveen, "The Evolution of Public Sector Pension Plans in the United States," pp 239 – 270, in Mitchell, Olivia S. and Anderson, Gary, *The Future of Public Employee Retirement Systems*, Oxford University Press, 2009.

⁵Table 5a: Number and Membership of State and Local Public Employee Retirement Systems by State: Fiscal Year 2008, data found at <http://www.census.gov/govs/retire/>, accessed 6 July 2010

21% in private sector (70% of unionized employees and 16% of non-unionized employees) in 1999.⁶

Today, there is considerable controversy about the long-term sustainability of public pension plans. Questions are being asked about whether they are affordable for the taxpayers in the jurisdictions that sponsor them. Questions have also arisen as to how plans invest the funds set aside for retirement and whether cash flows needed in the mature stages of a plan will be available. As fewer private sector employees are able to participate in defined benefit plans in recent years, the portion of taxpayers with hands-on knowledge of defined benefit pension plans is decreasing, and thus, the potential grows for a rift in understanding between government employees and the citizens they serve.

Actions taken by key stakeholders and decision makers that will put further stress on public retirement systems include:

- Insufficient funding by legislative bodies.
- Excessive benefit levels in relation to the risk capacity of the plan sponsor to fund them.
- Inappropriate benefit designs.

There are three common drivers that contribute to these stressful actions/decisions:

1. Slippery slope of skipping contributions. States can often be in a “funding crisis” due to competing fiscal, political and other priorities. Money saved in any one year by skipping contributions may have a minor impact on a plan’s overall solvency. But the impact on sound governance can be significant as it sets the precedent for repeated “one more funding holiday’s” as the original funding crisis is typically not solved, just postponed.
2. Challenge of managing plan “surplus” in relation to ongoing investment risk. The issue of surplus use in boom times is difficult – boards and plans sponsors can use the surplus to improve benefits, to lower contributions or leave the surplus in the plan and still have the employer make contributions. Unfortunately, there is a history in public pension practice of focusing on the impact of the surplus on the employer's budget without adequately addressing the factors that led to the surplus, or the future risk that still remains in the plan. The impact of today’s decisions on future surplus is often not immediately clear and often becomes the focus of politically motivated economic arguments.
3. The challenge of understanding the level of investment risk actually taken by the fund when it is invested in a balanced portfolio. Higher targeted (and expected) mean asset returns in a balanced portfolio is accompanied by higher volatility in the short and in the long run. Without proper regard for the underlying risk exposure, short-term decisions (particularly with regard to benefit levels) can have long-term impacts, particularly on future generations.

However, a major, underlying, structural issue for addressing stakeholder decisions that unduly stress and continue to threaten the public pension plan system is its diffusion of responsibilities and controlling authorities amongst stakeholders. In examining the factors leading to the stresses

⁶All data accessed through <http://www.bls.gov/ncs/ebs/#data> on 27 Jun 2010. Coverage statistics for public sector workers are not available from the DOL after 1998. Coverage statistics for private sector workers in 2006 are comparable (see <http://www.bls.gov/ncs/ebs/sp/ebsm0004.pdf>).

within the system, it becomes clear that there are stakeholders and agents who are either vested with (or assume) varying levels of responsibility. Each might receive some benefit(s) (tangible or intangible), and each of whom may have different competing objectives and goals for the system.

Absent an external, independent authority or regulator, the need for a risk management system becomes critical. Such a risk management system can and should:

- establish boundaries of risk taking;
- establish policies and mechanisms to support the following priorities:
 - continuous funding,
 - education of administration and employees (unions) to better understand the risk of current benefit structures,
 - develop processes for identifying plan provisions that create misaligned and/or mispriced risk incentives for plan participants and sponsors; and
 - identify stakeholder incentives that clash with the health of the system as a whole.

The three main financial “levers” of the system are benefit levels promised to current and future retirees, contributions paid by employees and employers, and investments made by the plan. When benefit levels are generally fixed, the other two levers must be coordinated to create a sustainable system: either by managing risk taking or creating an offsetting hedge (or some combination thereof)⁷. Within a private insurance system (private pension plan or insurance company), there are either fewer fixed elements (private pension plans have more ability to change future benefits) and/or there is a single authority figure who exercises some control over the variable levers. And, to add security, there is generally a regulator (e.g., Internal Revenue Service for private pension plans, state insurance regulators for insurance companies) providing oversight and, potentially, a backstop.

The actuaries’ traditional role in retirement programs has been to provide systematic approaches to spreading benefit costs over time, to determine the anticipated and necessary cash funding, and to report the associated accounting costs. Actuaries also report on the impact of potential changes to the retirement programs on the funding requirements and accounting cost. While they provide supporting technical information to various stakeholders, they do not have authority over the benefit levels⁸. And, if no robust risk analysis of the expected costing is performed, those who do have authority over the benefit levels may not have the information needed to ensure the long-term soundness of the system. Notwithstanding such limitations, members of the actuarial profession, given their experience and unique skill set can be key contributors to a discussion of the long-term financial risk inherent in these plans. We believe actuarial influence can strengthen the risk management of public pension plans. The actuary can help stakeholders understand the value of the benefits provided, how risk-taking strategies change the expected cost to employees and taxpayers (both current and future generations), and the downside risk (and upside potential) to any risk-taking strategy.

⁷ This will be explained in more detail in the sections on Risk Budget, Risk Mitigation and the Feedback Process.

⁸ Actuarial expertise may not be sought if there are no funding requirements or accounting standards. This was particularly true of retiree health benefits, which employers extended in the middle of the last half-century usually without any actuarial study. Funding requirements remain rare for retiree health benefits, so actuaries often are employed only to provide accounting numbers, with no real risk analysis included.

The Control Cycle and Risk Management

At the American Academy of Actuaries Financial Summit in 2009 a proposed risk management framework emanated intended to apply to any system or process used to share, pool, or transfer risk. In this report, we apply the current version of the risk management framework to public pension plans in general. Where possible, we draw conclusions and make recommendations based on the results of this application. We also note the practical challenges to implement those recommendations and options to overcome such challenges.

The Framework

The risk management framework as currently defined utilizes five elements to assist in understanding and ensuring the long-term viability of any risk system:

1. Identify all **participants/stakeholders** in the risk transfer system, their objectives (including the specific risks they are either protecting or assuming) and their options to impact/influence the range of potential, future, adverse outcomes;
2. Define the **objectives** of the risk system;
3. Use a process whereby the **risk budget (appetite)** of obligor(s) **is established**; current risk levels are measured on an ongoing basis and evaluated against the established risk budget;
4. Evaluate the range of **risk mitigation alternatives** and implement, as appropriate; and
5. Maintain an effective **feedback** process for participants and to the public (disclosures).

Any system (institution or set of contracts) that shares (pools) or otherwise transfers risk between participants can be assessed according to this framework. Public pension plans pool the risks of providing retirement annuities and meet the risk of the obligations through funding controlled by the representative agents of taxpayers (legislatures) and through management of the program by the designees of the legislature. The underperformance or failure of a risk system over the long run can be tied back to deficiencies in one or more of the five elements of the risk management framework. This framework is the heart of what has been called the Actuarial Control Cycle and is also at the heart of establishing quality control methodologies. The Actuarial Control Cycle is the specific or tangible application of this to financial risk.

Multiple Principals and Moral Hazard

In addition to the well-know principal-agent problem, public plans face a unique moral hazard because of multiple principals with conflicting objectives. In economics the “principal agent problem” exists where risk is created when the interests of the agent (often management) are not fully aligned with the interests of the principal (often owner). Within a public plan, there can be not only many agents but also multiple principals, as will be shown in this paper.

Assuming there is sound governance in place to align agents and principals, public plans still face risk because there are multiple principals, each with conflicting needs. These principals will (and are expected to) act to maximize their outcomes, possibly at the expense of other principals. These actions could be the result of a moral hazard that arises from an information asymmetry (one party has more information than another and can act to transfer risk). Examples of actions arising from moral hazard include: (a) individuals who elect single sum payments due to ill health or (b) elected officials deferring contributions (and the accompanying tax increase) until post-election.

Individual principals in some cases are rationally optimizing their own outcomes, e.g., officials who want to maximize compensation, including pension benefits. A complex system with multiple principals, none of whom has total authority, is at risk when such principals can act in ways to maximize their own benefits, at the expense of other principals, without appropriate risk disclosures and actionable checks and balances. For example, an appropriate disclosure would be for an elected official to state not just the current year’s cost to a city budget, but also the level of risk exposure (or mitigation) that is implicit in the budget.

One important objective of the framework approach is to assess how the participants’ interactions impact the risk exposures of the plan/system. The public pension system is composed of many stakeholders and their agents, none of whom have total authority over the system and none of whom have absolute responsibility for risks assumed by the system. Without proper design controls, parties to the plan can and will typically act to maximize their interests (which may or may not be fully aligned with the broader interests of the stakeholders they represent). To enable

the system to function more effectively, the five elements of the risk framework must be clearly understood by the stakeholders (as well as their agents). These elements can then be used to balance competing interests by clarifying the necessary plan design, governance and risk measurement items needed for long term prudent management to fulfill the plan's promises.

The following five sections examine and apply these five elements to public pension plans with two intended objectives: One – to educate and provide examples for those actuaries not familiar with public pension plan practice within each element of the framework, and Two – to clarify for practitioners and experts involved in current public pension plan practice, various examples of the key elements that could be considered, in the analysis and reporting of the risks within a specific public pension plan.

Identifying Participants/Stakeholders

The first element of the risk management framework is to identify all stakeholders in the risk transfer system, their objectives (including the specific risks they want to be protected against or are assuming) and their options to impact/influence the range of potential, future, adverse outcomes. This includes documenting where it is expected that individual choice and self interested behaviors of the various participants conflict with each other, where the interests of the principals and their agents are not aligned, or where the cost of the decision to take risk is allocated to other stakeholders.

The task force considered the public pension plan system from the point of view of six key stakeholders:⁹ society (taxpayers), public employees (and retirees), employee unions, public sector employers, a plan's governing body and the legislative body.¹⁰

A full discussion of the stakeholders and their short and long term incentives is provided in Appendix B. Summarized below are some of the key objectives, incentives, and options which drive the behavior of each stakeholder.

Society/Taxpayers/Recipients of Public Services¹¹

Objectives: Taxpayers will generally support a system that provides a level of benefits that will attract and retain well qualified public servants, but at a cost that is predictable, that does not impinge on other public services and does not over compensate public servants.¹²

Incentives: Taxpayers typically do not recognize the trade-offs being made between immediate funding decisions and long-term plan risks. Therefore, they generally view favorably short-term decisions that reduce their taxes or permit expansion of other public programs, even if they will lead to larger taxes or constraints on other public programs in the future. As such they may vote for legislative candidates who, from a risk management perspective, may “mismanage” the plan by taking undue risk to reduce the perceived current cost. Without meaningful risk disclosures, basing the value of benefits solely on an expected long range mean return will result in an underpricing of the benefits when initially granted.

Options/Decisions: While taxpayers may have access to information on public retirement systems, most members of the public do not have a basis upon which to critically examine these systems because of their complexities. Therefore, taxpayers are not able to objectively evaluate how they are managed. They rely on their “agents” – elected officials and public sector employers (e.g., boards of education, police and fire departments, etc.) – to make wise decisions

⁹ Stakeholder perspectives were developed using the Society of Actuaries' Retirement 20/20 Measurement Framework. While the market was eliminated as a stakeholder, market perspectives were included with the needs of society.

¹⁰ The legislative body that is being considered is that of the plan sponsor. Many plans for local public agencies are governed by laws enacted by the State legislature but it is the local public agency's governing body that we are considering as the legislative body.

¹¹ When public budgets come under pressure because of increased spending obligations, such as escalating pension costs, policymakers will need to undertake savings in budgets in discretionary accounts, such as parks, libraries, schools, social services and others in addition to revenue increases, which, depending on the jurisdiction may not be politically feasible. Including recipients of public services demonstrates the possible impact of mismanaged pensions on the most vulnerable in society.

¹² There may be an unrepresented stakeholder when future generations are considered. While the moral/political question of rights and/or obligations of future taxpayers is not meant to be addressed in this paper, there can be actions taken in public plans which either directly or indirectly make an assumption about those rights and/or obligations.

on their behalf. While they can vote legislators out of office for many reasons, including mismanagement of public retirement systems, such mismanagement might not be realized until many years later, perhaps long after those “legislative agents” have retired.

Public Employees (Plan Members & Beneficiaries)

Objectives: Public plan participants want secure retirement benefits as part of their competitive compensation package. They do not want (negative) surprises with regards to benefit levels as they approach retirement. Public plan participants who are not covered by Social Security are particularly dependent on their public pension plan benefit for income security in retirement.

Incentives: Public plan participants will tend to want to pay the least (in terms of direct contributions or indirect reduction in wages) for the greatest pension benefits. They also want those benefits to be as secure as possible, including security against future reduction in accrual rates.¹³ As with any individual negotiating an employment agreement, they will want to maximize benefits with the least possible contribution rate and will support decisions affecting their plan that increases benefits.

Options/Decisions: Public employees have options to find other employment. In some cases, certain specialties have limited career options in those specialties outside the public sector (e.g., police, fire, education). In the case of unionized public employees, there is, collectively, significant bargaining power over benefit levels whereas non-unionized employees may have little bargaining power.

Unions (as an institution)

Objectives: Unions want to secure competitive, and preferably superior, benefits for their members. They particularly favor benefits that continue unless renegotiated rather than benefits that must be bargained for anew in each round of bargaining.

Incentives: While unions are agents of the employees, they also have their own institutional incentives to succeed. Unions want to ensure the loyalty of their members through successful negotiation outcomes which engenders successful recruitment and membership retention.

Options/Decisions: Unions have the ability to negotiate for compensation and to campaign for (or against) elected officials who they believe are (or are not) sympathetic to public employee desires for fair wages and benefits. While organized labor in the private sector does not have a similar ability to influence who sits on the other side of the bargaining table, they may well have less restrictions on their rights to strike.

Public Sector Employers (Not elected)

Objectives: In this context, public sector employers are the “civil service” infrastructure responsible for attracting, retaining and retiring the personnel to help provide general services and safety for the public. While public sector employees have been paid historically at levels below comparable private sector wages¹⁴; public sector employees have also tended to stay within public

¹³ Most public employees are granted significant protection against benefit abrogation in state constitutions.

¹⁴ There is a current controversy on the comparative levels of private versus public pay (even prior to including benefits). Some claim that public pay has caught up to (or even exceeded) private pay levels. It is unclear whether this is true in general, only true of specific segments, or is due to the steeper pay scales of private sector (lowest to highest paid) jobs.

sector employment. Public sector employers have seen pension and other benefits as valuable tools to mitigate compensation disparities and retain workers.

Incentives: Public sector employers want to ensure a stable, well-trained workforce is available to meet the needs of the public they serve at the lowest cost to taxpayers. They also want to minimize conflicts with elected officials (who either have funding and/or hire/fire authority over them, but who may not have the same knowledge base or share the same incentives) and the unions. And, individuals acting in management roles within the public sector may also, themselves, be plan participants.

Options/Decisions: Public sector employers play a role at the bargaining table in negotiating for benefits. They also provide cost estimates and budgets to elected officials which include the costs of benefit improvements and tradeoffs that might have to be made between pension benefits, other compensation and public services. While they may or may not make the final budget decisions, they play an important role in framing those decisions.

Retirement System Governing Body

Objectives: Within a stand-alone retirement system, the plan administrator and fiduciaries must ensure it has adequate assets to pay current and future benefits. The governing body must ensure that the contributions it receives from employees and sponsoring employer(s) represent a fair contribution for benefits earned during that period (although most systems retain a “call on cash” to employer(s), allowing them to collect future contributions for benefits previously earned). The system has fiduciary duties to ensure the security and stability of the system, but also to ensure that benefits are provided on a cost-efficient basis.

Incentives: The governing body of a retirement system wants to be perceived as providing benefits at the lowest possible cost without risking the benefits of the participants. To do this, it wants a steady stream of contributions into the system, and might be willing to make tradeoffs to achieve longer term contribution stability. The composition of governing bodies varies from a single individual to diverse boards. The individual members of the governing body may have their own interests and incentives and may also be plan participants or representatives of the public sector employer(s).

Options/Decisions The options and decisions available will vary depending on the authority granted the governing body by applicable legislation. Authority to set contributions levels varies from full authority to set the contribution requirements to no authority at all. Similarly, authority over benefit levels varies widely with some systems determining benefit levels while other systems have no ability to affect benefit levels.

Legislative Body (Elected Officials)

Objectives: As a body, the legislative authority wants to ensure that it can provide services that taxpayers expect at the lowest possible cost.

Incentives: Individually, elected officials often want to be re-elected, or seek higher office. Even if they don’t seek re-election or a higher office, most want to be seen as effective public servants for the time they fulfilled the role.

Options/Decisions: While they generally have wide powers as a taxing authority, their ability to increase tax rates (and successfully stand for future elections or change constitutional limits on taxes) is limited. Through their agents, the public employers, they play a role at the bargaining table with unions and are cognizant of the political nature of their decisions on both specific and general blocks of voters.

Defining the Objectives

The second element of the risk management framework is to define the objectives of the public plan. For example, this, hypothetically, could be “to provide an adequate retirement benefit for full career employees at an acceptable cost within an acceptable variability of cost across generations of taxpayers.”

As straightforward as it sounds, this may be very difficult in practice; starting with, who will define the objectives. It is difficult for society (taxpayers) and public employees to engage in such a discussion directly. In practice they rely on their agents – the public sector employers or their legislative bodies and the unions. But there is often an antagonistic relationship between the employers and the unions and obtaining consensus can be extremely difficult. While the process of defining the objectives may be different with each retirement system depending on the relations between the various stakeholders and the history and legislation specific to each, requiring the objectives to be explicitly stated (and to the extent they evolve, updated) is essential. This explicit statement extends to clarifying the public decision on the competing rights of current recipients of public dollars as well as the competing rights of prior and future generations to benefits and/or tax obligations.

In this second element the risks are defined that must be managed (and measured) in order to meet the objectives of the plan. The major risk exposures for pension plans include:

- Risks inherent in plan design, including insurance risk (e.g., longevity risk).
- Management risk, including risk arising from the difficulty of managing the three levers - benefit levels, contribution policy, investment policy - particularly when one or more are fixed.
- Governance risk, including risk inherent in the diffuse authority structure and principal/agent risk.

Additional considerations when defining the objectives and determining which risks must be managed include:

- **Sustainable.** A plan that is sustainable can be managed to maintain consistent, anticipated changes in plan costs from year to year or across generations.
- **Equitable.** Equitable costs will link plan costs directly from the taxpayers who receive the services to the benefits for the public employees who deliver those services. In addition, the costs of risks that are taken by generations of stakeholders are borne by those generations.
- **Appropriate funding.** A plan with appropriate funding will not have an excessive level of costs and those costs will remain reasonably predictable, such that the plan remains healthy but not excessively so. There should not be a point where the plan either requires significant contributions (or benefit cuts) or has so much money that a particular generation of plan participants receives windfall benefits. Part of appropriate funding is balancing other budgetary considerations (e.g. infrastructure, schools, police, and fire).
- **Benefit design.** Benefit design should be set so that benefit levels are high enough to attract and retain public sector employees. In addition, benefit design for ancillary benefits, (retirement ages, etc.) should reflect the needs of public employees yet not permit public employees to “game the system.”

- **Governance.** Governance (including risk disclosures) should mediate the competing objectives of the stakeholders.

Establishing the Risk Budget

The third element of the risk management framework is to use a process whereby the risk budget,¹⁵ or appetite, of the various stakeholders is established. Risk budgeting for the pension plan of a public entity differs in one important aspect from cash budgeting. Cash budgeting is typically used to get precise allocations for the coming year and to track actual to expected cash outlays. Risk budgeting becomes important as a tool for managing the limitations within the traditional budget-setting process, to ensure that risks taken by the plan today do not lead to untenable cash budgeting situations tomorrow.

A risk budget must define how much risk the plan stakeholders are willing to tolerate and who bears the consequences (both favorable and unfavorable) for permitted risk exposures. Risk exposures are a straightforward calculation, but a budget requires explicit policy decisions. An example of a risk budget function for an insurance company might be to allow a return to shareholders which does not expose the company to losses that would lower the credit rating of the company (and hence its ability to attract cash for future growth needs, either through new sales or the capital markets).

The challenge for a pension plan is to link effective short-term, point-in-time measurements, with long-term commitments. An example of a simply defined taxpayer risk budget would be that contributions cannot, as a worst case, exceed x% of pay.

As with defining the objectives, getting agreement on the risk budget may be an extremely difficult process but it is essential for the transparency of the risk management of the plan. The risk budget should have a hard limit which should rarely, if ever, be crossed, as well as a soft limit which triggers escalating actions (e.g., higher level authorities, mitigation actions, etc.), to manage the escalating exposures.

The three main components of public pension plans are benefit levels, contribution levels and investment strategy. For any of these components that are permitted to be variable, the risk budget linked to that stakeholder needs to be documented and reported on. In the typical case, it is the taxpayer contribution which is the key variable.

In considering the risk budget, the following items illustrate some important considerations (Additional background on the major risk exposures in pension systems can be found in the Appendix C: Risk Exposures):

- For pooled risks, which of these risks have a systemic element that places a further risk on the parties that fund the system (employees and taxpayers)? In some cases risks are pooled “cost-free” (individuals’ longevity risk). This is a “win-win” situation for participants and funders. But the cohort risk, that the cohort mortality improves, is borne by the system.
- Are there plan features (options) that participants can use to select against the plan? This would typically be early retirement features, special programs (e.g. DROPs¹⁶) or ways to increase benefits by manipulating other parts of the system (maximizing overtime, taking a higher level position in the final year, “double dipping” and returning to work upon retirement).

¹⁵ This is often called a Risk Appetite or Risk Tolerance. For the purposes of public funding of pension promises, we felt the framing this in terms of a Risk Budget would be clearer and more effective.

¹⁶ DROPs are defined on page 48 of Appendix (D)

- What actuarial risks are there that the plan cannot hedge? The primary one today is systemic longevity risk. This can be significant for public plan systems because most pay inflation-linked benefits greatly increase the value of future payments and thereby increase the cost of systematic longevity improvements. Effective vehicles to hedge this risk are limited, and still being introduced to the US market.
- What non-actuarial risks are there that the plan cannot hedge? Chief among these could be the unwillingness of a legislative body to allocate funding consistently to the plan. Such a plan does not have an enforceable call on cash, even though promises are made which must be funded out of future cash needs. But, that cost is predicated on assuming future continuous access to that cash.¹⁷ “Hedging” in this case may include legal mandates to compel contributions or tighter review of the acts of legislatures and other taxing bodies by independent reviewers.
- What scenarios will create extreme tail situations – either positive or negative? In particular, what happens during negative events? Public entity finances are very susceptible to economic recessions; state and local entities must balance their budgets, and have limited sources for borrowing (typically for capital projects). Risk budgeting should be done in a way that is mindful of events that could both reduce the tax base and increase required contributions at the same time.
- What is the “stability” of the benefit level? How susceptible is the system to increases in benefits (above those that are being funded). For those public plans where the benefit level once promised must be maintained, the stability of the benefit level is a key consideration. A plan may be able to take more risk where there has not been (and there is not expected to be) significant increases in benefit levels. Plans which have the ability to change the promise, once made, may be able to take on more risk.
- What is the ability of the parties that fund the system (employees and taxpayers) to support pension contributions? This should consider both the level of contributions and the costs of increasing (or decreasing) contributions. Within a public system, there are risks to both increases and decreases in contributions: a recommended decrease in contributions can make it appear that the plan can support a higher benefit level without an increase in contributions, thereby creating pressure to increase benefits, often as a trade for other (presumably more costly) increases in non-pension compensation. In addition, employees may not want to make increased contributions without some increase in future benefits.
- What are the other demands on revenue streams? Legislatures may have the political will (in the past) to make contributions, but if they cannot keep schools open or roads paved, pension contributions may not be made. One test of this would be to examine how well the legislature pays its obligation during good times. Certain states (e.g., Illinois General Assembly) have not made contributions during recent stronger economic times, because the state has a systematic imbalance between revenues and obligations.
- What level of asset liability risk has the plan taken? Note that for pension plans, this includes the combined effect of interest rate, credit and equity risk. It is important to understand these risks, not just in an absolute sense, but also relative to the impact it could have on the funding of the plan.

¹⁷ This risk does not affect all plans equally. For example, California’s state constitution vests the authority to set actuarial funding policy with the board of the relevant retirement system and, for most public pension plans in California, supporting legislation requires the employer to make the contribution set by the System.

- How mature is the plan? One factor to consider in risk taking is the level of plan maturity. When a pension plan is established, it typically has none or very few retirees. Sometimes plans grant benefits for future service only; other times they will grant active employees past service benefits (limited or unlimited). But they don't typically extend benefits back to individuals who have already retired.

Plan maturity hits a major inflection point when a full generation of active workers has retired and the plan has reached a full complement of actives, vested former employees and retirees. At that point, the number of retirees is expected to remain relatively steady when compared to the active work force. Another way to gauge plan maturity is by comparing benefit payments to payroll or normal cost. An immature plan will have low benefit payments compared to payroll or normal cost. Over time, benefit payments will rise, but will at some point reach a relatively steady state when compared to payroll or normal cost. An example of this is provided in Appendix C.

When considering risk, particularly investment risk, a plan with few cash needs, and much cash inflow, can take more risk than a plan with greater cash needs, and relatively lower cash inflow. What this means for risk taking and risk mitigation is that in the early days of a pension plan, assets of a plan are small relative to the pension contributions (as a percentage of payroll) and subsequently a plan sponsor (or its agents) may choose to take significant risk with investments because a drop in the asset value can be made up over a few years with a relatively manageable increase in contributions (as a percentage of payroll). As the plan matures, asset shortfalls may drop the assets to a point where significant additional contributions (as a percentage of payroll) are required.

- Relative importance of investment earnings as a funding source. Research from the Employee Benefit Research Institute (EBRI) has noted that (as seen in the table below), except for fiscal years 2001–2003, investment earnings made up 71–82 percent of public pension funding, employer contributions accounted for 13–20 percent of the funding, and worker contributions for 6–9 percent.¹⁸ Both the volatility of investment results from year to year as well as the uncertainty about the overall, long term mean asset return highlight the significance of ensuring a sound risk management framework to successfully manage this risk.

¹⁸ Source June 17, 2009 Edition of EBRI Fast Facts (#127), <http://www.ebri.org/pdf/FFE127.17June09.Final.pdf> (accessed 10 September 2010).

Table III
Public Pension Benefit Funding Sources, 2008–1998
(in \$Billions)

	Total	Investment Earnings	Worker Contributions	Government Contributions
2008	\$ 79.6	\$ (39.3)	\$36.9	\$82.0
2007	577.6	470.9	34.1	72.6
2006	392.8	295.6	32.7	64.5
2005	354.3	262.7	31.0	60.6
2004	407.3	315.5	30.8	61.0
2003	147.7	72.7	28.8	46.2
2002	(7.5)	(74.7)	27.7	39.5
2001	123.2	58.0	26.4	38.8
2000	297.0	231.8	25.0	40.2
1999	263.2	197.9	23.6	41.7
1998	261.3	197.6	21.8	41.9

Fiscal Year 2008-1998, data found at <http://www.census.gov/govs/retire/>, accessed 20 September 2010

To conclude, the use of a risk budget is essential for sound risk management. The next section will discuss the tools and expectations needed to discipline stakeholder actions and choices when the budgets are exceeded

Evaluating Risk Mitigation Alternatives

The fourth element of the risk management framework is to evaluate the range of risk mitigation alternatives and to execute those risk mitigation techniques deemed appropriate. Setting a risk budget is the foundation for risk mitigation as it clarifies the measurements to use and establishes the expectation of additional mitigation tools. This is where measurement gets linked to actions that can be taken by those managing the plan. It includes not only financial risk, but the presence of possible risk sharing between system participants as well as actions and processes tied to governance concepts that create accountability and transparency for agents creating or managing risks in the plan.

Risk mitigation can occur through various means.

System Discipline

At the simplest level of system discipline, some examples include:

- Tight controls over how surplus can be used (e.g., for contribution reductions or benefit improvements).
- Exceptional care if the plan is used to achieve purposes beyond ordinary retention and retirement (e.g. DROPs).
- Additional controls when creating vested promises for future benefit accruals.¹⁹
- Plan design features that introduce some blend of risk sharing/management options between investment results and benefits such as those that target (rather than guarantee) benefit levels.

Additional system discipline tools that can be introduced through the risk management process include:

- Using the risk budget to identify potential warning (yellow flag) situations (e.g., decrease in tax revenues).
- Establishing a methodology for responding to the yellow flag situations and building in “red flag” mandated responses. One example of this would be triggers that require more usage and disclosure of stress testing and/or constraints on the amount of risk taken by the plan that are a function of the maturity level of the plan.

Pricing Discipline

A second type of risk mitigation is to include pricing discipline to understand the level of financial risk being accepted by the system. Pricing discipline simply means a framework to measure the risk inherent in the promises about to be provided (and the strategy used to fund those promises). Many tools can be used, often in conjunction, to increase pricing discipline:

- Use of market value or risk-adjusted assets and liabilities as well as actuarial values. This could include noting the cost of “settling” or “hedging” obligations as for retirees only (where obligations are known and understood and more easily hedged).

¹⁹ For example, putting a sunset date on when new benefit formulas are negotiated.

- Use of stochastic measurements (which include the appropriate use of fat tails for investment return distributions as well as differences due to long run errors in the mean²⁰).
- Use of stress and specific scenario testing (e.g., what would be the impact of a Japan-type 10-year economic stagnation?) This could also include illustrating the volatility in cost that results from the accepted (or contemplated) risk position of the plan. Volatility in cost arises because financial risk is taken. While volatility can arise from completely external sources (e.g. regulatory requirements, voter referendums), typically, volatility flows from strategies to take risk rather than hedge risk. While volatility in costs makes it difficult for individuals managing the plan, it is a consequence of risk taking, and not a risk in and of itself.
- Having appropriate analytics and guidelines when negotiating the trade-off between additional benefits relative to current market conditions.

Budgetary Discipline

A third type of discipline imposes budgetary discipline by aligning revenue to costs. For mature systems, where benefit payments exceed normal cost, care must be taken to ensure that cost variability can be supported by taxpayers. In these cases, risk mitigation by increasing contribution levels may have limitations. Thus, the need for the more rigorous disciplines mentioned previously.

Traditional Risk Mitigation

With traditional risk mitigation strategies, what happens if certain economic or demographic scenarios occur can be considered in combination with any of the disciplines incorporated above? Questions to consider in risk mitigation include:

- What is the potential downside (or upside) of the plans risk exposures?
- In what scenarios (e.g. economic) will there be downsides?
- What positions can be taken with regards to the rest of the portfolio to mitigate those downside risks?
- Are there other risks significantly correlated (positively or negatively), or uncorrelated, and what can be done about them?

²⁰ Consider the following problem. The real rate of return on US capital markets from 1950 to 2000 was 3% (300 basis points) greater per annum than from 1900 to 1950. Assume the actuary priced the cost of the plan based on 1950-2000 experience and that the public employer made benefit promises to public employees based on that costing. Typically, once a benefit formula has been promised, it cannot be reduced, even with respect to future service. Thus, in the year 2000, benefit promises included benefits that would be earned by current employees over the next 40+ years as well as the benefits earned to date by current employees and retirees. If the actual real rate of return during the period 2000-2050 replicated the actual real rate of return from 1900-1950 the actual return would be 300 basis points less than expectation. When many public plan benefits are indexed to post-retirement inflation and pre-retirement are indexed for pay, which is highly correlated with inflation, the actuarial losses that would emerge over the 2000-2050 period would result in tremendous costing increases that would likely be unacceptable to the taxpayers, yet required in order to support constitutionally guaranteed benefits. The current valuation/reporting paradigm does not provide a mechanism for addressing this problem.

Risk Mitigation: Regulatory Backstop Structure

It is important to consider what resources a system has when its “budgets” and risk practices break down.

Within an insurance company/entity, typically, the insurer has either collected the full premium for the product (so there is no additional call on cash to the policy holder) or the insurer has termination rights if future premiums are not paid. Thus the scenario of “unsustainable future promises” is mitigated through a renewable product (future premium income for future coverage), or the product may have features to share experience (positive or negative) with the policy holder. Reserves and capital requirements are established so that the insurer can meet its future promises without needing to “call” for additional payments from the policy owner. Beyond these resources the insurance company can also go to the capital markets or to its owners (policyholders for mutual companies or stockholders for stock companies).

Pension plans by contrast maintain a call on the plan sponsors resources. For public plans, this is the taxpayers (through legislative authorities). For private plans, this is the private employer sponsoring the plan. To mitigate the risk to members due to a default on this call, the federal government (through ERISA) compels contributions from private employers. If the private employer cannot make what the federal authorities define as the “minimum statutory contribution” by a certain date, the plan may be terminated. If the plan isn’t fully funded, the federal pension reinsurance agency, Pension Benefit Guaranty Corporation (PBGC) takes over payments and guarantees minimum payments to participants. Note that federal statutes compel both the *timing* and *amount* of the payment. This is to ensure protection of the participants in these plans from bankruptcy of the company sponsor or from being given lesser priority than other creditors.

While public plan participants may not be able to compel contributions to fund their benefits (as noted earlier), most public plan participants have strong contractual rights to those benefits. Public plan participants are generally protected by the same state constitutional clauses that forbid the government entity from using its power to abrogate contracts. While public entities can declare bankruptcy, it is rarely done, and when it has happened, typically a larger government entity has stepped in to ensure pension benefits are made whole.

Maintaining an Effective Feedback Process

The fifth and final step in the risk management framework is to maintain an effective feedback process.

A crucial part of risk budgeting is feedback, which happens after allowed risks are taken. Over time as internal and external risk exposures change, the feedback loop is critical to managing this process. For example, insurers must navigate the influx of premium income received, paying policyholder benefits, retaining revenue for reserves (and capital), and returning revenue as dividends to owners (policyholders or stockholders). There are systemic checks and balances: reserves must be recalculated each year, and each year owners find out if their investment was well managed. There is also immediate market feedback to an insurer who gets this wrong: loss of income (future policy rates set too high to be competitive), enforcement action by regulators and/or disinvestment by owners (policy owners not renewing policies or shareholders selling stock). Here the feedback loop disciplines the principal/agent behaviors at a macro level to maintain the ongoing sustainability of the participants based on the information provided to the stakeholders.

An important consideration in the feedback step is the process for taking risk and then being able to evaluate how and if value has been generated and who gets “credit” for that value. This means access to good managers with sound control cycle and feedback information to get the right signals back to the stakeholders. This feedback process is key to clarifying how to determine if there are investment “winnings” and when (and which) stakeholders should get to benefit from them.

Distortions in the pension plan feedback loop

The feedback loop within an insurance entity is fairly straightforward: there are only a few principals (the company, the policyholders and/or shareholders) and there is a strong regulatory structure at both a state and federal level. The feedback loop process is more complicated for public pension plans due to the following factors:

- **Time horizon.** As with any pension plan, the feedback loop process is very long. Pension plans typically get into trouble slowly. Market events can bring poor pension management more quickly to light, but absent negative market events it could be decades before plan mismanagement is discovered. And, when long-term mismanagement is brought to light as a result of a negative market event, it can be too late to employ cost-effective mitigation strategies.
- **Dysfunctional control structure.** There is no single stakeholder or authority that has the authority to make significant changes to the plan or compel contributions. Plans can be mismanaged in the short-term with long-term consequences. For example, if benefit levels are increased without raising contributions immediately, future taxpayers and plan participants may have to pay higher contributions. Similarly, elected officials who use market-driven plan surplus for funding holidays allow tax revenues today to be used for other purposes, but may put the burden of higher contributions on future taxpayers and plan participants.
- **Lack of effective regulatory standard.** There is no single regulator with the authority to compel certain disclosures, including the disclosure of information calculated on a roughly

comparable basis.²¹ GASB issues generally accepted accounting principles (GAAP) for the disclosure of public sector information; this disclosure is typically provided in the CAFR (Comprehensive Annual Financial Report). GASB standards have historically afforded leeway with regards to how results are calculated and disclosed than is typically found in the private sector. While compliance with GASB disclosure is strictly voluntary, state and local governments almost universally comply with the GASB requirements.

- **Economic and demographic cycles.** Economic cycles affect both revenues and the need for cash contributions. During economic downturns, plans may see the need for increased cash contributions at a time when tax revenues decline. Similarly, demographics can drive contributions. The need for contributions can be affected by plan demographics (plans with more retirees and long-service participants) and the ability to fund can be affected by tax base demographics (smaller tax bases or tax bases with more retirees). Relying on a long-term economic average as a risk mitigation strategy may lead to inadequate contributions during economic boom times and unsustainable contributions during economic down times. The challenge here is to translate this into either countercyclical funding policies or tighter risk budget tolerances.

Risk-adjusted value and the feedback loop

Significant controversy has centered on the usefulness in the public plan context of a risk-adjusted liability value. A strong argument has been made that a risk-adjusted value of liabilities for a public plan is a measure of the value of the promise and should be disclosed, along with the current budgeting value. The argument recommends that these benefits, as a virtually risk-free promise to participants, should not be valued as though equity-risk rates of return are guaranteed, but with risk-free rates (e.g., Treasuries). This is similar to how contracts are valued for insurance companies (where rates often reflect a liquidity premium), and how private pension plans are valued for accounting and funding purposes (where rates are based on high quality corporate bonds). If pensions are under-priced relative to the risk-adjusted cost, it may signal a distortion in total compensation.

The use of a discount rate based on market value, whether Treasuries or high quality corporate bonds, is opposed by many in the public plan sector. Some public sector actuaries note that, in a public environment, multiple values for the same thing create confusion and possible opportunities for political manipulation. While actuaries understand the meaning of using different values to assess the same contract, most members of the public (including elected officials) are used to a single price for an object, and therefore would see multiple values for pension benefits as confusing. Weighed against this possible confusion is important objective information regarding the benefit promise provided by risk-adjusted values. While there is no true "market" for public plan benefits, the value of the deferred compensation must bear a reasonable relationship to the nearest possible alternatives (bonds or annuities). Also, risk-adjusted values provide key information for setting a risk budget and for managing that budget through the feedback loop.

Note distortions in the feedback loop are endemic to all retirement systems (and in different ways for any risk pooling system without risk sharing between provider and insured): private pension plan sponsors are compelled to make contributions (both in amount and timing) to protect participants against the temptations of sponsors to divert revenue to other uses. 401(k) plans

²¹ For insurers and private pension plans, there are regulators or another authority that can compel disclosure to other stakeholders. State regulatory authorities and financial accounting standard setters act within the insurance context to compel the relevant disclosures to protect policy holders and/or shareholders. The IRS and financial accounting standard setters act within the private pension plan context to compel the relevant disclosures to protect plan participants and shareholders.

suffer similar problems (without any government mandating individual contributions): participants who don't save for their own retirement today have more money to spend today (not saving creates positive feedback). Annuity contracts have in recent years somewhat compensated for this gap by creating products with more participation features designed to mitigate this long-term risk.

It is true that the long time horizon coupled with the permanency of government allows more flexibility to address long-term risks. The longevity of operation is certainly more assured (it is reasonable to conjecture that the state of California will likely still be operating in 100 years, while many of California's top private employers will likely be different). However, there are two complicating factors that challenge this paradigm:

1. Tax bases are not stable. As noted above, the demographics of the tax base can shift (the US currently has an aging population and retirees are generally able to pay less in taxes than active workers). Tax bases are also subject to economic cycles and the competitive impact of lower taxes in other states
2. Taxpayers are better able to recognize reduced funding by the state for other long-term responsibilities. Taxpayers will immediately detect the tangible results of education budget cuts, through, for example increases in class sizes, and in capital budgets by less infrastructure maintenance. If these public goods are not maintained, taxpayers immediately take notice. However, taxpayers may likely not notice if undue investment risk taking or optimistic assumptions in pension plans will gradually, but increasingly, place long term responsibilities at risk. This version of state "disinvestment" can be much less apparent.

Importance of Risk Budgeting

Risk budgeting can play a critical role in mitigating distortions in the feedback loop process.²² Risk budgets can also deal with other key dysfunctions within the system: lack of a single authoritative decision maker and lack of training in risk assessment. The operation of a pension plan requires a high level of understanding of a number of complex risks. Actuaries and other risk professionals spend decades learning and understanding these risks. Stakeholders responsible for the operation of the system who do not have this training, cannot be expected to have the necessary skill sets to fully identify and manage these risks. This makes the need for a common risk budget vitally necessary since the risk budget structures the risk decision process. The feedback loop disciplines decision making and allows plan stakeholders to learn from their decisions and manage the effects of risk taking.

Risk budgeting and planning process

Risk budgeting is not cash flow budgeting. Risk budgeting goes beyond the ordinary budget process to consider:

²² Other financial institutions which manage risk, even without these distortions, have found risk budgeting to be an essential aspect of their risk management. For example, multi-national insurers, for example, have found a risk budget critical because they don't have a single regulatory structure and as such have found risk budgeting to be an effective way of managing risk within the company and often voluntarily disclose that risk to their shareholders.

- What are my risk tolerances (e.g., general revenue contributions cannot exceed X% of payroll or Y% of general tax revenues; employee contributions cannot exceed Z% of payroll)? This includes quantifying and disclosing hedged and unhedged costs.
- What kinds of future events would create intolerable risk outcomes today, in the short- and long-term? (considering different horizons)
- What risks can I take, and what mitigation strategies must I employ, to ensure that my risk taking is within my risk budget?
- How do I achieve this strategy and over what period do I need to achieve this strategy?

Each of these questions is now considered in further detail:

Establishing a Risk Budget

Consider both the features of the plan and the features of the sponsoring system(s). For example:

- How large is the plan vis-à-vis the revenue stream designed to support the plan?
- Is there one sponsoring system or a number of sponsoring systems (which might have distinct risk budgets)?
- What political considerations will drive the ability to sustain variability (both positive and negative) in cash contributions?
- What will the employee base look like tomorrow, and can payroll needs be sustained by similar contributions tomorrow?

The needs of the various public plan stakeholders should be considered. Risk budgets will often be stated as an upper limit to the cost of the plan (typically stated as cash contributions, from both the employees and sponsoring system(s)). It can also consider how much cost can vary from period to period (e.g., no cost increases in one year greater than Y%).

Future taxpayers. Some argue today that public pension plans can take on risk because the sponsor will never disappear. But, as noted above, the ability of the revenue base to support the system might vary. A plan may be able to sustain more risk, or less risk, in the future. Particularly for systems where it is anticipated that less future risk may be able to be taken, the system needs to carefully consider the consequences of risk taking today on tomorrow's cost structure.

Risk Defeasance. Defeasance from an investment standpoint involves establishing a risk-free portfolio of assets that match the expected benefit payments in timing and amount. The cost of defeasing financial risk is established by comparing the risk adjusted value of liabilities to the market value of assets. Defeasance can also involve limiting or decreasing the obligation: eliminating benefit options (e.g., early retirement) or decreasing future benefit accruals. Most public pension plans are considered to have established contractual obligations which cannot be abrogated, so the ability to eliminate or decrease future benefit accruals can be quite limited. Note that understanding the cost to defease financial risk is not the same as budgeting to a defeasance cost: the cost of defeasance is the cost that a rational party would pay to accept the liability, but it does not mean that the system intends to or could transfer the liability. This is not an argument that benefits must be financed at that cost; rather, a public entity that is supporting benefits it cannot afford to defease should recognize the additional risk it places on the parties that

fund the benefits (taxpayers and employees). These entities should establish governance and risk management safeguards to address the risk they are accepting, such as disclosure to the public.

The use of the range of all possible outcomes. The analysis focuses on how to manage and/or mitigate the outcomes that fall outside of an acceptable risk budget. For example, market value and amortized (or smoothed) cost value measures only indicate a measurement of cost at a specific point in time. Yet neither can indicate (or reliably predict) the actual total plan cost over its lifetime. Yet, when used in tandem they may provide useful inputs to assess upper and lower bounds for ranges of costs and assessing how excess returns will contribute to a reserve that is a function of the amount of risk allowed in the budget.

Exceeding Risk Budgets

Once the plan stakeholders have established a risk budget, they must look at what it would take to exceed that risk budget. Again, they must look at both features of the plan and the features of the sponsoring system. If risk budgets are expressed as a percentage of revenue, then scenarios where there are sharp decreases in revenue or sharp increase in cash contributions (a greater portion of revenues) must be considered. Note, this is not considering what the probability is of such a scenario; only the impact if the scenario does occur. How could the system respond to those scenarios (e.g., tax increases, reallocating revenues, lowering benefits, increasing employee contributions)? When considering the scenarios under which risk budgets might be exceeded, both a) how close it is currently to the risk budget and b) how much risk it is taking on in the future through new commitments, should be considered.

Employing Risk Mitigation Strategies

Risk mitigation strategies can reduce risk (in general) and reduce risk when risk budgets are exceeded. To the extent that a system's stakeholders determine that the plan needs less risk (or is already at or trending to the risk budget) long-term risk mitigation strategies must be employed. This does not mean defeasing all risks; instead there should be a prioritization of risk exposures based on significance, severity and time horizon (over what period the risk can be mitigated). Risk mitigation strategies also don't have to be "all or nothing" – the plan may tolerate some risks (e.g., systematic longevity risk) but it may be decided that others are too significant not to defease (e.g., economic downturn risk).

Strong governance structures can be a key risk mitigation strategy. For example, if elected officials can "choose" the level of contribution to be made to the plan in any year, based on the political preferences for revenue allocation, then the plan has greater risks than in a system where, by law or other means, the elected officials or system sponsors "must" contribute a specified percentage of payroll or general tax revenue. Plans with a weak governance structure may need to employ other risk mitigation strategies.

Risk Management Strategy: Establishing Process and Time Horizon

Once the risk budget has been defined, the scenarios in which the budget might be exceeded are determined, and risk mitigation strategies considered, a process and time horizon over which to implement a risk management strategy can be developed. Risks that can have a severe and immediate negative impact may need immediate mitigation. Some risks do not

pose an immediate threat, or are too complicated to mitigate quickly; in that case a multi-year strategy may be needed to move from the current risk taking to a future strategy. A clear and actionable plan must be developed, with roles and responsibilities for those managing the system clearly defined. In addition, key stakeholders must agree to the risk management strategies employed, and the process they will use to evaluate and make any future change to the risk management process. It is advised that any changes to the risk management process must first re-evaluate the risk budget, consider scenarios where the budget might be exceeded, and consider risk mitigation strategies.

For illustrative purposes, the table below (Table IV) is a sample risk management evaluation for a public pension plan. The first column defines *what* attributes of the risk management system should be considered when constructing an evaluation. *How* the scores would be assigned should stem from agreed on standards for a risk framework and evaluation process.

Table IV			
Sample Risk Management Evaluation			
Attributes of an Effective Risk System	Comments	Score (1 to 10)	Risk Management Recommendations
1. All stakeholder and agent incentives are clearly known and recognized	System is relatively transparent, although motivations of stakeholders and agents are generally not well understood by all parties	6	
2. The system objectives are well defined and understood by all participants and stakeholders	Pooling of risks inherent in DB plans is widely understood and appreciated; US has a strong DB tradition	8	
3. The risk budget (the ability, desire and capacity of participants and stakeholders to take risks) is well understood and communicated, and mechanisms exist for relevant measures and reporting on the budgeted risks	Generally, the parties that fund the system (taxpayers and employees) are unaware of their risks and risks assumed by other parties ; future taxpayers have no voice and can exercise no choice. Other stakeholders are also similarly unaware.	3	
4. The range of available and acceptable risk mitigation alternatives are well understood by all participants and stakeholders and flow out of the risk budgeting parameters	Current and future tax-payers are usually the risk-bearers of last resort and have little or no say in key risk decisions. Without a risk budget, managing mitigation successfully is almost impossible and will be seen as a “cost” and not a benefit.	2	
5. The system provides an effective feedback process which provides all participants and stakeholders with relevant and timely information with which to support decision-making regarding system interventions	Current reporting fails to provide a reporting on the risks in the system and the long-term implications of short-term decisions	2	

Conclusions & Recommendations

With its use and articulation of risk management principles the actuarial profession has an opportunity to move into a central role in limiting and managing individual, corporate and societal exposures to catastrophic losses. However, recognizing that actuaries still have work to do to prepare for that role, centers of thought and professional leadership have been organized to push forward with work on these issues in order to realize that goal. The information and approaches outlined in this report can be further applied and built upon to address the challenges facing public sector pension plans as well as benefiting the larger public interest goals of the profession on a broader spectrum of issues.

This report focuses on a risk reporting and governance framework for a public pension plan; a similar framework could be constructed for retiree health benefits (see Appendix D) and other public employee benefit systems. We are aware of the following groups already organized and underway to address issues of pension risk:

1. Society of Actuaries (SOA) – Enterprise Risk Management (ERM) for Pensions, started their work in January of 2010 to prepare a report for the SOA President this fall.
2. Actuarial Standards Board (ASB) – Three projects were listed on their March 2010 Agenda list:
 - a. ASOP No. 27 revision (*Selection of Economic Assumptions for Measuring Pension Obligations*)
 - b. Economic value of pension plan assets and liabilities
 - c. Assessment and disclosure of riskThese three subject areas are interrelated and, in totality, will result in proposed revisions to ASOP No. 27 (economic assumptions); proposed revisions to ASOP No. 4, *Measuring Pension Obligations* (measurement and value); and a proposed new standard on risk.
3. American Academy of Actuaries - The Pension Practice Council, the Joint Academy SOA Pension Finance Task Force and the Public Plans Subcommittee continue to actively discuss aspects of these issues and develop a body of work in this area.
4. Conference of Consulting Actuaries – Now have an active Public Pension Plan Committee.

Consider as well the following groups addressing the role of actuaries in Risk Reporting and Management:

1. International Actuarial Association – Practice note released March of 2010 on CARE. The focus of the note is “What to include in a Comprehensive Actuarial Report on Risk.”
2. Academy – Financial Summit in the summer of 2009 focused on Systemic Risk, 2010 Summit on advocating on issues in the public interest.
3. ASB – They are considering a recommendation to develop an ASOP on Enterprise Risk Management. The recommendation to develop it was accepted at the June Board meeting of the ASB and the project is now an active project.

The task force also recognizes external sources that are similarly concerned with the risk and financial stresses of public employer plans and whose actions impact the actuary’s responsibilities including

1. Governmental Accounting Standards Board
2. Federal, State and Local legislative bodies
3. State and locally sponsored retirement commissions and oversight boards
4. Public employer interest and lobbyist organizations.

The risk framework discussed in the Framework Section was also reviewed by the Academy Practice Councils and should be of significant value for those charged with a fiduciary responsibility for the risk management of public pension plans. The framework centers on five attributes of an effective risk management system. The task force's analysis showed that there is a fundamental gap between what exists and what is desired in the way of risk-focused reporting for public pensions.²³ The actuarial profession needs to communicate the value of risk-focused financial reporting and recommend what such reporting could and should provide. Table IV above contains an illustrative summary of how this risk framework could apply to public pension plans.²⁴ As previously noted, the lack of any centralized regulatory oversight underscores the need for and the value of strengthened actuarial standards to enhance the understanding and management of risk in the public plan sector.

A risk-focused reporting and governance requirement will add value by addressing three topics:

1. Constructive structural incentives for stakeholders and agents (including addressing the presence of moral hazards).
2. Inform decision-makers of the risk levels and potential range of consequences inherent in current and proposed benefits, investments and governance structures.
3. Possible stresses/breakdowns that could impact the plan, and action steps that will be followed should they occur.

Constructive Structural Incentives

Examples of breakdowns in structural incentives among stakeholders and agents include:

1. **Funding dysfunction** exists when defined benefit public retirement systems have:
 - a. An unenforceable funding mechanism whereby the employer is not required to make the needed funding contributions, or
 - b. An unspecified or non-actuarial method of contribution determination and an unclear method for benefit adjustments if the funding contributions are insufficient, or
 - c. An unclear method for limiting perceived surplus from favorable experience being dedicated to purposes other than reserving against the potential for future adverse experience, or
 - d. No quantification of risk to permit limits on the risk undertaken in relation to the ability of the sponsoring entity to withstand adverse results.

²³ There is no explicit requirement for a risk focused report in private plans either.

²⁴ A similar framework could be applied to private pension plans and Social Security.

2. **Principal/agent misalignment** occurs when, contrary to the optimal functioning of the system, plan provisions encourage actions on the part of stakeholders and agents such as:
 - a. Manipulation of pay in final average earnings plans to increase members' pensions. Basing benefits on a short final compensation periods can greatly increase the incentive of participants and others to "spike" the final compensation and provide benefits significantly greater than contemplated in the design of the plan.
 - b. Management supporting retroactive benefit improvements (applicable to both past and future service benefits) in situations where both labor and management benefit from such improvements.
3. **Overly broad dispersion of control** occurs when checks and balances act against truly effective system-wide risk management. Most public retirement systems have the control and authority spread amongst multiple parties (e.g. retirement system, public sector employer, legislative and executive branches). This dispersion of authority makes a holistic view of the risks of a public retirement system difficult to achieve. Authority (and responsibility) to oversee risk, determine required funding, grant benefits, and actually provide the funding may all reside with different parties.

Distinguishing Prudent Risks

Factors that need to be examined to determine if the risks being taken are prudent include:

1. **Risk adjusted or market value vs. going concern (actuarial) value of assets and obligations.** An important consideration is the appropriate use of each of these measures in different contexts. Both have shortcomings and in the current accounting/cash budget model used to finance pension plans, neither is adequate. At a minimum, they provide two different views of the financial health of the system. The market pricing information provides the value of the benefits being provided, and contains the information needed to construct hedges. And, yet, the volatility of reported market values over different economic cycles can create skepticism and misunderstanding. On the other hand, going concern values can create a focus on yield that may be blind to the risk being taken. It is the lack of dialogue about a risk budget and a plan to manage it that are the missing elements, not a specific accounting number.
2. **Maturity level of plan.** The maturity level of the plan leverages the investment risk relative to payroll. The increased leverage in mature plans typically decreases the amount of risk that can be safely taken.
3. **Plan design.** The antiselection and "put option" cost of plan design features should be considered. In particular, plan design features which have the potential to be manipulated by participants (e.g. single period final compensation features, DROPs, terminal leave compensation) or which provide financial protection (e.g. post-retirement COLAs) must be considered in any risk taking and risk hedging strategy.
4. **Ability of the plan sponsor to adjust plan design.** To the extent the plan sponsor is unable to reduce future benefit accruals, it has less ability to react to future events (e.g. market downturns, economic downturns). Implementation of a contingent benefit structure that shares the risks of future benefit accruals among stakeholders would enhance plan viability.

5. **Ability of the plan sponsor to adjust the contributions without endangering other public benefits.** Public plan sponsors have the ability to raise revenues (taxes) should the plan need extra funding, but at some point they can no longer raise revenues and must make trade-offs with the funding of other needs (e.g. infrastructure, schools, member health benefits). This can only be done with the presence of an agreed upon risk budget.

Planning For Future Stresses

Part of sound risk management is to understand possible stresses that could occur and negotiate ahead of time how they will be addressed. The results of this process contrasts with what is typically presented in accounting reports, which focus on what has happened or is reasonably likely to happen. Effective risk management reporting:

1. **Clarifies which elements of the system are fixed and which are discretionary** and how the discretionary elements can be managed to keep the system in balance. The three main elements of the system are benefit levels, contribution levels and investments. If any one of these elements is variable, one of the others or a combination of the two must create an offsetting hedge.
2. **Ensures all relevant decision makers have access to the information necessary** to make appropriate risk decisions. For example, this information could be the risk-neutral cost of benefits and potential shifts of cost among generations of taxpayers.
3. **Considers how future demographic and economic conditions could affect the financial health of the plan**, including the ability to withstand risks taken today. Examples include the impact of a declining workforce, economic downturns, high inflation, and changes in the tax base.
4. **Assesses the plan's event horizon** (the point at which the plan is no longer able to achieve levels of funding to sustain benefits)²⁵.
5. **Identifies governance issues that could create bias**, such as in the benefit structure or funding.
6. **Incorporates a feedback loop** based on actuarial considerations to suggest possible governance enhancements.

Recommendations

The task believes there is a need to expand on and deepen actuarial practice in the following areas:

- Identify and assess the incentives of the stakeholders and agents involved in managing, designing and administering public pension plans. Sound risk management maintains a healthy and transparent balance of incentives.
- Identify, and appropriately disclose, in a forward-looking fashion, the potential stress between the promises made (obligations) and the funding of those promises. Such disclosure should include a discussion of the risks entailed in the funding of the promises and where the stresses involved could lead to a breaking point. This

²⁵ The pension plan event horizon is taken from Hallmark, Bill and David Kelly "How Much Investment Risk Can a Government-Sponsored Pension Plan Afford?" *2009 Public Pension Finance Symposium Monograph*, Society of Actuaries, 2010. Available online at <http://www.soa.org/library/monographs/retirement-systems/public-pension-finance/2010/june/mono-2010-mrs10-toc.aspx>.

includes how to disclose the risks of volatility that accompany a best estimate number and any errors around the mean.

- Educate stakeholders, agents and regulators as to the value of these risk management principles.

Therefore, the task force recommends the Academy’s Board of Directors encourage and sponsor development of a risk framework based on the principles in this report for actuaries reporting on public pension plans. Further, future, examination of public retiree health benefit plans might result in similar recommendations in that practice area. Because the task force recommendations have focused on *what* topics should be covered, we also recommend the full report on this framework be shared, with the appropriate committees of the Academy, ASB and SOA for their usage and discussion regarding if and how they should be incorporated into ongoing practice. The task force respectfully requests that these groups attempt to build on our “*what-focused*” concepts in their deliberations as they develop the “*how-to*” of tools, methods, professional guidance, and specific examples needed to establish risk budgeting, mitigation alternatives, and feedback processes as central to actuarial practice.

* * *

Appendix A – Background

Public pension plans have characteristics that are similar to many other programs that provide a financial hedge against future uncertainties. But the design and operational differences between public pension plans and those that are similar - private plans, insurance products and the like - are important to more completely understanding them. This Background Appendix – A, presents some context for the task force report, with particular attention paid to the differences that, if ignored or misunderstood by those familiar only with private pensions or insurance, might lead to incorrect conclusions.

State and local government entities that provide retirement income for public sector employees are, for the most part structured as pension plans that will pay a monthly annuity to retirees. Pension plans are deferred compensation systems that promise an income stream for the retired employee's lifetime (and often that of a surviving spouse). Pension plans leave the employer (in the public case, the governmental entity) with the responsibility for these payments to retirees. The employers make cash contributions to advance fund for the retirement years and manage investment growth of funded assets to provide the eventual payment. Actuaries play a major part in designing and monitoring the funding programs.

Public employee plans now provide a contrast with much of the private sector, where in recent decades and particularly for newly hired employees, pensions, which define the benefits retirees receive, have been replaced with plans that define the amounts that employers contribute in a given year into a worker's retirement account. Much of the employer's responsibility ends with the contribution. One of the effects of these defined contribution (or DC) plans, is to transfer investment risk from the plan sponsor to the employee/retiree. Defined benefit (DB) pension systems, however, retain considerable investment risk to the plan sponsor. For public employee pension plans, this risk falls on the governmental employer and, ultimately, taxpayers.

Much of the current scrutiny of public pension plans stems from investment risk, the cost of risk defeasance, and the affordability of that cost following the market decline. Low bond interest rates and falling stock prices highlight a risk that has always been present in retirement systems, be they DB or DC. But this report points out other significant risks and recommends a comprehensive risk management approach to the design and operation of public pension plans.

Public pension plans differ in **design** from those in the private sector for two main reasons – a lack of federal involvement and differing expectations of employees. Our system of government secures for the states significant rights of self-government, the result of which has come to include little federal interference in the governance of public employee compensation and retirement systems. For example, some states and other jurisdictions elect not to participate in Social Security. In addition, state and local government are responsible for public safety, judicial administration, and education. Jobs needed for such dependability may call for training, physical duties, or career commitment with limited parallels in the private sector. Different career patterns emerge regarding age of hire and duration of service. This has led to compensation packages with designs for deferral that may differ from private retirement systems.

Public pension plans differ in **operation** from those in the private sector for the above two reasons but also two others – the need to enact annually a balanced cash budget and an informational transparency that allows more scrutiny by citizens and attention by media in part through mandatory freedom of information laws. Other aspects to remember about public employers and employees are that the public entities are set geographically and governmental

services affect virtually everyone in the geographical vicinity. These implicit permanency and intergenerational effects may lose focus in the face of annual budget battles and short public attention spans, but must retain a priority for actuarial involvement.

This background section is organized around five topics: the nature of the plan sponsors; the nature of the employee membership; plan design; governance issues; and funding programs.

The Nature of the Plan Sponsors

Governments service the needs of the public, and taxpayers fund those services. State and local government finances are driven by annual budgets that must be balanced, leading to challenges of revenue allocation. Unlike our federal government that is allowed to run a deficit, states, cities and other public employers must balance their budgets and, if they borrow, it is through channels similar to the private sector, but usually more bureaucratic. Public retirement systems are managed in the open, subject to sunshine rules, such as freedom of information laws and open meeting laws.

Given that they are associated by definition with a geographic location unlikely to disappear, most governments are likely to exist for as long as the pension promises made to their members. This association, however, also increases the number of stakeholders, with interests complicated by this expected continuing existence. State constitutions may dictate aspects of benefit plans for state employees and retirees.

States are large employers of people, as are major cities, counties, and some other public governing bodies. Their pension plans represent a disproportionately high number of the largest U.S. plans. This has advantages in terms of risk pooling, economies of scale, and the ability to employ dedicated professional advisors. Large retirement plans have the ability to employ quality control measures not typically found in smaller plans, including regular scheduled experience analysis and plan audits.

The Nature of the Membership

Many jobs in the public sector have different characteristics than those in the private sector, which may mean different risk profiles and design of compensation and benefit plans. The physical demands placed on public safety personnel, including police, firefighters and other first responders, has led to retirement plans providing for retirement at lower ages than plans covering other public employees (often referred to as general or miscellaneous members). Within the general employees category there are other groups, such as teachers or judges, which have unique characteristics to be considered.

With some exceptions, public sector employees tend to have longer average service periods (for retirement credits) than private sector employees. This is generally due to two factors – less movement between employers and networks of reciprocal agreements that allow movement between public sector employers without loss of vesting. Layoffs have been less frequent than with private employers, but job mobility to the private sector is limited for public safety personnel, teachers, and some other public employees, which correspondingly limits the opportunity to share in private sector productivity or entrepreneurial gains.

Many public sector employees are not covered by Social Security and hence lack that underlying level of protection against poverty in retirement. Lack of Social Security coverage is particularly prevalent amongst safety employees – but many general employees are also not covered.

Plan Design

Public retirement systems generally are designed to provide an adequate retirement benefit after a full career of employment. The vast majority of public sector plans are contributory final average earnings defined benefit plans. That is, the benefits are determined as a specified percentage of the members' final average earnings times the number of years of service. A distinctive difference between public and private sector defined benefit plans is that members typically are obligated to make contributions in public plans (in addition to the employer contributions). Public pension plans are generally qualified plans under section 401(a) of the Internal Revenue Code and are subject to some, but are exempt from many, of the provisions of ERISA. Member contributions to a public sector pension plan (with the appropriate IRS resolution) can be made on a pre-tax basis. This is not an option of private sector plans. Virtually all public sector plans for public safety members provide for job-related (or "industrial") death and disability benefits.

While the final average earnings plan is very common, there is a substantial variation in the specified percentage (the "benefit formula"), the age at which the specified benefit is payable (the "retirement age") and the adjustments that are made to the benefits if taken earlier or later than the retirement age. In addition, there are frequently provisions that permit unreduced benefits in retirement when some specified number of years of service or combination of attained age and years of service is reached.

Most public pension plans provide some sort of regular cost-of-living adjustment (COLA) to the amount of pension being paid to retirees. This is especially critical for those members who are not covered by Social Security and hence do not have that base level of inflation protected benefits that are a part of Social Security benefits. There is a wide variation in COLA provisions – some are totally discretionary, some are conditional on investment returns or other factors, some are contractually guaranteed. Many automatic types of COLA are subject to various limits that will result in increases being less than full price inflation. A small number of plans have COLAs linked to indices other than price inflation.

Public sector plans can include a deferred retirement option plan ("DROP") whereby members upon reaching normal retirement, are permitted to continue active employment and have their pension become payable at the same time into a DROP account rather than paid to the member. When they stop working, their pension is based on their age, salary and service at the time they entered the DROP but they also get a lump-sum payment of their DROP account with interest. DROP plan features can vary widely.

Other types of provisions found in public plans are various cost-sharing or self-adjusting provisions whereby contributions are increased or benefits are adjusted for a variety of reasons. One example is where favorable investment results have been, in part, used to reduce contributions and the balance used to provide additional benefits. Another example is where the employer and employees agree to share the cost of a benefit improvement through an increase in the member contribution rate.

As private sector employees have seen their retirement benefits erode, the concern that some public retirement systems have benefits that are greater than is necessary to provide for an adequate retirement is increasing. There have also been examples of benefit increase spirals where, in the competition to recruit and retain the best talent, public employers have attempted to meet or better the pension benefits provided by their neighboring communities. Those neighboring communities then feel compelled to increase their benefits as well, contributing to the spiral.

Plan Governance

As noted, because of states rights there is little federal interference in the governance of public employee compensation and retirement systems. State constitutions set the rules and often confer special status on employee and retiree benefits. Concerns with ERISA, the PBGC and Social Security do **not** dominate public pension plan governance issues. Most public sector pension plans are governed by a board composed of elected, ex-officio or appointed members. These members may represent management, labor, non-represented members and/or retirees and often include outside trustees not directly aligned with administration or labor. The inclusion of outside Board members is a growing but not prevalent trend. Decision-making is potentially more balanced than in the private sector, where management may be making decisions more directly aligned with the shareholder interests. However, the influence of directly elected Board members may result in the opposite bias – in favor of the members at the expense of the employer. The investments may be governed by the system’s board or by a separate board. Benefits may be under the control of the system’s board or, more commonly, are under the control of the legislature or plan sponsor²⁶.

Generally, public plan retirement boards are subject to freedom of information laws, which require public access to all but certain exempt classes of information (e.g., disclosure of private citizen information, trade/proprietary business information, etc.). “Open meeting” laws and policies require public entity meetings to be properly noticed and open to the public, with a resulting focus of attention and potential need for public explanation rarely found in the private sector. For actuaries, this transparency can lead to public scrutiny and a need to communicate to a wider than usual variety of stakeholders. While this atmosphere provides for a much more transparent process of decision making than in the private sector, without a standard for risk disclosures and analytics, the actual risk exposures of a plan in the public sector may be less transparent than in the private sector.

Another distinction is that in the public sector benefits are typically codified by law. This structure creates significant limitation in the modification of benefits, because such changes require consensus action by a legislative body. In addition, state courts may find the implied employment contract between a state entity and its employees to mean that, once employed, the employee has a continuing right to the current benefits that the sponsor can not modify without providing a comparable benefit. This is very different from private sector plans where the benefit accrual rate can be modified or eliminated prospectively for current employees.

State and local governments generally subscribe to the accounting rules promulgated by the Governmental Accounting Standards Board (GASB), not the rules promulgated by the Financial Accounting Standards Board (FASB).

Funding

The funding of public plans is not governed by ERISA, thus avoiding the minimum funding limitation compliance overseen by the U.S Department of Labor. Tax deductibility for employer contributions is not an issue since the public sector employer is not subject to taxes. Public employers are not subject to IRS maximum funding limitations. Thus, the plans and plan sponsors have much latitude in developing a funding regime appropriate to their particular

²⁶ For example, for the plans covering employees of New York City, the benefits are determined by the State Legislature, whereas for many local agency plans in California, the benefits are selected by the local agency’s governing body from a menu of benefits prescribed by the State Legislature.

circumstances. Funding is generally only subject to the requirements of State law, which can vary significantly from state to state. In some cases the funding of pensions is included in State constitutions²⁷.

Because these systems are subject primarily to state or local jurisdictional laws, the application of actuarial judgment and alternative funding techniques allow them to create methodologies to manage and mitigate risks that are precluded from use in the private sector. Flexible techniques include using corridor asset valuation methods to require contributions on a level basis (even if the system is fully funded) and setting aside assets to be held in reserve for adverse experience or to be earmarked for emerging benefit obligations.

A technique used to minimize the volatility of employer contribution requirements is the use of “asset smoothing” whereby asset gains and losses are not recognized immediately but rather are recognized over a number of years. Such methods for smoothing the contribution volatility allow for investment in a diversified portfolio of assets, but this increases funding risk. While smoothing is valuable during times of high funding ratios (when such methods call for continued funding) it slows the reaction time of retirement boards in implementing contribution increases during significant market declines. Up until recently these techniques were available to public and private sector plans but have since been limited for use with single employer private sector plans.

In general, governmental entities favor a predictable budget process emphasizing funding that remains reasonably level as a percentage of payroll. This in turn has led to the widespread usage by the majority of public pension plans of the Entry Age Normal cost method.

The emphasis on relatively level funding contributions as a percentage of pay has also impacted the selection of amortization periods. In general, public plans amortize unfunded liabilities over relatively long periods.

There have been very few failures of public plans to deliver the benefits that were promised. This is true both in terms of actual failures and in terms of failure because of plan changes. The private sector, even with a PBGC backstop, has seen many more failures – on both a relative and absolute basis – than the public sector. Possibly because of this history, many systems do not have a strong commitment to become 100% funded. Other reasons include the long-term nature of the employer and the longer time horizon perceived to make up funding shortfall. It may also be due in part to the desire to maintain consistent budget cycles. As previously noted, however, techniques that manage costs and mitigate volatility may slow responses when funding has deteriorated. Some of the techniques adopted to meet budget objectives that are being challenged in the current market include:

- Asset valuation methods that produce values excessively above current market values.
- Amortizations as a level percent of pay that fund less than the debt service on the unfunded liability.
- Rolling amortization schedules that increasingly fall short of paying down the principle (unfunded) and never approach full funding.

An item of controversy, particularly for actuaries, is the appropriate investment return assumption, which often also serves as the discount rate for determining the present value of

²⁷ e.g. Section 17 of Article XVI of the California Constitution

liabilities to be funded. To the extent that investment portfolios include stocks, which have higher expected risk and return than do bonds, a higher valuation discount rate has been considered justified by some, scorned by others. Selection of the assumption may be circular, in that the actuary may base it on an investment consultant's long-term expected return, while the investment consultant is modeling asset allocations to meet the actuary's assumption. A risk is that the actuary may be unable to reduce this assumption when appropriate. The decision is often shared and to reduce the rate adds additional financial strain to the public employer's obligation to fund the retirement system from lower general revenues. Often the adoption and selection of this rate rest solely with the Board not the actuary and in some cases is codified in the laws governing the plan. There is evidence from recent trends that the assumed rate of return is decreasing.

Elected officials may have a shorter planning horizon for benefits and budgetary items than the trustees of a pension system. In the legislative budgeting process, funding is subject to shorter-term competing issues and can often lose out, especially during economic downturns. Yet in that same process, promises of future pension benefits can serve as alternative compensation solutions, attractive because the immediate cash flow implications are slight. These conditions can lead to risk transfers against the long-term health of the system, including biased funding approaches and benefits that allow participants to select against the system. These include such provisions as gain sharing, deferred retirement option programs, service purchase programs, and accumulation of accounts at above market rates.

While the general case is for plans to be funded by fixed member contributions and variable employer contributions, this is not always the case. A significant minority of public plans has notionally fixed employer and employee contributions as well as defined benefits. In these plans, the amortization period is often used to reconcile the funding equation. If a plan suffers large enough losses, however, the fixed contributions may not be sufficient to fund the plan, necessitating adjustment to the benefits or contributions. In some jurisdictions, the obligation to make adjustments lies with the employer. In others, the members and the employers have a joint responsibility to address any imbalance.

Many public plans have the employers required contributions fixed in statute. For these plans, it is generally necessary to have a mechanism to reconcile the benefits with the funding. These mechanisms may be explicit or may be unstated. In some jurisdictions, the obligation to make adjustments lies with the employer. In others, the members and the employers have a joint responsibility to address any imbalance.

The following table was referenced on page 7 of the report as "Table 1, Appendix A"

TABLE 1 – Appendix A				
Investment Holdings, Expenditures and Receipts by State and Level of Government: Fiscal Year 2008				
Investment Holdings (\$ Billions)	State	Local	Total	% of Total
Cash & short-term investments	66.0	25.2	91.2	2.9%
Bonds (government and corporate)	625.2	121.3	746.5	23.4%
Stocks (corporate)	917.0	201.1	1,118.1	35.0%
Foreign & international securities ¹	396.4	71.7	468.1	14.7%
Other non-governmental securities ²	288.9	53.2	342.2	10.7%
Other investments ³	370.3	53.7	424.0	13.3%
Total	2,663.8	526.3	3,190.1	100.0%
Expenditures				
Benefits & withdrawals	146.7	33.4	180.1	
Other administrative ⁴	10.7	3.0	13.7	
Total	157.4	36.4	193.8	6.1%
Receipts				
Employee contribution	31.6	5.3	36.9	
State & local government contributions	63.9	18.1	82.0	
Total	95.5	23.4	118.9	3.7%
<p>¹ Includes securities of foreign and international private companies, foreign-sponsored agencies, and foreign national governments (central or otherwise).</p> <p>² Includes mortgages held directly, Investments held in trust by other agencies, shares held in mutual funds, conditional sales contracts, direct loans, and loans to members.</p> <p>³ Includes venture capital, partnerships, real estate investment trusts, pooled or partnership agreements, and leveraged buyouts.</p> <p>⁴ Includes costs for administering system or managing assets and other costs or payments not representing benefits or withdrawals (except purchase of investments).</p> <p>Sources: Table 2a. Revenues of State and Local Public Employee Retirement Systems by State and Level of Government Fiscal Year 2008; Table 3a. Expenditures of State and Local Public Employee Retirement Systems by State and Level of Government: Fiscal Year 2008; and Table 4a. Cash and Investment Holdings of State and Local Public Employee Retirement Systems by State and Level of Government: Fiscal Year 2008; all data found at http://www.census.gov/govs/retire/, accessed 6 July 2010</p>				

Appendix B – Discussion of Stakeholders

This section will discuss stakeholders in the public plan retirement system. Stakeholders have needs that the system serves, and each has interests (particularly self-interests) that they are trying to address through the system. This section frankly discusses those needs and self-interests for each stakeholder category in general; it does not ascribe behavior to any particular individual.

Society/Taxpayers

Within the public plan system, society plays two roles. First, society, as a whole, plays the role with public plan employees that it plays with other citizens: the backstop for any pension program that provides inadequately funded retirement income (through an increased draw on social services benefits, and potentially greater pressure for higher taxpayer-funded benefits for seniors). For public employees, society plays a second role: direct payers (for those taxpayers within the jurisdiction receiving public services). Just as shareholders/owners for private retirement plans must use part of their profits to fund the pension program, taxpayers pay for retirement income for public employees through taxes. When public plans provide adequate, secure, robust and well-designed retirement income to public employees, it minimizes the role society might need to play to backstop the plan.

Civil society, in its role as the collective of taxpayers, finds benefits and challenges in the public retirement system. Public retirement systems, particularly larger plans, can provide economically efficient benefits (low cost of administration and operation, access to sophisticated investment portfolios and advisors, transparency of costs). Traditional pension plans can permit flexible plan contributions to ensure stable tax rates.

To the extent that public retirement plans take risks (particularly investment risk), there are potential issues faced by taxpayers. These issues have to do with understanding how the value of the promise of a lifetime guaranteed income interacts with the risks inherent in the assets used to fund the promise and their impact to the anticipated cash contribution. The desire to save money long term by taking investment risk can also result in a greatly increased long term cost. Poor understanding of this can significantly impact to what extent the plan passes costs between generations. This affects future taxpayers, who are a “silent stakeholder” in these plans (they bear the cost of mistakes but don’t have any representation in the discussion). How risk is taken, how rewards (and deficits) are handled and to what extent costs are shifted between generations is covered in the section on risk management.

In some cases, taxpayers can easily understand when program cuts go too far (roads aren’t repaired, class sizes increase) and demand that revenue be redistributed, or at least potentially be willing to face a tax increase. However, underfunding of pension plans is not necessarily transparent to elected officials, taxpayers, or plan participants. Elected officials, taxpayers and plan participants may not understand when the plan may be at significant risk (other than choices to not fund when the plan is reported to be underfunded). Taxpayers would likely support elected officials who argued that diverting all tax revenue from plan funding was not prudent (most people understand the value of paying bills on time). But elected officials, taxpayers, and participants, may have a harder time understanding that more subtle revenue diversions can have negative long-term effects. For example, taxpayers and participants cannot judge if the change from a 10% of payroll pension contribution to an 8% of pension payroll contribution is robbing the plan or simply prudent financial management.

Finally, private sector workers have seen benefits greatly diminished in the last 20 years; will private sector workers (as taxpayers) continue to be willing to fund benefits for public sector workers that are more generous and more secure than the benefits they enjoy? One challenge facing taxpayers, which shareholders/owners do not face in the private sector system, is that benefit levels often cannot be changed for public employees.²⁸

Public Employees (Plan Members, Beneficiaries and Future Employees)

Public employees derive many benefits from the public retirement system: guaranteed, predictable income, retirement flexibility, well-designed plans that operate without a lot of knowledge on behalf of the employee, and plans that protect public employees from many financial risks at retirement, including investment, inflation and longevity. Public sector employees tend to have long careers within public service (with a single public employer or several). Many public retirement systems cover large geographic areas and/or employment types allowing public employees to continue coverage as they change jobs within the public sector system. Most public employees make significant contributions to the plans and have a large stake in their benefits. Also, many public employees are not part of the Social Security system, so robust and adequate benefits are of vital importance. Finally, for certain classes of public employees, such as public safety workers, the physical, emotional and mental strains of the job are high; public pension plans can be constructed to account for the typical shorter working career these employees face.

Public sector employees work in an environment with many employers. Excluding the taxpayers, politicians play the role of employer in that they ultimately decide which public sector jobs to fund or not fund with tax revenue. The other employer is the civil service bureaucracy which has the responsibility to attract, retain, manage and retire the public employees. Public sector pension plans have been recognized as contributing to the ability of public sector employers to attract and retain employees. Historically public sector jobs paid less than comparable jobs in the private sector, so pension benefits were seen as a key tool in the attraction and retention of civil servants into otherwise lower-paying jobs.

Unions

Most public sector employees are covered by unions. While unions are notionally agents of the plan members, there are times when the unions do not act as agents and, as such, have been treated as a stakeholder distinct from public employees. In general, unions represent active employees and do not represent retirees, beneficiaries, and non-represented employees who participate in the plan.

Union leadership may have concerns about the strength of the union, both locally and nationally. Union leadership wants to ensure the continuation of the union, which means they must ensure the union is getting the best possible compensation package for employees (including working conditions and benefits) in addition to securing workplace protections. Public pension plans meet many needs identified by union leadership: equity, security, generous benefits.

The influence of the unions over elected officials can be considerable; union members are able to vote for or against their “bosses.” Elected officials may not want to anger unions before

²⁸Within private sector plans, it is the benefit earned to date that must be protected; future accruals can be changed or eliminated. Within public sector plans, the benefit promise (including future accruals) has been interpreted to be a contract which the state may not abrogate (it may improve benefits but never decrease them).

elections; unions know this and push for additional benefits (pension or otherwise) either directly or in the form of campaign promises. In addition, because benefit levels are constitutionally guaranteed in most states, union leaders know that a rich benefit formula cannot be undone in future negotiations (they can only be eliminated for future employees).

Public Sector Employers

The public sector employer (civil service bureaucracy) can be defined as the agent of both the politicians and the taxpayers. As an agent, they should always act in the best interest of their principals (taxpayers and politicians). The public sector employer is also subject to risks, based on the actions of taxpayers and citizens.

Public sector employers use public plans as a tool to assist in the management of their staff. Pensions have a substantial role in recruiting new employees and usually have a significant role in retaining employees at certain stages in their public service careers. Public sector employers have to make budgeting decisions and there are many competing needs for the funds that are needed to fund the pension plan. Pensions can have a significant influence on the morale of the employer's workforce. Many public sector employees believe that they have received lower pay for their services in return for higher benefits. Adverse changes to their pension benefits could, and probably will be viewed as a betrayal of the employees with consequent impacts on morale.

The employer controls several of the key elements in the pension equation – pay levels (including both direct pay and benefit levels), continued employment, and the making of the employer contributions. If the plan is separate from the sponsor, the plan may have control over the contribution level. In that case, the employer may have fewer options.

Please note that senior managers who are public employees may also benefit from the plan benefits, and as such may face principal-agent conflicts.

Retirement System Governing Body

Each retirement system has a board or other governing entity. The governing body may be wholly controlled by the employer sponsor, or a semi or fully independent organization. This body oversees execution of funding for plan benefit requirements authorized by the legislature and administer plan benefits. These bodies vary widely in form and levels of authority. The governing body may, or may not have the power to adjust benefits, select investments or investment advisors, select professional staff (including actuaries) and adopt regulations.

The retirement system governing body has a primary duty to safeguard the contributions and investment earnings to pay for future benefits. Where the governing body has more autonomy as to how that is done – benefit levels promised, contributions made, risks taken – the body acts more as an independent principal with authority over the system. But to the extent the governing body does not have authority over the operation of the plan it can be an agent, often of multiple stakeholders.

For example, when the governing body acts as a trustee, it is an agent for plan members and beneficiaries, as well as the employer. The governing body can also act as an agent for the unions or elected officials; to the extent it can be influenced by either party to “set” plan costs in such a way to achieve their goals. Ironically, when the governing body is asked to mediate between the

needs of different stakeholders, it may be once again elevated to the role of principal (albeit without any authority), as the primary body mediating competing interests.

Legislature

In this section, “legislatures” will be used to represent the body of elected officials responsible for making employer contributions, and for setting benefit levels. For large state plans, often the same legislature is employer and “regulator” (the state sets the rules for plans in that state). For small public plans (e.g., municipal plans), the legislature (e.g., town council, county board) may set the benefit level, but may not be responsible for the plan operation (it may participate in a statewide plan), or it may have to follow rules for the operation of the plan set by a higher legislative body). Public entities face pressures to increase programs as well as to decrease taxes. Therefore, there is always tension in looking for ways to cut costs on program A to fund program B.

Legislatures through elected officials are responsible for appropriating cash contributions into the plan, and ultimately are responsible for benefit levels provided. There is very little, if any, room to trade off funding priorities in a public budget. Public entities value steady revenues, and steady expenditures. While public entities do have some ability to raise capital in the marketplace, this ability has traditionally been used for specific projects (generally infrastructure related). However, public employers do have the ability to raise funds beyond debt ceilings to fund retirement plans through pension obligation bonds. These instruments create another level of risk as they often create a non-risk adjusted swap of a market defined fixed income rate with a diversified portfolio rate.

Please note that private sector companies that get in serious fiscal difficulty often also short the pension plan as they head to bankruptcy. The cash needed to pay pension benefits truly isn’t due for another generation, so cash will get diverted to suppliers, payroll, debt repayment and other more pressing needs. For private sector plans, the IRS has authority to ensure minimum contributions are made. For public sector plans, there may be no authority to stop elected officials from diverting funds unless codified by state law.

Other agents

In addition to the above stakeholders, there are agents within the system with a high degree of influence, including actuaries, plan administrators and investment managers. Pension plans are complex and typically the sponsors (private or public) with the legal mandate to manage and report on the pension plan do not have the internal risk expertise and background to do so. These agents have professional responsibilities to communicate risk; however they cannot ensure that those responsible for taking action act prudently, nor can they ensure that their communications aren’t misunderstood or misused.

Appendix C – Risk Exposures of Public Pension Plans

There are three ways to consider risk exposures for public pension plans. The plan's risk exposures are based on the benefit design, the management choices of major stakeholders, and the governance structure (which includes, therefore, operational risk). There are also general benefits from pooling which are not risk exposures of the plan.

General Benefits from Pooling

There are general risk exposures that affect all stakeholders who then can benefit from pooling and the defined benefit structure. Most of the benefits of pooling within a pension plan fall directly to plan participants. However, all principals benefit because the benefits provided through the pension plan can be provided at a significantly lower cost than if individuals were to finance them on their own, or go through an insurer.

The primary pooled participant risk is the idiosyncratic longevity risk of plan participants. This is of high benefit to participants at low cost to the plan (assuming the plan is of sufficient size). However, the plan must be sure that it is using an appropriate mortality table (and projection scale) to forecast the group's longevity risk.

There is a benefit to all stakeholders in low cost administration and low cost access to sophisticated market instruments. This is an important benefit to participants and ultimately to taxpayers when it reduces the ultimate cost of providing the pension benefits.

Some have argued that pooling eliminates (or minimizes) investment risk because sophisticated investment managers are better able to achieve alpha returns (by having access to more sophisticated market instruments). However, this ability to consistently achieve long term returns above the risk free rate is strongly debated within current financial literature. And, from a risk management standpoint, chasing alpha returns does involve taking risk. The pooling benefit is only realized if investment risk is constrained within a sound risk management budget.

Risk Exposures of the Plan

Most plans face significant risks through one of three elements: risks inherent within their design, risks created by the actions of stakeholders and risks created in the operation/governance of the plan.

Risks Inherent within the Design

Systematic longevity risk (the risk that a cohort will live longer than its expected lifetime). This risk is more significant for the typical public plan (vs. private plan) because benefits are larger for several reasons: benefits are typically inflation indexed; many public employees are not covered by Social Security; and larger retirement benefits are often provided to compensate for the lower pay and lack of other compensation incentives in the private sector.

Benefit options available to plan participants. Primary among these is the option plan participants have to choose when to retire. Many pension plans have provisions that allow individuals to retire before normal retirement age with actuarially subsidized benefits (the total expected amount of payments, taken early, would exceed the total expected amount of payments if taken later). These are essentially options held by individuals which must be honored by the plan.

Another example is when participants can manipulate final earnings to increase benefits; this particularly affects final pay (single year) plans where individuals can maximize their pay in their final year (through overtime pay if counted for pensions, taking accrued vacation or sick time), they can significantly increase their benefit under a final average plan. While this is perfectly legal, it can represent a high cost to the plan.

Management Risk of Major Stakeholder Actions

As noted earlier, there are three main levers that affect the cost and risk of the plan: level of benefits, contributions paid (by employees and employers) and investment policy. To the extent any of these is fixed, this increases the consideration in the management of the other two levers.

Contribution policy can be seen primarily as a management risk. Typically plans require that employee contributions be paid, regardless of plan funding status. However, often the employer contributions are variable. Legislatures (and other elected officials) can refuse to make “required” contributions. Many public plans are not able to compel contributions from public authorities; they cannot assume the public authorities will fund payments tomorrow. This also occurs when a plan has seen significant investment gains; public authorities may take funding holidays, not recognizing that gains, like losses, are a natural part of an investment cycle and may disappear.

Increasing benefits levels is another way that the plan can increase the management risk. As noted above, elected officials may take funding holidays when there is plan surplus. Elected officials can also act to increase benefit levels in lieu of other compensation or benefit increases. This can be seen as “cost free” by the elected officials. But, to the extent that the plan surplus was achieved through investment risk taking, elected officials are actually ratcheting up the fixed plan cost and exposing the plan to the inevitable asset decline during market downturns.

Investment risk is a choice made by one or more of the parties involved in plan management. The plan may elect to invest risk-free securities (typically Treasury securities, including TIPS). While this insulates the plan from investment risk, it can have a high cost. And, such a risk-free investment policy may be considered to fail the “prudent man” rules reflected in ERISA and many state laws.

Historically, pension funds have taken investment risk by investing in riskier securities, including corporate bonds and equities. The argument has been that because the pension plan has a long duration, it can outride market cycles. If done properly, the argument is this can lower the cost of the plan, allowing it to provide higher benefits at lower cost to both employees and taxpayers. However, it can also push costs from one generation of taxpayers to another, and also introduces the possibility that where investment gains are produced from risky investments, they are not maintained as a fund to offset possible losses from future risk taking, but are used to provide larger benefits. The biggest risk/unknown here is how to “pick” or determine what the long term rate should be.

Governance & Operational Risk

Governance risk is a risk unique to public pension plans and other structures where there is not a single governing authority and different stakeholders are able to push risks to other stakeholders.

This can also be true when there are risks that interact, and no single authority has an incentive to handle the risk interaction.²⁹ The two major governance risk drivers thus are:

1. No single authority. There is no single stakeholder within the system who is ultimately charged with (and given the authority to) ensure appropriate risk limits are observed and mitigation strategies are taken. The pension obligation is managed by, and passed on through, multiple generations of agents (elected officials, unions, senior management public employees). No individual or group of individuals will still be part of the system when the final dollar of obligation that accrued under their stewardship is paid out (unless the plan has become a closed plan).
2. Governance Principal/agent problems exist because of the diffused governance authority and accountability structure. Within the typical plan governance structure, it can be hard to focus on loss protection via a risk budget because stakeholders within the system gain benefits without a clear understanding of the risk or cost to other stakeholders. In contrast, well designed systems will be set up to incentivize participants to act in a way that reduces the overall risks for all involved).

These shortcomings of the governance structure have made it more difficult to introduce a governance regime of improved risk metrics and procedures to better manage and comprehend the operational risks of public pension plans. Legislative statutes or administrative rules may set actuarial assumptions and methods which do not give the actuary sufficient authority or ability to change as needed³⁰. Without this expectation of risk assessment, the exposure to the following operational risks can be greatly increased:

1. Managing risks without the expertise to do so. Pension systems face an inherent challenge of being “outside the core business” of the sponsoring system. This affects the system on two levels: expertise and risk taking. Elected officials do not have the expertise to manage a pension fund, and the risks inherent within the pension system are different than other risks undertaken by public authorities.
2. Lacking appropriate (or improved) risk analytical tools to understand the risks that lead to bad decisions. Chief among this is a meaningful way to measure the “return on investment” as well as the risk of recognizing anticipated investment returns ex ante rather than ex post. First, return on investment can be thought of simplistically, without consideration for the liabilities supported by the investments. Looking solely at return on assets will not create

²⁹ For example, DROPs (delayed retirement option programs) are an option whose cost often exceeded expectations due to an interaction of the option, timing and investment risk. These programs were designed to keep public sector employees in the workforce after they had reached retirement eligibility. While employees continue to work beyond normal retirement eligibility, their pension payments are not started but are calculated at the time of entry into the program and the benefits are put into a notional account (the DROP account), which is typically guaranteed a rate of return. The employee, at retirement, receives this single sum, as well as the annual pension determined at the time of entry into the DROP without recognition of additional pay increases or service credits from the time of DROP entry to actual retirement. The risk to the system is the selection by participants who anticipate that because of their long service, the value of the lump sum paid to them will be more valuable than the additional accruals and impact of pay increases from the date of DROP entry to actual retirement age. In addition, many DROPS were introduced in the late 90s, right before returns fell, so that the guaranteed return to participants exceeded the short-term return for the fund during the period the employee participated in the DROP program.

³⁰ This limitation on actuarial authority and the communication of risk has impeded our own professional expectations to develop stronger standards.

an incentive to match the performance of the assets to the underlying portfolio. Second, many systems use asset-liability management (ALM) studies. However, ALM studies that don't consider the effect of fat tails on costs do not provide sufficient risk analytics. Finally, other measures should be considered that include the effect of cascading risks (such as the recent market meltdown) and the fact that market downturns often coincide with economic cycles with reduced tax revenues.

3. Inherent risks of long time horizons. The management of long-term risks provides specific challenges. Arguments have been made (discussed below) that public sector entities are better able to handle those long-term risks than the private sector. In addition, others have argued that the long time horizon itself minimizes certain other risks (such as investment risk). We would argue that these misperceptions themselves become part of the risk of the long time horizon; because no single generation of managers will still be part of the system when the final dollar of benefits is paid, they can pass forward the risk, assuming that future generations will be as able (or more able) than as current generations of managers to handle the risks.

For example, an argument has been made that public systems are used to taking longer-term risks, as they have responsibility for infrastructure. Some have argued that, for a private company, pensions make no sense because the pension obligation can literally outlast the company. Even if the company survives, it could be a fraction of the size it was at its peak (e.g. auto or steel), making it unable to support a mature pension plan that dwarfs the size of the reduced core business. A public plan however does not face a similar risk. While a city or state is not going to diminish to a fraction of its size or disappear they are subject to economic cycles which are often correlated to downturns in markets thus exacerbating financial limitations and encouraging passing responsibilities into the future. In addition, the disappearance of a key industry or company can have a significant diminishing impact. The pension obligation cannot outlast the state. This is why a state can monitor infrastructure investments – which have a similar long lifespan – as well as pension funds.

However, there are key differences between pension funds and infrastructure, one of which is transparency. Even with full financial disclosure, the operation of a pension fund can be opaque to taxpayers, who don't know what it means if a plan is 70% funded using a PBO funding method but a 4% discount rate and 85% funded using a ABO funding method but a 6% discount rate. In contrast, the operation of infrastructure is somewhat more transparent: roads deteriorate and test scores decline for successive classes of graduates. These facts can easily be reported, the effects can be seen, and taxpayers can react to the consequences.

Another consequence of a long time horizon is that it creates little incentive to hedge. Hedging risks cannot be done without cost; there are few incentives with public systems to drive down cost, because the system is being seen as being to take on risk “cost-free” because it can always outlast any market cycle, and it is backed by the full faith and credit of taxpayers. Therefore, the hedge is argued as not cost effective.

Another reason why hedges are not considered, particularly for plans that have not reached maturity, is that other mechanisms have been used to smooth the recognition of costs such that immediate effects of risk taking are dampened. In some cases this is simply smoothing an unrecognized cost over a short period of time (5 years) and does not involve significant generational transfer. In other cases this could be forward recognition of plan improvements over extremely long periods (30 years) that push the costs of

current decisions to future taxpayers. Future taxpayers are the primary group interested in a hedge (and the higher cost that entails, partly because they would be more likely to see benefit levels calibrated to higher costs) and have no say in the matter until the call on financial resources come due.

4. How to recognize the evolving plan maturity risk. While arguably part of the risk of a long time horizon, this warrants additional discussion and an explanation of what drives this risk.

An immature plan has few needs for cash flow. Most of the cash flow is into the plan, paying for benefits being earned by current employees. As the plan matures, the payments out of the plan will start to grow relative to the contributions. The contributions may remain stable as a percentage of payroll, but the benefit payments will continue to grow. These plans may eventually see benefit payments reach or exceed normal cost, depending on the level of benefits and the size of the active workforce.

When considering investment risk a plan with few cash needs, and much cash inflow, can take more risk than a plan with greater cash needs, and relatively lower cash inflow. Consider two plans:

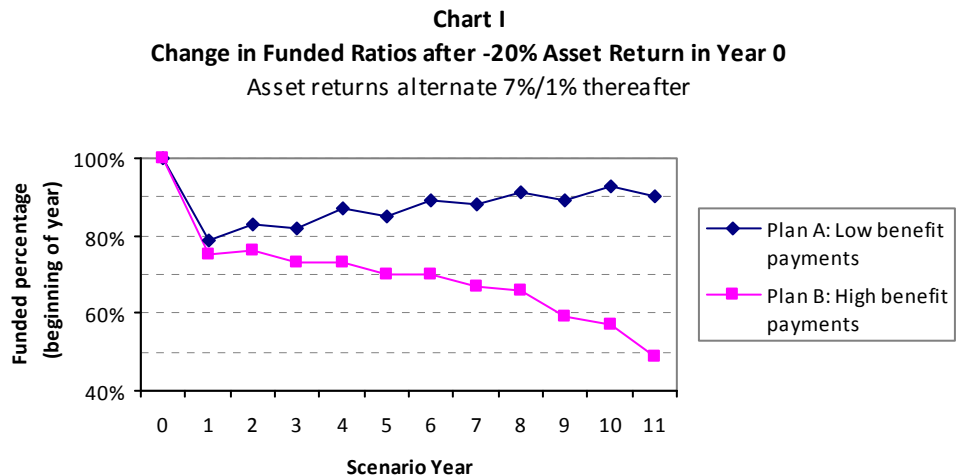
- Plan A is a relatively new plan; it has normal cost of \$9 and benefit payments of \$1.
- Plan B is a relatively mature plan; it has a normal cost of \$1 and benefit payments of \$9.

Each plan starts out fully funded at time zero, based on an interest rate of 4%, assuming contributions made equal to the normal cost in each year. And, assuming the plan earns average returns of 4% per year (by earning returns of 7% and 1% in alternating years) each plan would remain fully funded at the end of year 11. In the baseline scenario, Plan A pays a total of \$99 in contributions (\$9 per year over 11 years) and Plan B pays a total of \$11 in contributions (\$1 per year over 11 years). Yet each plan would be 100% funded at the end of the 11 year scenario.

Chart 1 follows the funding progress of these two plans if in the first year of the 11 year scenario, the plan loses 20% of its value. Each plan increases its contribution by \$1, to cover the difference between the interest cost and asset return. At the end of the 11 year scenario, Plan A is now 90% funded after having made \$109 in contributions (a 10% increase in contribution over the baseline total of \$99). However, plan B is only 49% f

u
n
d
e
d
,
a
f
t
e
r

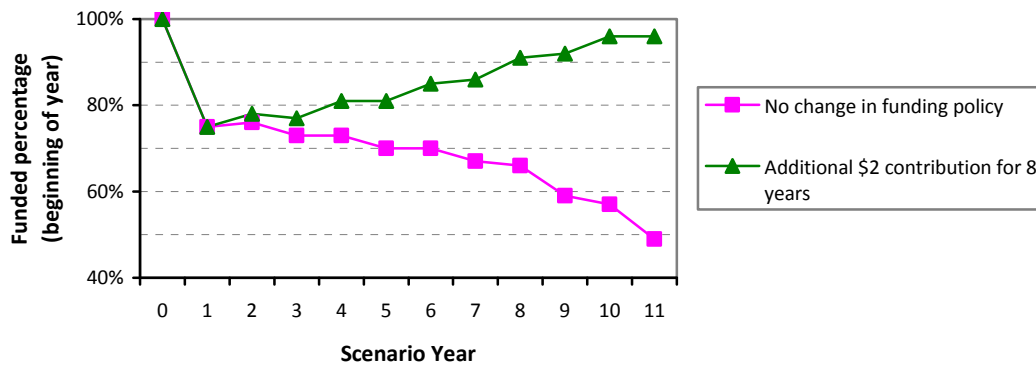
h



having made \$21 in contributions (a 91% increase in contributions over the baseline total of \$11). Each plan increased contributions in the same manner and neither contributed enough to account for the reduced asset loss. But, the low benefit payment plan simply was better able to use the regular market cycles to rebuild its funded status, while the high benefit payment plan had slid too much and was now not generating enough return on assets to cover cash outflow.

Chart II shows that the high benefit payment plan can recover its funded status by contributing an additional \$2 per year for 8 years (repaying the \$16 asset loss). However, this represents a 236% increase in contributions over the baseline scenario (from \$11 to \$37.)

Chart II
Plan B with Revised Funding Schedule after -20% Asset Return
 Returns alternate 7%/1% thereafter



What does this mean for risk taking and risk mitigation? In the early days of a pension plan, assets of a plan are small relative to the pension contributions (as a percentage of payroll). A plan sponsor (or its agents) may choose to take significant risk with investments because a drop in the asset value can be made up over a few years with a relatively manageable increase in contributions (as a percentage of payroll). As the plan matures, asset shortfalls may drop the assets to a point where significant additional contributions (as a percentage of payroll) are required.

Appendix D –Retiree Health Benefits

In addition to retirement income plans, public employers may offer other retirement benefits, with life and health insurance being the most common. Retiree health benefits may include dental and vision coverage but it is the medical coverage for hospitalization, physician treatments, prescription drugs and the like that most typically provide a significant financial risk for the sponsor. It is beyond the scope of this paper to address any of these non-pension benefits in depth, but we acknowledge their potential importance in the public sector, where they are often constitutionally guaranteed yet unfunded.. Retiree health benefits in particular should be well understood, both in their financial implications and their role in employee compensation, for a given public sector retirement system. Careful analysis of the combined impact of retiree income and retiree health benefits is rare in employer studies of retirement needs, or in pricing of compensation packages.

Health needs increase with age and thus the annual costs in retirement can be anticipated to be greater than during the years of active work. Medicare can be expected to pick up much of that cost, but Medicare does not start for most people until age 65 and, even with Medicare coverage, substantial coverage gaps remain that could be indemnified by employer plans. Thus, there can be significant health costs in retirement that are covered by a retiree health plan and not by Medicare. Cash flows from retiree health benefit plans have risen faster in many cases than comparable pension payments for the same populations, due to steep increases in medical prices and utilization. In the private sector, the financial implications of these costly indemnity plans, particularly as reflected in financial reporting on an accrual basis mandated by FASB almost 20 years ago, has led to significant reductions in retiree health benefit coverage and occasional outright termination of plans. GASB financial reporting only recently mandated accrual accounting and, so far, benefit reductions in the public sector retiree health plans have been more muted.

Pension benefits may include COLAs, but health care benefits usually offer indemnity coverage, which by its nature covers inflation. Since medical inflation has generally been higher than the overall CPI in the US and people are using more services, the employers' share of the health plan cost can increase rapidly. Unless there are adjustments to retiree contributions and plan design, employer health plan costs can increase even more steeply than medical costs generally. In essence, retiree health benefits have an implicit COLA, which is recognized by actuarial valuations under GASB rules for financial reporting.

As to who is covered by retirement plans for a particular public employer, the same groups of employees are likely to be eligible for both pension and retiree health benefits. While pension levels are a function of individual pay and service, however, health benefit levels are not based on pay and often are not a function of service. In some cases, full health benefits are allowed for retirees with as little as 5 years of service and often commencing at ages well below those typically associated with retirement in the private sector. Spouse and dependent coverage is usually also employer subsidized and often may survive the retiree's death and be available without a joint-and-survivor reduction.

The health plan offered to active public employees is often the coverage that is extended to retirees, albeit with offsets for Medicare. There is a great deal of variation in plan design, including in treatment of terminated vested employees and contributions required from retirees, as well as in the deductibles, co-pays and other limitations seen in active employee health

insurance. Some plans offer lifetime coverage while others may effectively extend coverage only a few years. Variations in the extent of coverage, both in duration and scope, mean generalities about cost should be applied to specific plans only cautiously. Furthermore, some coverage is available only with steep retiree contributions, while other public plans may be so generous as to not require any contribution.

Unlike pension benefits, which often have required participant contributions during their working years, retiree health contributions are generally paid only during retirement. Required retiree contributions may be linked to length of service, but such provisions appear less often in the public sector than in the private sector. Retirees share health costs both through regular required contributions and through benefit features like deductibles and coinsurance. Some plans may offer options to the retirees, and plan designs will be changed from time to time. Deductibles, contributions and co-pays may be adjusted annually, but may not pass along a full share of the plan's cost increase.

Today most public employee groups have access to Medicare, and members of groups that do not have access to Medicare may have access through other employment or family members. Medicare is normally the primary insurer starting at age 65. After the retired participant becomes eligible for Medicare, the public employers' secondary coverage will integrate benefits with Medicare in a number of different ways (coordination of benefits and carve-out are the two most common methods). For the plan sponsor then, primary coverage annual costs for pre-age-65 years are much higher per member than for the secondary coverage years after Medicare eligibility, even though utilization of medical services climbs dramatically from age 50 to age 80. A person retiring at 55 with an age 50 spouse where both die at age 80 would have coverage years as follows:

Retiree	10 years pre Medicare and 15 post-Medicare
Spouse	15 years pre-Medicare and 15 post-Medicare

The early years when the public plan is primary would be the more expensive years and overall plan costs would be much more sensitive to early retirement (versus later retirement) than would pension costs that often have some reduction trade-off for earlier-than-normal retirement. Note also that in the example, the spouse not only would have a longer period of coverage but all the extra time would be in the more expensive pre-Medicare period. A further contrast between a retiree who is single and one with a spouse would typically show that the latter could have an expected lifetime plan benefit more than twice that of the former, even if both have similar work histories and demographics such that their pension benefits are identical. The cost to an employer of an employee's retirement pension will usually be based on the pay level and years of service of that employee, but that will rarely be true in the case of the employee's retiree health benefit. Two main indicators of actual cost will be the age at which the employee retires and whether a spouse is participating in coverage. Neither the retirement age nor the presence of the spouse may have much correlation with the value of the employee's service to the employer, even in the case where the required retiree contribution calibrates with service.

The economic conditions that have heightened interest in public pension plans are also bringing increasing attention to retiree health plans for public employees. Financial reporting disclosures mandated by GASB allow a comparison of liabilities against dedicated assets, which are relatively few. Pensions are advance funded, but retiree health benefits, despite having some of the same constitutional guarantees and being a high priority of public employee unions, are usually not advance funded. In terms of the relative magnitude of unfunded liabilities, this means that the retiree health unfunded figure may be more than the pension figure. (In a September 8,

2010 press release, the governor of Connecticut indicated unfunded liabilities were about \$25 billion for retiree health benefits and about \$9 billion for retiree pensions.)

The public sector tendency to have retiree health benefits constitutionally guaranteed but unfunded warrants a danger signal. While the present value of future payments will almost always be less for a retiree health plan than for a parallel pension plan, the lack of advance funding for retiree health plans could mean that, for the public entity sponsor, the net future unfunded liability is greater than for the pension plan. It is often only a comprehensive actuarial study that can indicate the level of financial risk involved with any retirement benefit, and review by actuaries experienced in the intricacies of retiree health plans can reveal the perils and risks. In terms of managing prospectively, the risk management framework advocated in this paper for public pension plans may be even more important in addressing the public plans of retiree health benefits.

