

Public Employee Retirement Systems: Funding Liabilities

by **Brian Murphy and Louise Gates**

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Public employee retirement systems are receiving a great deal of attention these days. Recent corporate scandals and the apparent end of the last decade's great bull market have resulted in the erosion of pension plan assets at the very time the baby boom generation is reaching retirement eligibility. For defined benefit plans, this situation has been described in various ways including "the perfect storm," "public pension morass" and "pension deficit disorder." Such descriptions elicit a variety of responses from readers and prompt a number of questions, including:

- What are defined benefit plan liabilities?
- How are these liabilities funded?
- What has caused the current situation?
- How are plan sponsors responding?

This paper will address these questions and enable the reader to gain a better understanding of how state and local retirement systems fund pension benefits.

Defining the Terms

In the simplest terms, a *defined benefit (DB) pension plan* makes a promise to pay specific benefits to eligible plan members. The benefit is defined by a formula. A typical formula among public employee systems defines the annual pension benefit as some specific percentage of final average compensa-

tion multiplied by years of service with the employer.

The liabilities of a DB plan are the value of the benefit promises made to all plan members. If plan assets are insufficient to cover all plan liabilities, the plan is said to have an *unfunded liability*. When the value of plan assets exceeds the value of plan liabilities, the plan has a *surplus*. The term *unfunded liability* is often misunderstood by those outside of the pension profession. Some people think that a plan with unfunded liabilities does not have the assets required to pay current benefits or that actuarially determined contributions have not been made. In fact, pension funding is intended to be carried out over a long period of time. An unfunded liability can be compared with a home mortgage. The existence of a mortgage is of less importance than the existence of a sound plan for paying it off over a reasonable period of time. Unfunded liabilities, accompanied by a sound plan for paying them off, do not present cause for concern.

Public employee retirement system liabilities are usually prefunded by a combination of employee and employer contributions along with the investment return they generate. A few systems, including the Social Security System, use essentially a pay-as-you-go approach to finance program benefits.

Figure 1

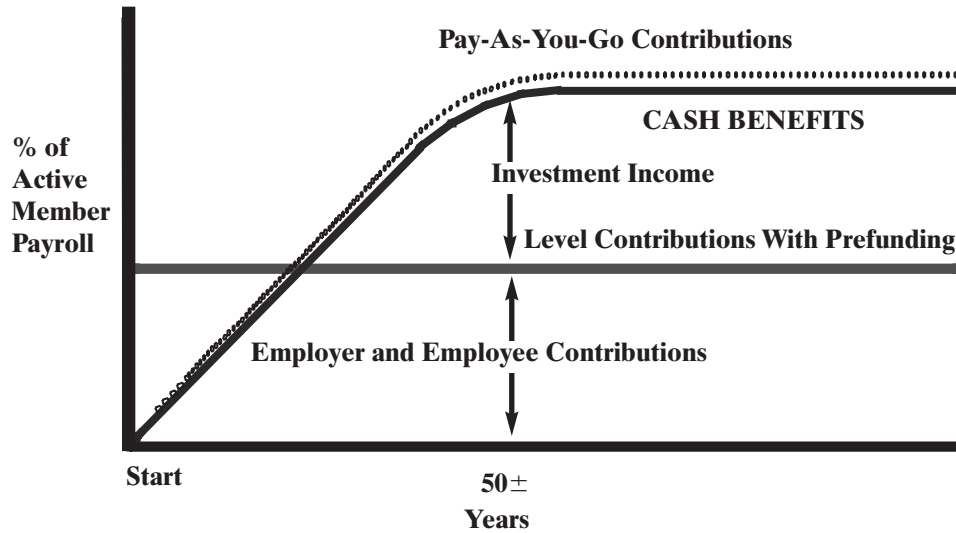


Figure 1¹ illustrates the difference in contribution patterns (as a function of time) between the two methods.

The Role of Actuarial Assumptions in a Valuation

Actuaries use mathematical models based on numerous assumptions about future events to determine both plan liabilities and a contribution rate sufficient to fund plan obligations as they come due. This process is called an *actuarial valuation*. In a small number of cases, the employer contribution rate is defined by statute or local ordinance.

Even though an actuarial valuation is required to assess the sufficiency of the contribution rate, actuarial assumptions do not determine the cost of a pension plan. They do, however, affect the magnitude and timing of employer contributions. The ultimate cost of a pension plan is the sum of the benefits and expenses paid. Actuarial assumptions are a key ingredient in the development of contribution rates and can be classified as either economic or demographic (noneconomic).

A key economic assumption is the assumed rate of investment return. A common and sound practice for setting economic assumptions begins with the presentation of a range of potential economic assumptions by the actuary to the plan's representatives for consideration. After a careful review of the impact of each possible assumption set, plan representatives and other advisors select the economic assumptions that will be used in future valuations of the plan. Table I includes some actuarial assumptions commonly used in pension plan valuations. Figure 2 illustrates investment return assumptions used by 121 statewide plans (covering millions of people and billions of dollars) in a recent survey.²

When assumptions are not realized, there will be actuarial gains or losses. Actuarial gains for example, can be the result of higher-than-expected levels of investment return or lower-than-assumed wage increases. Actuarial gains reduce contribution requirements. In contrast, losses may be the result of lower-than-expected levels of investment income or higher-than-assumed

Table I
SELECT ACTUARIAL ASSUMPTIONS COMMONLY USED
IN THE VALUATION OF PENSION PLAN LIABILITIES

Economic Assumptions

Rates of

- Payroll Growth
- Population Growth
- Investment Return
- Wage Inflation

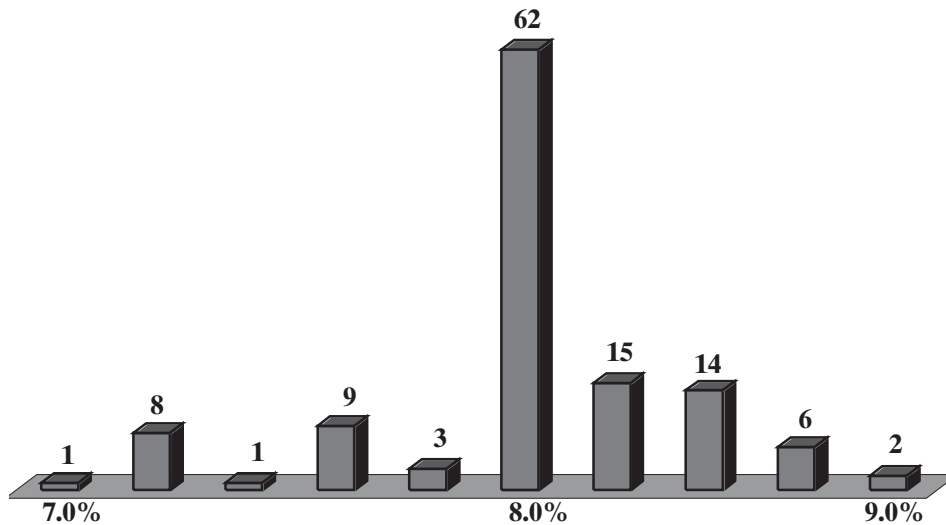
Demographic Assumptions

Rates of

- Retirement
- Mortality
- Termination From Employment
- Disability
- Merit and Longevity

Figure 2

DISTRIBUTION OF PUBLIC PENSION PLAN
ASSUMED RATES OF INVESTMENT RETURN



wage increases. Losses increase contribution requirements. The investment experience of a retirement system is typically the most significant in terms of the impact on funding the system.

The Impact of the Investment Markets on Retirement Systems

As shown in Figure 1, a level percent of payroll contribution objective requires contributions that exceed benefit payments during the system's early years. Because contri-

butions exceed benefits, an investment fund develops. Contribution income and a portion of the return on invested assets are expected to be sufficient to provide benefits during the later years of the system, when benefits exceed contributions.

Investment return plays a critical role in the operation of a retirement system. Investment losses have been common in recent times and for some systems they are measured in millions of dollars. To understand the current state of retirement systems one must understand the recent history of the investment markets.

The Good Years—The 1990s

During this period of time, inflation was low and capital markets were booming. The Dow Jones Industrial Average (DJIA) increased from 2,753 on January 2, 1990 to over 11,497 on December 31, 1999. Although there were stagnant periods in 1990 and 1994, the average annual rate of increase for the period was 15.4%. There was a similar increase in the Standard & Poor's Composite 500 Stock Index (S&P 500) during this period from 353 to 1,469. The National Association of Securities Dealers Automatic Quotations (NASDAQ) index of nearly 3,000 firms increased from 453 to 4,069 during this period. This is an average annual rate of increase of about 24.6%.

Public employee retirement systems were in an ideal position to profit from this major bull market. Many systems increased benefits, enjoyed contribution rate reductions and remained well funded. This superb but temporary investment climate contributed to pressure for benefit increases, which were in many cases permanent. By the end of the decade, contribution rates in many plans were reduced to unrealistic levels in anticipation of continuing investment gains. Many systems increased their investment return assumption. Such a change lowers employer contributions and makes benefit increases appear inexpensive. In addition, many systems changed their investment allocations to increase equity exposure. By 1999, some systems had as much as 90% of their investments devoted to equities.

The Bad Years—2000 to 2002

Capital markets peaked in 2000. The S&P 500 reached a period high of 1,553 on March 24, 2000. On October 10, 2002, the S&P 500 had declined to a period low of 769. Similarly, the DJIA had moved from a high of 11,909 on January 14, 2000 to a low of 7,181 on October 10, 2002. The average annualized rate of return for the DJIA during 2000-2002 was -10%.

During this period, pension trust assets declined as investment losses mounted, creating increases in pension contribution requirements. Tax caps and reductions in state and federal revenue sharing added additional pressure to local government budgets. Most governmental entities were unprepared for the rapid reversal of fortune. Asset smoothing techniques used by many public employee retirement systems helped to mitigate the effect of the unfavorable investment climate during this period. But no realistic amount of smoothing could eliminate the effect.

In general, *smoothing techniques* spread part of a fund's investment experience over future periods. When investment experience is good (as it was in the late 1990s) some of the investment gains are held in reserve and spread over future years. During good times, the smoothed value of assets (also known as the *actuarial value of assets (AVA)*) is lower than the *market value of assets (MVA)*. For many public systems, the AVA during the late 1990s was lower than the market value by 10% to 20% and the pressure to release these "unused" assets was often irresistible. However, the investment gains held in reserve at the end of 1999 were not sufficient to completely offset the investment losses during the period 2000-2002.

Smoothing techniques used in most systems work best when deviations from the mean are relatively small. In an environment where returns are moving from +15% to -10% in a short period of time, there is some risk that smoothing left unchecked can produce unrealistic results. For example, one system had plan assets with a market value of \$74 million on June 30, 2002. The smoothing techniques used by the plan produced an AVA of \$100 million. The large difference in values (35%) was attributable to the especially bad investment experience of the fund. Eventually, the investment losses will be recognized and the two asset values will become more aligned.

Some actuaries recommend the use of a corridor on the AVA to prevent such a large

difference in values. For corporate pension plans subject to the provisions of ERISA, such a corridor is required. The advantage of a corridor is that the AVA is closer to the MVA in both good and bad economic times. The disadvantage is less smoothing and greater volatility in the resulting AVA. In the public sector, contribution rate volatility is very hard to manage. It can be argued that a higher, more stable contribution rate is more compatible with governmental financing objectives than a lower, more volatile rate.

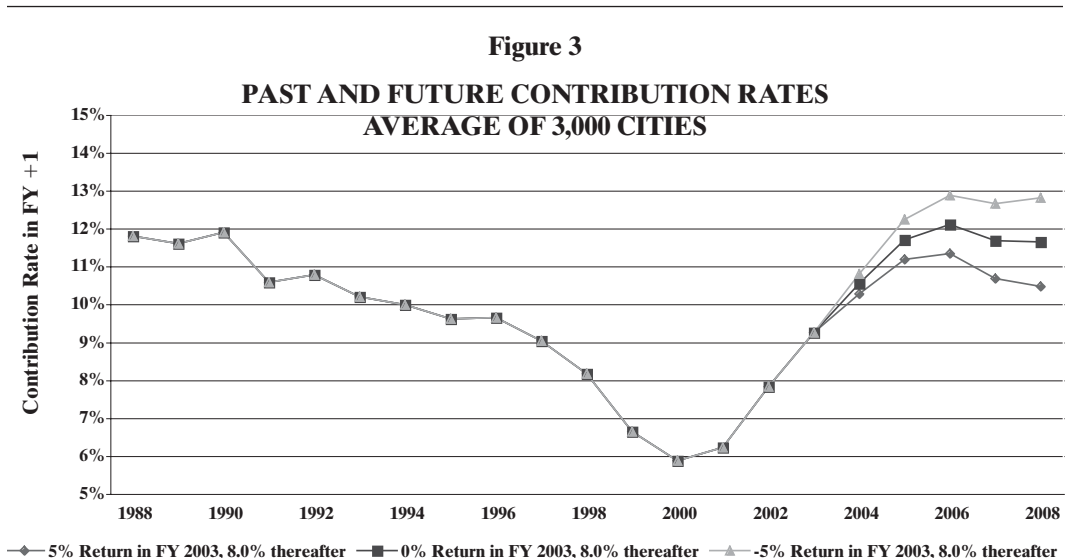
One might wonder how governmental entities responded to these difficult and powerful forces. During 2000-2002, few if any systems granted benefit increases. Several systems converted to defined contribution plans or have added new tiers of lower benefits for new hires. Other systems have implemented early retirement incentive programs to reduce their workforce. Such programs provide incentives for people to retire through enhanced benefits or earlier eligibility for benefits. The savings associated with the workforce reductions must exceed the cost of the enhanced benefits in order to benefit the employer. Still other governmental entities have issued pension obligation bonds. In many cases, the employer has continued to contribute to the system, but at a rate lower than

the Governmental Accounting Standards Board prescribes. The result has been debt on the financial statements of the plan sponsor and often the need for additional contributions at a later date.

Looking Ahead—2003 and Beyond

During 2003, the DJIA increased from 8,342 to 10,453 (a 25.3% increase). The NASDAQ increased from 1,335 to 2,003 (a 50% return). The S&P 500 increased from 880 to 1,112 (a 26.4% return). Certainly this was good news for public employee systems. While these returns have created greater optimism among plan sponsors, they have been generally insufficient to completely wipe out prior investment losses. It is important to note that an investment loss of x% in a given year followed by a year of x% investment gains still results in a loss overall.

During the first six months of 2004, most systems had rates of return in the 2% area. The probability of meeting actuarial investment return assumptions in 2004 appears low. If investment markets continue to provide insufficient rates of return, we could see dramatic contribution rate increases from present levels. Figure 3 illustrates past and potential future contribution rates for 3,000



cities.³ The potential future contribution rates are based on the indicated levels of investment return. For example, the investment experience for fiscal year (FY) 2003 is reflected in the FY 2004 contribution rate. From a historical context, the rates may not be much higher than they were ten to 15 years ago. But for many governmental entities, financial resources have already been earmarked for other programs.

The Funded Ratio: A Retirement System Barometer

The *funded ratio* is the ratio of a retirement system's assets to its accrued liabilities. It is a measure of how much funding has occurred in the past. For purposes of developing this ratio, the actuarial value of assets is usually used (as opposed to the market value of assets).

When an investment fund is small relative to its liabilities, the lack of investment return may have a small effect on the system. When the investment fund is large and nearly equal to its liabilities, the investment return earned or lost matters a great deal. This is the classic pension fund dilemma. A well-funded system has lower contributions but much more volatile contribution rates. Such volatility is hard to accept in the public sector. A poorly funded plan will have much higher contribution rates, but the rates may be relatively stable. Most public employee retirement systems have been around for decades and are fairly well funded. Diabolically, the reward for their funding discipline is volatile contribution rates!

A high funded ratio means a high level of assets relative to liabilities and results in volatile but low contribution rates. A low funded ratio means a low level of assets relative to liabilities and results in high but relatively stable contribution rates. Comparing funded ratios among retirement systems and drawing sound conclusions from the comparison is difficult since each system has a different history and uses different assumptions. The comparison is further distorted by differ-

ences in asset valuation methods among the plans being compared.

Over time, the funded ratio of a retirement system should generally be increasing. Benefit increases, assumption changes and adverse plan experience act to lower the funded ratio. These decreases can have a magnified effect on results when the asset pool is large. The funded ratio goal in a retirement system should always be to eventually achieve a 100% funded level. In recent times there has been pressure to use a lower funding target. The result of using a lower target is higher contribution rates for future generations and an increased risk of eventual fund insolvency.

Asset losses, particularly at recent levels, can produce remarkable changes in unfunded liabilities, contribution rates and funded ratios. While the funded ratio can be used to assess the health of a retirement system, the direction of the funded ratio over time is more important than the absolute level. If the funded ratio is falling, a strategy for turning it around should be developed. For some plan sponsors, the strategy has included issuing pension obligation bonds or changing the investment mix pursuant to an asset liability study.

Asset Liability Studies

Asset liability studies model the benefit cash flows of a retirement system together with appropriate asset streams in an effort to maximize the investment return of the system. As a result of such a study, the asset mix of the retirement fund portfolio may be changed. Such changes may include higher equity exposure as well as various alternate strategies including venture capital and hedge funds.

The frequency of these studies and the use of alternative forms of investment has increased. Table 2⁴ shows survey results for select years and illustrates this point.

Hedge Funds

Hedge funds are private investment part-

Table 2

**PERCENTAGE OF PERS ASSETS DEDICATED
TO CASH AND ALTERNATIVE INVESTMENTS**

| <u>Source</u> | <u>Year</u> | <u>Average % Invested</u> |
|---------------|-------------|---------------------------|
| PPCC | 1991 | 3.8% |
| PPCC | 1992 | 4.1 |
| PPCC | 1994 | 3.7 |
| PPCC | 1996 | 3.0 |
| PPCC | 1998 | 3.6 |
| PPCC | 2000 | 4.8 |
| PFS | 2002 | 6.3 |

nerships that allow the fund to take long and short positions, and use leverage and derivatives in many markets. Since these funds are not limited to buying and selling securities, they can profit potentially in any market environment.

The objective of a hedge fund is to profit in both up and down markets. This is accomplished by using techniques to offset particular sources of risk. Like mutual funds, hedge funds pool money from investors and invest these funds in financial instruments to make a profit. Unlike mutual funds, hedge funds are not registered with the Securities and Exchange Commission. Hedge funds are subject to very few regulatory controls.

Public employee retirement systems in Massachusetts, California, Virginia and Louisiana have recently moved some of their assets into hedge funds. Systems in other states including Alabama and Washington have chosen not to make such investments. The hedge fund strategy involves both investment and political risks for public employee retirement systems.

When hedge funds are considered by a retirement system they should be measured against the system's internal and external guidelines. A sensible technique would include a review of a prospective hedge fund's investments and an evaluation of whether the system could make such investments directly and comply with existing system policies.

Pension Obligation Bonds (POBs)

POBs are bonds issued by a pension plan sponsor (a governmental entity) and are typically backed by tax revenues. The issuer borrows money at an attractive interest rate and invests the proceeds through the pension fund. This transaction reduces or eliminates unfunded system liabilities (and sometimes part of the normal cost) while creating a debt owed by the issuing plan sponsor.

POB proceeds are deposited into the pension fund in lieu of employer contributions. The bond debt is paid off at a later date. The pension plan must then invest a large sum of money at a single point in time. This differs from the common situation of investing periodic contributions and using dollar cost averaging. While POB proceeds often create a contribution holiday for the plan sponsor, they may create a simultaneous investment challenge. To the extent that periodic employer contributions are first allocated to pension payments, these contributions provide a measure of asset liquidity. With POB issuance this stream of income may stop for a while, and other sources of asset liquidity will be needed to make pension payments. POBs are best suited to plans with low asset liquidity needs.

POB issuance is a type of risk arbitrage since the bonds are sold and the proceeds are invested in riskier (potentially higher

yielding) investments. The plan sponsor profits if the pension fund return on the investment exceeds the total cost of borrowing during the period the bond is outstanding. This cost of borrowing includes the taxes that must be paid by the issuer. Ultimately, no liability is actually extinguished. Instead, a footnote on the plan sponsor's balance sheet is replaced with actual debt.

During 1993-2003, state and local governments raised more than \$33 billion through POBs (see Figure 4⁵). During 1997, \$3.8 billion in POB debt was issued. During 2003, over \$15 billion in POBs was issued with a single state accounting for \$10 billion of the total.

Issuing a POB is a financial investment and involves investment and other risk. While the plan sponsor bears the political risk of POB issuance, the retirement system bears the potential political risk associated with hedge fund investing.

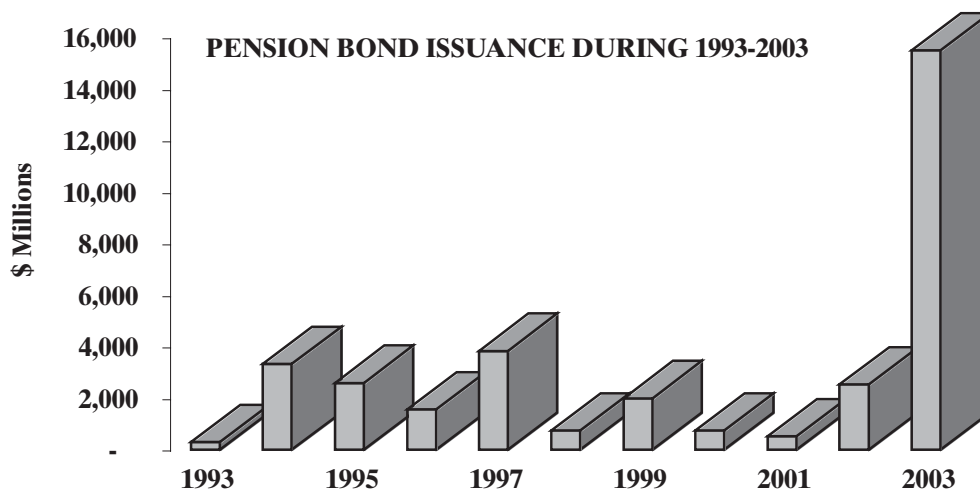
Conclusion

Public employee retirement systems have been around for decades and have weathered many storms. Plan sponsors, plan mem-

bers and taxpayers enjoyed the economic prosperity of the last decade. For some, there was an expectation that this prosperity would continue into the millennium. Many plans were unprepared for the rapid reversal of fortune. While some plan sponsors have developed strategies to strengthen the position of their retirement systems, others are simply overwhelmed. In light of the current situation, one might wonder, when should we start to worry? The following seven indicators should tell you that the time to worry has arrived:

1. Are the plan's economic assumptions materially more aggressive than average?
2. Do people deny that there is a problem?
3. Is the plan sponsor "solving for the actuary?"
4. Ask what the contribution rate would be if assets were evaluated at market value.
5. Ask for an actuarial projection of the funded ratio and the contribution rates, under reasonable projection assumptions. Do the projected contribution rates look unaffordable?

Figure 4



6. Is the plan sponsor a viable economic entity?
7. If the investment markets do not start producing some consistent real returns fairly soon, *everyone* should worry.

Endnotes

1. Gabriel, Roeder, Smith and Company, Open Retirement System Funding Graph.
2. Survey of NASRA Members' Recent and Anticipated Changes to Inflation and Investment

Return and Actuarial Assumptions, conducted May 2003.

3. Gabriel, Roeder, Smith and Company study of a large multiple employer governmental retirement system.

4. The Public Pension Coordinating Council (PPCC) surveys over various years during the period June 1994 through March 2002. The 2003 Public Fund Survey (PFS).

5. Brown Brothers Harriman & Company, *Fixed Income Management Research*, November 2003.

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