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## **SENSITIVITY OF REQUIRED CONTRIBUTIONS TO INVESTMENT PERFORMANCE**

Each retirement system is affected to a different degree by positive or negative investment performance. The system's funded status, funding method, demographic composition, and benefit structure are all factors that determine how sensitive a fund is to investment gains or losses. The interrelationship between these factors is complex but certain aspects of the relationship between assets and liabilities can give some insight into the funding process.

In general, the better funded a system is the more sensitive it is to investment gains and losses. For statewide public funds in Louisiana, investment gains or losses are either part of the system's normal cost or they are amortized over a fifteen-year period; in either case, actuarial costs for a given year are increased or decreased by approximately 9% to 12% of the gain or loss in the year following that in which the gain or loss is experienced. For example, an invest-

ment loss of \$10,000,000 (after actuarial smoothing) in one year would produce an increase in the actuarially required contribution of approximately \$900,000 to \$1,200,000 in the year following such a loss.

Plans with high benefit levels must accumulate greater assets to pay benefits. In addition, well-funded plans accumulate greater assets than poorly funded plans. As a result these types of plans have a greater sensitivity to asset gains or losses. That is to say, a fund with \$20 million in assets would produce gains or losses equal to twice the amount of a fund with \$10 million given the same rate of return. The exact sensitivity to gains and losses for any particular fund can be calculated by the actuary. This information can be helpful in determining asset strategy since it allows the board to translate investment risk into the tangible impact it has upon the employers' contribution rate.

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## **SAME BENEFITS - DIFFERENT COSTS**

Requests for benefit increases are frequently generated by comparisons of benefits to those of other plans. The expectation is that if a given benefit has a certain cost or is affordable for one group, it should have a similar cost if installed in another plan. However, an identical benefit structure can

have a significantly different cost if it is applied to a different group. Factors such as age and service distribution, ratio of males to females, and rates of termination and retirement at various ages can produce very different costs for identical benefits. Many other factors

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such as rates of return on invested assets as well as employment practices related to promotions and pay increases can also have an impact on pension costs.

In order to demonstrate the effect that demographic differences can have on costs, we developed the cost structure for a prototype pension plan with benefits and a population rather typical for public employee groups. We set retirement eligibility in this prototype plan at thirty years regardless of age, at age fifty-five with twenty-five years of service, or at age sixty with ten years of service. The plan was set up to have an accrual

rate of 3% and an employee contribution rate of 8%. We then calculated the employer cost of the plan based on a model population. Under these conditions we determined the employer cost to be 12.94% of payroll. We then calculated the cost of identical benefits for a group which had rates of withdrawal 25% lower and retirement rates 25% higher than the first group. We also set the salary increase rate 1% greater than the first group. For this group we determined the employer cost to be 16.67% of payroll.

Thus two different groups with an identical benefit structure but with different employee characteristics

show cost differences of 3.73% of payroll. These results do not include any number of other variables which could also affect the costs. As stated above, these additional variables include differences in funded status, age and sex composition of the populations, and average amounts of creditable service.

As the above example demonstrates, all benefit cost estimates should be based on the particular population to which they are to be applied since transporting a benefit structure from one plan to another can produce unexpected results.

## THE IMPORTANCE OF ACCURATE DATA

Whether you are the actuary working on the annual valuation, a benefits analyst calculating someone's retirement benefit, or a member of the system's staff answering a member's question on the phone your final answer will only be as good as the data you are working with.

Unfortunately, there are times when data is either incomplete or inaccurate. Some of the more common data problems encountered are:

- Unreported salary and contributions
- Incomplete service histories
- Missing dates of birth
- Missing beneficiary information
- Records that do not properly

reflect the status of the member.

- Disappearing member records

If not detected and corrected, these data problems can lead to miscalculations of future liabilities on annual valuations, members receiving incorrect benefits at retirement, loss of time spent correcting errors, and members receiving bad advice when making decisions about their retirement plans.

Data problems are caused by such things as data input errors, programming errors, and poor computer system design. There is no way to eliminate all data problems. However, there are some things a retirement system can and should do to prevent some of

the more common errors from happening and to detect errors as early as possible:

- Computer programs can be designed in such a way that erroneous or nonsensical data will not be accepted by the program (e.g., the program would not accept May 35, 0000 as a date of birth or date of entry).
- Reports can be generated that look for missing information (e.g., dates of birth, sex codes, contributions for a given reporting period). These reports can be run on a monthly or quarterly basis so that errors can be detected and corrected in a timely fashion.

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- A retirement system can take steps to ensure that members of their staff are properly trained on the use of all computer programs. Such training should include understanding the ultimate uses of the data being entered.
- Maintain and update computer programs to ensure that they are both user friendly and address all current plan provisions.
- Customize software to directly handle new forms of benefit, such as DROP benefits or Back-DROP benefits rather than simply extending current programming to try to handle such a specialized case.
- Work with employers to ensure that they submit all member information to the retire-

ment system in a timely fashion.

Database maintenance takes time, effort, money and thought, but is essential to providing the best possible service to members of the retirement system and it has a direct impact on the quality and timing of the actuarial valuation.

## CHANGE THE VALUATION INTEREST RATE?

Recent market performance has affected virtually every pension fund in the United States. Market returns on diversified pension portfolios have been below assumed rates of return for the last two years. This shortfall in earnings has produced increasing funding requirements as the investment experience losses increase. Hence, depending upon the funding method, either the system's normal cost or unfunded actuarial liability increases. These cost increases are problematic, but a larger issue may need to be addressed. Does the long-term rate of return assumption still make sense?

Valuation interest rates for most public retirement systems are in the range of 7½% to 8½%. If current market conditions are merely temporary fluctuations in performance, addressing the earnings shortfall need not involve a reassessment of the long-term anticipated rate of return. If, however, the economic and market environments are such that a fund can no longer expect to earn the assumed rate of return over a long-term

time horizon, the valuation interest rate will have to be reduced.

A reduction of the valuation interest rate produces a range of effects on the fund, the members, and the employing entity. Most importantly, any reduction in the valuation interest rate will result in an immediate increase in the employer contribution rate for the fund. The magnitude of the increase will depend on the benefit levels, funded status, and demographic characteristics of the retirement system. Even a reduction of 1% in the assumed rate of return can produce cost increases which are substantial. A recent estimate of costs among a sample of current clients produced employer contribution rate increases ranging between 4½% to 9½% of payroll when the valuation interest rate was reduced from 8% to 7% without adjustment to other assumptions. Typically, any such reduction in the valuation interest rate would only be made after reevaluating all the other actuarial assumptions. Collateral changes in other assumptions, such as the assumed rate of

salary growth, might moderate the contribution rate increase produced by reducing the valuation interest rate. However, even considering such other changes in assumptions, reductions in the assumed rate of return on assets will generally increase the required contribution to the fund.

### Distribution of Plans by Actuarial Assumption for Investment Return:

FY 2000

< 7.0%	-	3%
7.0% to 7.9%	-	23%
8.0% to 8.9%	-	65%
> 9.0%	-	2%

Average Actuarial Assumption for Investment Return was 7.91% across all survey participants

Source: 2001 Survey of State and Local Government Employee Retirement Systems - Survey Report (March 2002 - by Jennifer D. Harris of the Public Retirement Institute)

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### One Actuary's Prospective



Certainly the most significant issue currently facing defined benefit pension plans is the sub-par performance of investment markets. Both good and bad investment performance is “smoothed” as part of the process to determine actuarially required contributions. However, this technique is designed to reduce the volatility of contribu-

tions, not the level of contributions. Hence, prolonged bear markets increase contributions because of the need to replace assets “lost” in the market. In times such as these, there is always the search for processes and procedures to avoid contribution increases. Inquiries are made as to what adjustments to actuarial assumptions and methodology may relieve the employer of the burden of additional contributions. Unfortunately, actuarial methodology cannot substitute for funding. Actuarial funding is designed to determine a level of funding necessary to provide for the plan’s benefits. That level of

funding can change when economic or other factors affect the assets or liabilities of the plan. However, benefits must be paid with cash, and there are only two sources for this indispensable ingredient—investment returns or contributions. If benefits are to be paid and investments will not provide the resources, the fund must look to contribution increases to fill the void. The alternative is to risk fund insolvency.

Gary Curran, A.S.A