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Public Plans: Using Risk Profiles to Manage Funding Goals

Joshua Davis, Scott Porter, Karen Steffen

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Submitted by

Joshua Davis, FSA, EA, MAAA

Scott Porter, FSA, EA, MAAA

Karen Steffen, FSA, EA, MAAA

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Executive Summary

In recent months the traditional actuarial practice (TAP) of reporting funding status and pension liabilities for public pension plans has been called into question both inside and outside the actuarial profession. It is becoming clear that funding policies for public plans must address the long-term nature of the plan, its payment obligations, *and* the substantial market risks that are present in various portfolio mixes. Policy makers need to recognize the potential volatility in funding contributions that results from the risk profile of their asset allocation strategies.

New funding policies and actuarial models can and must evolve to help manage the investment risk on the liability side of the balance sheet, because neither the TAP disclosures nor any new Market Value Liability (MVL) disclosures give policy makers enough information to make sound funding decisions. Ultimately, public pension plan policy makers need to shift their focus from simply managing the plan's *funded ratio* to managing the plan's *risk profile*.

This paper will present two alternative practices that could promote fuller recognition of a plan's investment risks and that take into account the long-term nature of the benefit promises of maturing retirement systems. The paper will comprise a brief discussion of why the current funding policy, which aims for a 100% funded ratio (AVA/AAL), does not adequately reflect underlying portfolio risks. If plan assets include a significant investment in equities and alternative investment asset classes, the potential volatility in such investments can result in a plan's 100% funding proving quite tenuous, recent history being an obvious case in point.

Then the main thrust of this paper will be a discussion of the key factors in a plan's risk profile, followed by two possible alternative funding policies that are designed to align a plan's underlying portfolio risks with its liabilities and maturity. Both approaches would encourage plan

trustees to focus annually on the plan's risk profile when devising asset allocation and funding strategies to reduce contribution volatility.

1) The key factors of a risk profile for a pension plan include contribution volatility, future investment risk, and the maturity of the plan. Three measures of a plan's maturity are explored in greater detail and the historical results from multiple public systems are reported. Results indicate that the maturity of plans is increasing and should be addressed as an important risk factor for today's funding polices.

2) One possible alternative funding policy, based on a plan's risk profile, is to fund a surplus against possible future losses. Specifically, the plan is funded up to two standard deviations in excess of the plan's actuarial accrued liabilities. This strategy provides a cushion against market volatility and thus helps reduce contribution volatility. The risk profile of the investments determines the amount of the cushion, with a plan that has a lower risk profile requiring a smaller cushion.

3) Another possibility is to pursue a modified liability-driven investment strategy that focuses on a plan's maturity level in deciding how to adjust the asset allocation mix between equities and bonds and thus reduce the effect of market volatility. The plan invests in fixed income securities with staggered maturities to cover the annual benefit payments *for the foreseeable future*, (i.e., from five to 15 years). A plan with a lower risk profile would cover a shorter time horizon with its bond holdings. As a plan matures (i.e., as a larger percentage of the plan's liabilities are owed to participants nearing retirement age or in retirement), a higher percentage of the plan's assets would be invested in fixed income securities maturing within this foreseeable future time horizon. The maturity of the plan and the risk profile of the remaining investments determine how many years out to set this time horizon. Again, these questions would be addressed annually by trustees.

Introduction

In recent months the Traditional Actuarial Practice (TAP) of reporting funding status and pension liabilities for public pension plans has been called into question both inside and outside the actuarial profession. It is becoming clear that funding policies for public plans must address the long-term nature of the plan, its payment obligations, *and* the substantial market risks that are present in various asset portfolio mixes. Policy makers need to recognize the potential volatility in funding contributions that result from the risk profile of their asset allocation strategies and from the plan's maturity.

New funding policies and actuarial models can and must evolve to help manage the investment risk on the liability side of the balance sheet, because neither the TAP disclosures nor any new Market Value of Liabilities (MVL) disclosures give policy makers enough information to make sound funding decisions as a stand alone measurement. Ultimately, public pension plan policy makers need to shift their focus from simply managing the plan's *funded ratio* to managing the plan's *risk profile*.

Given all the issues surrounding public pension plans, one paper cannot explore each and every one. This paper is based on some key assumptions regarding public pension plans which are not within the scope of this space to discuss. However, the authors believe that:

- the complex nature of public pension plans needs to be better understood;
- the plans do provide a valuable benefit to public servants, who are often engaged in hazardous and necessary responsibilities for us all;
- defined benefit plans fit with the nature of these public servants' work and value to society[1]; and

- the plans are an effective way to provide these benefits and have proved cost efficient over time.

Discussion

1. How do Most Public Pension Plans Measure Their Funding Status Today?

Most plans have historically used the concept of the plan's funded ratio, the simple relationship between the plan's Actuarial Value of Assets (AVA) to its Actuarial Accrued Liability (AAL) to measure progress toward funding pension obligations. This measure has been used by the actuarial community as a signal of a plan's overall health for some time and was required as part of the new accounting disclosures by the Governmental Accounting Standards Board (GASB) when they issued Statement Nos. 25 and 27 in 1994. While these new reporting requirements were established for accounting expense purposes, they were established to closely coordinate with common funding practices at the time.[2] Following the new expense rules, many plans decided that the minimum that needed to be contributed was equal to the minimum recognized for accounting purposes. Some public systems did not even contribute at these minimum expense levels and still don't. Little thought was given to whether this minimum contribution level provided adequate funding for all stakeholders. As long as the funded ratio increased over time, many plans were satisfied with the arrangement.

The issue is that the funded ratio is only a single point estimate approach to measuring funding status. We intend to challenge this measurement as being inadequate as currently used and needing more dimensions to correctly evaluate funding status. We feel there are two key components that this measurement currently fails to recognize to the detriment of all stakeholders. First, this measurement does not recognize to what extent the plan is subject to market volatility, a shortcoming brought into sharp relief by the recent economic turmoil. Secondly, the funded ratio does not adequately reflect the plan's maturation process.

2. What's Wrong with MVL and TAP?

Both MVL and TAP give a snapshot of a plan's funded ratio at the measurement date, solely taking into account two valuation numbers. MVL attempts to capture the true value of what a hypothetical market would place on the plan's liabilities. Projected benefit payments are modeled as if they were bonds and then are assigned the market value of equivalent bonds. Further, the projected benefit payments only reflect service and compensation accrued to the valuation date.

With TAP, all benefit payments are discounted with a theoretical long-term asset portfolio return rate in an attempt to smooth out the implied cost of benefits. The benefit payments reflect all expectations regarding future service and compensation levels and use actuarial cost methods to assign a portion of this liability to past service and a portion to future service. The liability allocated to past service, or Actuarial Accrued Liability (AAL) is then compared to the current asset values. Usually asset gains and losses (the difference between expected versus actual returns) are smoothed over a short period of time to produce an actuarial value of assets (AVA), the resulting unfunded actuarial accrued liability (UAAL), and the funded ratio.

Under TAP, actuarial measurements and discussions have not done enough to encourage public plan savings. The political realities of the situation ruled, and we do not expect MVL to change this philosophy. When most public pension plans were first established, they naturally had no pool of assets. Benefits were promised with the expectation that future taxpayers would pay for them. In the early years, only a small percentage of members retired, and the time when most active employees would start drawing benefit payments was a long way off. Plans seemed to have plenty of time to accumulate the funds needed to pay benefits.

Because all the money was not due immediately, payments needed to fund the benefits could be (and were) postponed to a future day of reckoning. Due to the tax generating abilities of the employer sponsors, any shortfall or UAAL could be financed by raising taxes to cover the difference. Some plans felt no real urgency to pay down UAAL amounts.

Saving too much was also discouraged. If a plan were close to 100% funded or overfunded, governments often felt the plan had "too much" money and that other uses for these public funds were more urgent. The concept of being over 100% funded did not surface within the public plan sector until the investment boom of the 1990's when accumulated assets grew much faster than their obligations. Before that time, as long as some progress was being made on increasing the funded ratio, a plan was considered to be doing well. When plans became funded greater than 100%, the extra money could be "used" for issues of the day rather than issues of tomorrow. Most decision makers in the late 1990's had perhaps forgotten (or never heard of) the market decline in the 1970's that necessitated a spate of increased contributions.

3. Historical Review

Prior to the 1960's, many public plans were prohibited by law from investing their accumulated funds in anything other than secure, stable, fixed-income assets. Equities had historically provided more income and held out the promise of providing richer returns in the future. These historic returns led many public plans to begin allocating sizeable portions of their assets to stocks starting in the mid-1980s. And the resulting additional income from equities eventually led to richer benefits being promised to employees.

Actuaries began to use a higher discount rate in their calculations, reflecting the higher returns being realized (and anticipated) from equity investments. In fact, prior to 1980, it was rare to see a discount rate as high as 7%, let alone north of 8%, a rate many plans moved to in the 1980's

and 1990's. Higher discount rates led to lower contribution rates. Lower liabilities combined with the higher equity returns during this period paved the way for increasing benefits. A popular political decision was made: rather than put more money into the system to increase the funded ratio or decrease the amount of risk in the asset allocation policy to forestall potential downturns, benefits would be increased and funded at the same (or even lower) contribution levels.

As plans grew accustomed to higher actual returns, and actuaries accordingly used higher long-term discount rates, investment committees began to countenance riskier investments--all in an effort to achieve the higher returns that would justify the higher rates of assumed income. Now, as plans continue to mature, will they be able to adjust their contribution pattern to handle the increased volatility in contributions due to riskier investments?

4. Volatile Markets

During the market upswing in the late 1990's many public plans used these excess returns and amounts over 100% funding to reduce employer contributions and grant increased benefits. A better approach, in hindsight, would have been to *save* those extra investment returns in a rainy day fund or reduce the amount of risk taken by the trustees and employer.

Plans that used the excess assets to offset employer contributions made another mistake. No provisions were made for reassigning budget funds back to the pension plans if and when greater funding was needed. In fact, following the 2000 market fall, a great hue and cry arose protesting the contribution rate increases needed just to get back to the Normal Cost contribution rate. But the increased rates were really back to the relatively normal levels before the market boom in the 1990's.[3]

Plans that increased benefit levels, thinking their excess assets would always be there, found themselves committed to richer benefits. This has led to higher required contribution rates that many entities are trying to determine if they can afford. Moreover, in many jurisdictions, employers cannot legally cut back benefit levels, even benefits yet to be accrued, as plan members have a contractual right to them.

Ultimately, the current reliance on the funded ratio as measured by AVA/AAL has not served the public plan community well. Key questions raised by various stakeholder groups have gone unaddressed:

- For employers, it does not address the need for stable, level contribution requirements that will fit into a budget.
- For active employees, it does not guarantee benefit adequacy and security for their future retirement.
- For current retired employees, it does not ensure that lifetime payments maintain purchasing power by keeping pace with inflation.
- For taxpayers, it provides no real assurance that future tax requirements might not increase dramatically.

In fact, the economic downturn of late 2008 has seen each of these stakeholder groups lose confidence in the adequate funding of their plans. This is a direct result of the market volatility associated with the asset allocation of the plans' current portfolios and prevailing expectations about the magnitude and source of plan funding.

5. What's Wrong with 100% Funding?

The current funding policy, which aims for a 100% funded ratio of AVA/AAL, does not adequately reflect underlying portfolio risks. As just one example, if plan assets include a significant investment in equities or alternative investments, the potential volatility of such investments can result in a plan's 100% funding disappearing from one day to the next. When a plan has funds invested in volatile assets, 100% funding can suddenly become 75% funding.

How can this happen? Attaining 100% funding does not and never has meant that a fund will remain 100% funded. What 100% funding provides is a sense of security that may be at best temporary. Instead of shooting for the (at times illusory) sense of security that a 100% funded ratio represents, public pension plans should consider working toward a better method and level of funding that will allow the plan to make good on the level of benefits it has promised its members.

By not focusing on just achieving 100% funding, plans will avoid two pitfalls. The first, as already mentioned, is that a market downturn will transform 100% funding into something far less attractive. The other danger is that a market boom will catapult the plan beyond 100% funding. Taking this as a permanent boon, many constituents will want to employ the surplus to provide richer retirement benefits, making the next downturn in the markets that much more costly. When that happens, the plan will no longer be overfunded, nor even 100% funded, but it will find itself with more benefits to pay.

A better alternative would be to decrease the risk in the plan when market gains result in the plan being more than 100% funded. This de-risking of the plan will be greatly appreciated in any future downturn.

6. Why a New Multidimensional Funding Policy Should be a Top Priority

Determining, establishing, and implementing an effective formal funding policy is critical for public plans going forward. After all, as Alice in Wonderland says, “If you don’t know where you’re going, any road will take you there.” Many systems that thought they had sound funding policies in the past have discovered their inadequacy in the aftermath of the boom/bust/boom/bust dust of the past decade.

Any good funding policy should be multidimensional and cover the real risks associated with where a plan is headed. Historically, funding decisions have been based solely on moving towards a 100% AVA/AAL funded ratio combined with annually amortizing some of the plan’s unfunded actuarial accrued liability (UAAL).

However, if one steps back, any funding policy needs to be able to answer the following:

- At what contribution rate will the public employer be able to sustain the plan?
- How will the government maintain a well funded plan?
- How will the plan maintain the stability of employee and employer contribution rates?
- How should the funding policy react when the plan is over 100% funded?
- What are the risks if things do not go as planned (i.e., asset values fall and the employer is unable to maintain the contributions required to sustain the plan)?

Well thought-out funding policies, based on the plan’s risk profile, need to be devised in advance. A plan’s risk profile should take into account the expected maturing of the plan. In many cases, current asset allocation and funding policies may not be taking into account the maturation process of the plan and its effect on the employer’s ability to take on funding risk. Furthermore, the investment return assumption used in the actuarial valuation assumes no

change in the asset allocation policy in the future. We believe the additional dimension of a plan's maturity should influence asset allocation decisions and funding policies based on the plan's risk profile.

7. Determining a Plan's Risk Profile

In theory, it is possible to assign public pension plans their spot on a risk continuum, because, clearly, some are more likely to make good on their benefit promises and others are at greater risk of failing (in the absence of significant changes in contribution levels). At the riskiest end reside underfunded, mature plans invested in volatile securities with little room in the budget to adjust for potentially higher contributions. At the other extreme – the least risky end of the spectrum – are overfunded plans with a healthy active member population, whose assets are invested in a dedicated bond portfolio matching their obligations, and which have the ability to adjust their budget for changes in contribution requirements. Most plans fall somewhere in-between.

Actuarial analysis should help a plan develop an approach for long-term success. It should encourage plans to adopt funding policies that make it possible for the plan to accumulate sufficient assets during an employee's career that the member's benefits will be secure and paid in retirement. And it should guide the plan's decision-makers so that the plan's maintenance fits within the employer's budget constraints.

8. Key Factors Contributing to a Plan's Risk Profile

Ultimately, neither a traditional actuarial practice (TAP) funded ratio nor a market value of liabilities (MVL) funded ratio adequately illuminate the embedded risks inside a public pension plan. Both MVL and TAP measures are silent about some major risks embedded in pension

plans, including: contribution volatility; future investment risk; and the maturity of the plan. As will be shown, these risks are significant.

Contribution Volatility – How volatile will future contribution rates be? Can the employer adapt to volatile contribution requirements? At what point can the employer no longer afford the benefits promised. Answers to these questions are based on the underlying characteristics of the plan's demographics. Moreover, answering them should help the employer adopt policies that meet these goals. An employer with a growing active member population is a healthy employer with the means to adapt to volatile contributions. As an employer's growth stabilizes, its budget policies have more trouble accommodating volatile contributions. Its risk profile has changed. An employer who understands its budget risks should adopt policies to manage its pension plan accordingly. How do trustees adapt to changes in their plan's risk profile, before they occur, through their funding policies? This is the $64,000 question and depends on all the other factors below.

Future Investment Risk – What investments are backing the required future cash flows and what kind of investments are they? The nature of investment risk and return, and the historical difference in performance and volatility among such asset classes as equities, bonds, and commodities, play a major role in a plan's risk profile. (These differences are well documented and so will not be discussed in detail here.) However, it is worth noting that historically, public plans' investing in equities led to a significant increase in investment revenue that helped keep the level of contributions down. However, recent events prove that the risks assumed with these equity-based portfolios need to be better managed or at least better understood.

In hindsight, one of the biggest problems public plans faced during the market upswing in the late 1990's was what to do with the "excess" money, if they reached or exceeded the 100%

funded ratio. For decades the underlying assumption was that once a plan reached the 100% funding goal, that full funding level would persist and maybe even grow. The concept that any funds greater than 100% were “excess” or available for other needs arose in many places around the country. Few trustees understood the risks associated with the investments that generated these excess assets, and that perhaps these funds would be best saved for a rainy day.

The key questions employers and all stakeholders should be asking are these: Are the investments consistent with employer’s ability to adjust to volatile contribution requirements? Are potential volatile contribution requirements in keeping with the evolution of the plan’s demographics? In reviewing valuation reports from the past 20+ years for several public retirement systems, we have found that as the plan’s demographics have matured, plans have increased their exposure to riskier asset classes, and at the same time budget constraints have gotten tighter. One might believe that this is the opposite reaction employers and trustees should have given the circumstances. Now the question is: Can employers and trustees afford to reduce the risk in their pension plan portfolios? Can they afford not to?

Maturity of the Plan – For many public trustees, one concept used in setting its funding policies is intergenerational equity, (i.e. the costs for one generation of taxpayers is consistent with the cost for prior and future generations of taxpayers). Current actuarial methods do not take into account expected changes in the maturity of the plan and how those changes might adjust the contribution and investment risks over time. How does one measure plan maturity? And how should adjustments in the risks be reflected in the funding policies of today to be consistent with the concept of intergenerational equity?

We have reviewed three separate measures to assess a plan's maturity level:

- The first is a simplified measure of the number of active members versus the number of retirees;
- A second measure weights these counts by their liabilities (i.e., the percentage of the plan's accrued liabilities attributable to retirees compared to the plan's overall liabilities);
- The third measure is the ratio of a plan's accrued liabilities to its current year's benefit payments.

For this paper, we have reviewed these maturity levels for several statewide systems and how they have changed over the past 20 years.

9. Active-to-Retiree Ratio

It is no secret what impact the baby boom generation is having on Social Security, and public pension systems are faced with similar demographic issues. When baby boomers began working, there were many more active workers than there were retirees collecting Social Security. The pay-as-you-go financing system was flush with cash. Now, with baby boomers beginning to retire and retirees living longer, the active-to-retiree ratio has been dramatically reduced. Because most of the excess cash in prior years was not kept in the Social Security system, the fixed pay-as-you-go financing is only expected to be able to cover a portion of the annual benefits promised beginning in 2041[4].

Today a higher percentage of employees in the public sector also are collecting retirement benefits. As the number of members receiving benefits increases compared to the number of employees still in the accumulation phase, a plan is said to mature. Plan maturation is due to the normal aging of the population and to the length of time a plan has existed.

In the beginning, a pension plan generally has no (or few) retirees. After 30 years, an entire (workforce) generation has advanced in age. If the employer's workforce continues to grow, the maturation process is slow. As the employer's workforce becomes stable or perhaps declines, the maturation process hastens. Enhancements in the benefit formulas and reductions in retirement eligibility have also contributed to the maturation process. Adoption of early retirement incentive programs can certainly increase the maturation process as usually the incentive reduces the number of active members and increases the number of retired members receiving retirement benefits. Added to this, life expectancy has generally been increasing, which increases a plan's maturity level.

In a review of several systems from across the country, the average active-to-retiree ratio has decreased by more than a one-third from 3.1 to 1.9 active members per retiree from the mid-1980's to 2005. In addition, the life expectancy for the average 60-year-old male and female member has increased by 11% and 4%, respectively, based on the assumptions used in actuarial valuations.

10. Percentage of Retiree Liability to Total Plan Liability

The second measure essentially weights the head count ratio by each group's liabilities. In our analysis we have used the actuarial accrued liability. The head count ratio does not take into account cost-of-living adjustments provided to retirees nor the higher benefits provided to active members, based on either improved benefit formulas (or reduced benefit formulas) or higher salaries. Actuarial funding methods are designed to accumulate enough assets during employees' careers so no additional monies are needed for members in retirement status. If additional funding is required on behalf of retirees, it will be passed on to the next generation of taxpayer. Therefore, decision makers would want to reduce this possibility. Understanding the impact of the maturity ratio on a plan's funding and investment policies should be considered.

Over the past 20 years, the percentage of actuarial accrued liabilities attributable to retirees has increased from approximately 33% to almost 50% for the systems reviewed.

11. Accrued Liability to Annual Benefit Payment Ratio

The third method provides a simplified measure of how many years of benefit payments are covered, excluding future investment income and contributions. The inverse of this ratio represents the percentage of the actuarial accrued liability attributable to next year's benefit payments. This measure can also substitute market value of assets for actuarial accrued liability and provide some sense of what percentage of the assets would be required to cover a year's worth of benefit payments. Underfunded mature plans may find it difficult to attain the expected asset returns if the plan has net negative cash flows (benefit payments exceeding contributions). Over the past 20 years, the ratio for the systems reviewed has declined from slightly over 30 to slightly over 20, resulting in an approximate increase of almost 40% in the percentage of the liability attributable to the next year's benefit payments.

Exhibit 1 displays the various measures of plan maturity from the mid 1980's to 2005 for each of the state-wide systems reviewed.

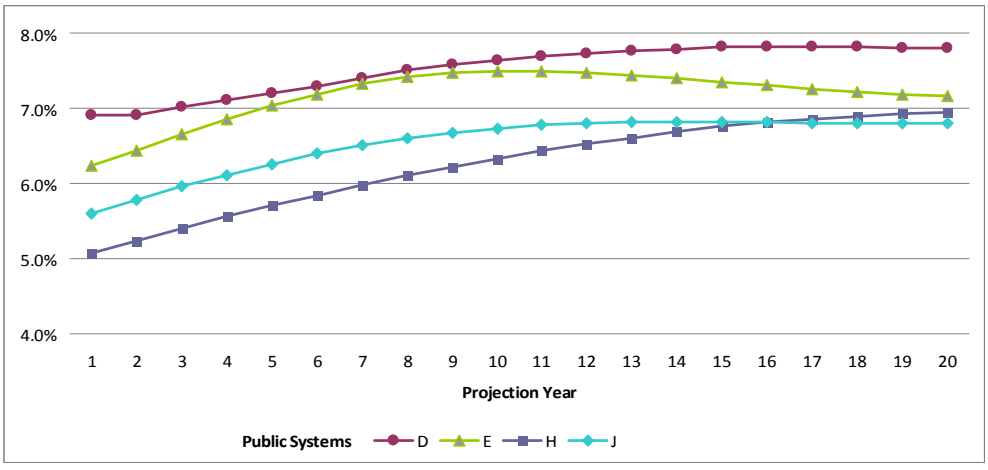
Exhibit 1 – Measures of Plan Maturity

System	Active to Retiree Ratio		% of AAL for Retirees		Ratio of AAL to Annual Benefit Payments	
	1985	2005	1985	2005	1985	2005
A	2.9	1.3	36%	60%	30.4	18.1
B	5.1	2.2	25	45	35.6	23.9
C	3.1	2.4	35	41	28.8	25.6
D	1.7	1.1	39	49	25.2	18.0
E	2.4	1.6	34	44	26.8	20.2
F	2.6	2.4	39	45	27.0	23.6
G	2.3	1.5	36	57	30.6	20.1
H	3.7	2.2	34	51	25.9	20.8
I	4.4	2.6	34	47	25.8	19.8
J	2.6	2.0	22	39	45.2	24.9

Unlike Social Security, the actuarial prefunding mechanisms in place for public pension plans are expected to keep any system from not delivering on its promises. However, many of these prefunding mechanisms still defer contributions to future years and assume no changes in asset allocation strategies. In light of the plan maturation process, the key questions are: 1) will employers be able to continue to fund the increasing contribution requirements resulting from deferred funding mechanisms? And 2) how will asset allocation strategies evolve over time?

In addition to looking back and doing a historical review of several statewide systems, we have also been able to see future projections for some systems. One of the maturity levels we reviewed over time was the percentage of liability due to one year's worth of benefit payments. Over the next 20 years, the average increase in this percentage is over 20% for the four systems reviewed. Thus, the cash requirement would be expected to increase assuming no change in net cash flow of the plan. However, the difference between benefit payments and contributions would be expected to continue to grow in the future, further increasing cash requirements. As baby boomers retire over the next 15-20 years, annual benefit payment growth would exceed payroll growth. For one plan studied the negative cash flow almost doubles over the next 20 years.

Exhibit 2 – Plan Maturity Measure Projection
% of Liability due to One Year of Benefit Payments



Gradual changes in these maturity ratios affect the level of investment risk and contribution risk and need to be taken into account in setting the plan's risk profile.

12. Multidimensional Funding Tools

Despite the potential difficulty, a more comprehensive, multidimensional tool is needed by the pension community to discuss and decide future investment decisions, contribution rates, and benefit plan changes. Determining a plan's risk profile is an important first step. It should help the plan's trustees better appreciate and handle the actual risks in their plans going forward.

Having evaluated a plan's risk profile, consider two alternative funding measurement options that could promote fuller recognition of a plan's investment risks and take into account the maturation process of the retirement systems. These two possible alternative funding policies are designed to align a plan's underlying portfolio risks with its liabilities and its maturity. They would encourage plan trustees to focus annually on the plan's risk profile when devising asset allocation and funding strategies, to reduce contribution volatility and to strengthen the plan's long-term viability.

13. Alternative Funding Policy Option 1: Fund in Excess of 100%

One alternative is to fund a surplus against possible future losses, based on a plan's risk profile. Specifically, the plan would be funded to cover up to a two standard deviation loss on their portfolio in excess of the plan's actuarial accrued liabilities as of the measurement date. This strategy provides a cushion against market volatility and thus helps reduce contribution volatility. The risk profile of the investments coupled with the plan's inherent demographic risks determines how much of a cushion is needed, with a plan that has a lower risk profile requiring a smaller cushion.

Another way to look at it is that to better manage for future downside risks, plans can create a "rainy day fund" or "excess funding reserve" to safeguard any assets in excess of the 100% funded ratio goal, and which would be available to use to offset any future investment losses. This has an added advantage of using the same terminology and concepts as the current 100% funded ratio goal. It uses the same measurement criteria and terms but recalibrates to a new ultimate funding goal. No new concepts are needed, just a re-measurement of where the plans need to be going. Politically, it would be important to understand that funds in excess of the 100% measurement could not be used for benefit improvements or decreased employer contributions. Should this fund be used for benefit improvements, the plan could experience dramatic increases in contribution requirements when downside risks occur. Should the excess funds be used to decrease employer contributions, it may be too difficult to increase contributions when needed. As a minimum, the Normal Cost contributions should continue to be paid when the 100% funded ratio level has been reached until a sufficient surplus has been reached.

How much more than 100% should be the target funding ratio? Since assets are, on average, expected to deviate about 10% a year, at least a 10% reserve or buffer should be established as protection against a market downturn. However, with the percentage of retired plan members growing, an even higher reserve or buffer from accumulated assets is probably advisable. We suggest two standard deviations or 20% in this example for the portion of the liability attributable to retirees. If a plan has 50% of its obligations, or 50% of the AAL earmarked for retired members, then an ultimate funding goal of 115% is appropriate, 110% for the active member obligations and 120% for retired member obligations.

Based on statistical analysis, an investment portfolio with a 10% standard deviation, means there is a 16% chance the fund will have a 10% asset loss or roughly once every seven years.

Likewise there is a 2.5% probability that it will incur a 20% loss, or roughly once every 40 years. Funding up to a two standard deviation asset loss on the retired AAL portion would make it less likely that retired member experience losses would have to be compensated for by increases in contributions based on active members' pay. This is especially true if funds in excess of the 100% goal are used first to support retired member losses. This separation of funding or application of the assets between active and retired members would be a deviation from most current practices but has merit in adding more visibility to the funding issues.

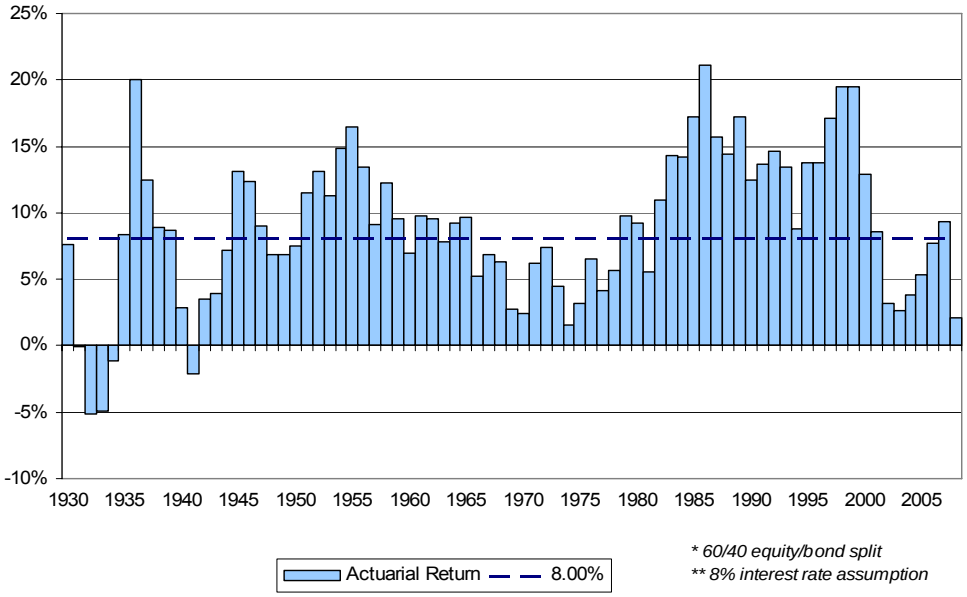
One stochastic study of a large municipal system that was nearly 100% funded, and had an expected standard deviation on its investment portfolio of roughly 10% per year, indicated that over the next 30 years, the plan would experience a funded ratio of less than 100% around 1/3 of the time; between 100% and 115% around 1/3 of the time; and over 115% around 1/3 of the time. Thus, on average, the plan would need to be somewhere between 100% and 115% funded to be able to stay well funded once the 100% funded ratio was achieved. With the average portfolio falling some 25% in 2008, the odds are 65% they will remain below 100% funded, with a 15% probability they will be between 100% and 115% funded, and a 20% chance they will have a surplus fund greater than their goal of 115% of their AAL over the 30-year period.

For a maturing plan, the percentage of the AAL earmarked for retired members is increasing over time. Therefore, if a system decides to maintain its current asset allocation strategy in the future, the ultimate funding goal will increase over time resulting in additional contributions. On the other hand, if the system decides to adjust its asset allocation strategy to be less risky over time to coincide with the changing maturity of the plan, additional contributions will be required as less investment income would be expected. In either case, this additional dimension of the

evolving plan's maturity should be taken into account today in determining asset allocation and funding strategies.

Just as the Entry Age Normal Cost method requires higher payments early in members' careers to spread the costs over their working lifetimes, setting a funding goal higher than 100% will allow employers and employees to pay more when the market is good and tax revenues are up than when the market and tax revenues are both down. Exhibit 3 illustrates the point that excess returns in one year could be accumulated and used to offset deficient returns in another year, resulting in more stable contributions over time. The chart displays hypothetical actuarial rates of return of a portfolio composed of 60% equity and 40% bonds based on the historical investment results reported by Ibbotson[5] for the past 78 years. The actuarial returns are based on portfolio gains and losses smoothed over a 5-year period. The market value return for 2008 was computed to be -19% for the total fund. It is interesting to note that with five-year smoothing, the only time a negative return occurred was during World War II and the Great Depression.

Exhibit 3 – Actuarial Earnings Based on Five Year Asset Smoothing



As the graph shows, by saving higher returns in good years to fill in the valleys of the bad years (and overall that is what the actuarial discount rate assumes), plans' good years can be used to offset bad years – but only if they are not spent.

14. Alternative Funding Policy Option 2:

Modified liability driven investment (LDI) strategy

A second possibility is to pursue a Modified liability-driven investment (LDI) strategy that takes into account asset allocation and investment strategy. This option focuses on a plan's maturity level in deciding how to adjust the asset allocation mix between equities and bonds, again so as to reduce the effect of market volatility. The plan invests in fixed income securities with staggered maturities to cover the annual benefit payments *for the foreseeable future*, (i.e., for anywhere from five to 15 years). A plan with a lower risk profile would cover a shorter time horizon with its bond holdings.

As a plan matures (i.e., as a larger percentage of the plan's liabilities are owed to members nearing retirement age or in retirement), a higher percentage of the plan's assets would be invested in a dedicated bond portfolio maturing within this foreseeable future time horizon. For the rest of the assets, a balanced and diversified portfolio is maintained. The maturity of the plan and the risk profile of the remaining investments determine how many years out to set this time horizon. These questions would be addressed annually by trustees. (This is similar to an approach often recommended by investment managers for an individual's retirement portfolio.)

Benefit payments for the next 15 years are fairly well known. The assets backing these cash flows should not be "chasing" equity risk premium. As a plan matures and more of the liability is for the retiree or "in-pay" population, the portfolio will be adjusted to become more conservative (invested in bonds). As the actuary tries to model benefit payments further out into the future,

the exact nature of the benefit payments becomes less certain. What will retirement trends be in 20 years? Will people continue to live longer or will longevity plateau? Will predicted costs increase or decrease? Dedicated bonds may not be the ideal investment to back these future liabilities due to the unpredictable nature and timing of the required future cashflows.

In bull markets, where the balanced and diversified portfolio grows in value, additional years of benefit payments can be backed by bonds through the sale of the assets in the diversified portfolio, thereby “de-risking” the plan. The focus is thus turned away from the ups and downs of an overfunded plan which can lead to benefit improvements and an underfunded plan leading unavoidably to higher contributions. The new focus will be to maintain a target risk profile and to fund it accordingly.

15. Requiring Trustees to Perform a Regular Risk Assessment

Based on the desired risk profile, each year the board will have to decide how many years of benefit payments to secure with dedicated bonds. This mechanism would encourage the trust to engage in an annual exercise in risk management for the plan. This would turn the discussion away from increasing benefits to managing the risk inside the plan to secure the benefits already promised. Boards should no longer use an annual funded ratio as the sole decision-making factor.

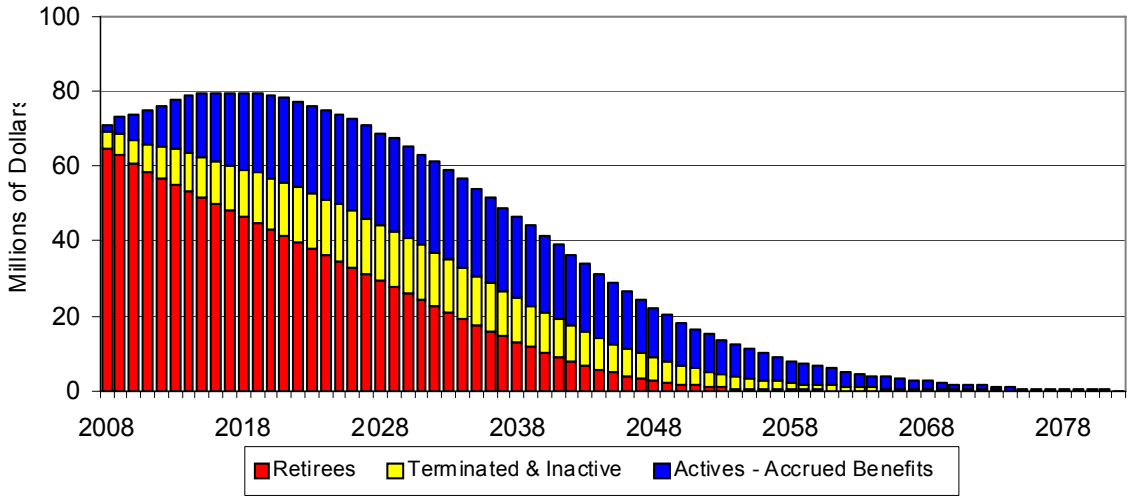
Funded ratios will be based on a select and ultimate interest rate structure. The select period and associated interest rate will be based on the number of years that benefit payments are backed by bonds and the average yield of those bonds if they were held to term. The ultimate interest rate will be the traditional long-term median return of the diversified portfolio. If the number of years of benefit payments backed by bonds increases, the overall discount rate will be reduced leading to a lower funded ratio, but a reduced risk profile. This is known as “buying

down the risk." On the other hand, if the number of years backed by bonds decreases, the funded ratio may increase, but the risk profile of the plan will also rise. Over the years, as the plan matures, more of the liabilities will be backed by bonds regardless of how the other assets are invested.

Exhibits 4 and 5 show the accrued benefit payment streams for a mature pension plan and a young pension plan. The TAP funded ratio is using an 8% discount rate while the MVL funded ratio is using a spot bond yield curve[6] to discount the liabilities. In both exhibits, the TAP ratio is 100%, which can be quite deceiving for the mature plan as it does not take into account portfolio risk. On the other hand, the extremely low MVL funded ratio is deceiving for the young plan. Spot rates for bonds change daily and undergo dramatic shifts from year to year. Funded ratios may vary dramatically from year to year due to changes in the spot rates. This makes it difficult to make long-term funding decisions (assuming the plan is invested in a diversified portfolio).

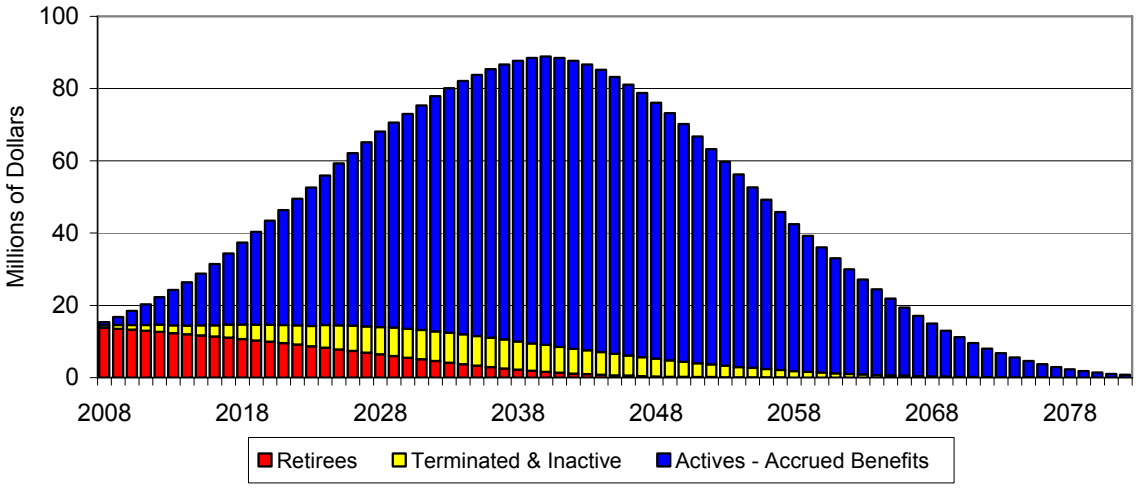
The other two funded ratios in the exhibits represent the use of a Modified LDI approach for either 10 or 15 years. As an example, a 6% select interest rate is used to capture the time period in which benefit payments are backed by bonds, with an 8% ultimate rate to represent the long-term mean return of the diversified portfolio. Communicating the two ratios to the trustees shows the value of risk in the plan. If the target risk profile (mature plan) dictates that the plan should have 15 years of benefit payments backed by dedicated bonds, the funded ratio would be lower than if the trust decided to go with 10 years. Presenting trustees with the two Modified LDI funded ratios and the other risk factors in the plan helps make the risk profile of the plan more explicit.

Exhibit 4 – Mature Plan Benefit Payments



Funded Ratios	
TAP	100%
MVL	83%
Mod LDI 10 yrs	88%
Mod LDI 15 yrs	85%

Exhibit 5 – Young Plan Benefit Payments



Funded Ratios	
TAP	100%
MVL	76%
Mod LDI 10 yrs	85%
Mod LDI 15 yrs	80%

Conclusion

Keep the focus on the risk profile! Plans should have a road map of where they want to go instead of being driven by the latest investment fads or just seeking the highest returns. The trustees' main job is to manage the risk profile of the plan. How are they going to structure the plan to meet its cash flow requirements 30 years in the future? Increasing benefits without increasing contributions raises the risk. Decreasing the equity share of the portfolio as the plan matures, lowers the risk profile.

The goal of public pension actuaries is to use assumptions and methods that will produce stable contribution levels for public plans such that benefits are prefunded in a systematic, stable and adequate manner. Assumptions that are too aggressive may lead to ballooning future contributions. Assumptions that are too conservative may lead to overfunding (and the decision to indulge in potentially unsustainable benefit improvements). In many cases, the assumptions actuaries employ cannot be tested for many years. The assumptions are based on current information and are assumed to reflect what will happen for many years—30 years prior to retirement and 30 more in retirement.

Based on the foregoing, how can actuaries and plan trustees use their plan's risk profile to better determine assumptions, funding policies, and asset allocation strategies for their pension plans? What is the funding policy plan that will get the plan where it wants to be? One size does not fit all. There is no magic silver bullet to ease all concerns. The risk profile is dynamic and demands constant attention.

Plans need to decide what level of benefits the system wants to provide for future generations *first*. This is regardless of future market returns. What replacement ratios is the plan trying to target and what work force management issues does it want to build the plan around? Set up a

contribution rate that has a high likelihood of covering the required cash flows in the future and invest as the plan's risk profile dictates. Any changes to the plan should be made according to how it would affect the risk profile. Benefit improvement discussions should always be viewed as increasing the risk profile of the plan. Economic and demographic annual experience should be viewed in the context of their effect on the plan's risk profile.

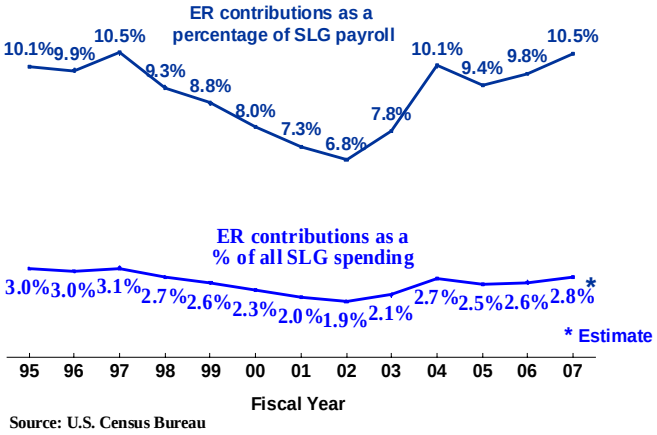
Focus on how to manage the risk profile of the plan to meet the future cash flow demands of benefits, instead of being satisfied once the current year funded ratio is known. Numerous funding policies exist. Some are very complex, some simple and straightforward. A current risk profile analysis should be performed and then a targeted risk profile should be decided upon. Pension actuaries need to start laying the foundation and present plan results in terms of how they relate to the impact on the risk profile of the plan. In the future, actuaries must make sure that the funding policy and investment policy jive with the plan's risk profile, because the risk profile—not the AVA/AAL funded ratio alone—will give plan decision makers a fuller and more adequate picture of the state of the plan, its future needs and viability.

Endnotes

[1] In 2007, state and local government retirement systems in the U.S. distributed over $90 billion more in benefits than they received in taxpayer-funded contributions. Personal income from state and local government pensions exceeds the personal income derived from the nation's farming, fishing, logging, and hotel/lodging industries *combined.* The expenditure of public pension benefits results in a considerable economic impact that reaches every city and town of every state. Source: *The Economic Effects of Public Pensions, www.nasra.org.*

[2] GASB 25 & 27 implicitly set a new funding expectation equal to the minimum amount to be expensed for pensions accrued in a single year. This minimum expense was set equal to the Normal Cost and an amortization of any UAAL (Unfunded Actuarial Accrued Liability) based on a maximum period of 40 years for a 10-year period, then reducing to 30 years. The amortization period could either be open or closed. Under an open period, the plan would have the option of effectively refinancing the UAAL each year. Thus, when using an open amortization period the intention is to never actually eliminate the UAAL.

[3] Chart from the Public Fund Survey, NASRA and NCTR



[4] See the following link for the Social Security 2008 Annual Report: http://www.ssa.gov/OACT/TRSUM/index.html

[5] Information for modeling stock and bond performance was taken from the Ibbotson SBBI 2008 Classic Yearbook published by Morningstar, Inc.

[6] The January 2008 PPA Monthly Yield Curve was used as a proxy for the spot bond yield curve. For specific rates, please refer to IRS Notice 2008-24.