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# Lessons from Well-Funded Public Pensions: An Analysis of Six Plans that Weathered the Financial Storm

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## EXECUTIVE SUMMARY

Defined benefit (DB) pension plans provide American employees in the public and private sectors with secure, regular retirement income following a lifetime of work. In the public sector, although the average monthly benefit is somewhat modest, these benefits go a long way in ensuring the financial security of nearly 27 million Americans.<sup>1</sup> For governmental employers, traditional pensions remain an attractive recruitment and retention tool,<sup>2</sup> particularly given that public sector workers typically receive lower wages than their private sector counterparts.<sup>3</sup> For taxpayers, the pooled nature of DB plans make them a cost-effective way to provide retirement benefits—nearly half the cost of defined contribution (DC) accounts.<sup>4</sup>

The financial crisis of 2008–2009 presented financial challenges to investors, including state and local pension plans. Because public pensions are invested in equity markets, like most investors, their assets fell because of the unprecedented stock market crash. In addition, the entire decade saw historically low returns in the equity markets. This led to a short-term drop in plans' funded ratios, and an increase in plans' unfunded pension liabilities and costs.

While the financial crisis lowered the funded levels of most public pension plans, several plans were nonetheless able to maintain a well-funded status. Alternatively, a number of plans were not well-funded going into the financial crisis, which only served to further deteriorate their funded status.

In this study, we analyze six well-funded public pension plans to learn what practices in terms of pension funding policy, benefit design, and economic assumptions have resulted in a better financial condition for these plans. This serves to provide a platform for further discussion on pension benefit reform in the public sector.

While each of these plans experienced less than expected investment gains over the 10-year study period beginning in 2000, each remained well-funded despite two economic downturns. This suggests that the funding policies they

used are strong, and worthy of examination by other public pension systems. Through this analysis, we have identified the following features of plan design and process that helped these six plans remain affordable and sustainable over the long term, and can inform the debates on public pension reform:

1. Employer pension contributions that pay the full amount of the annual required contribution (ARC), and that maintain stability in the contribution rate over time, that is, at least equal the normal cost;
2. Employee contributions to help share in the cost of the plan;
3. Benefit improvements such as multiplier increases that are actuarially valued before adoption, and properly funded upon adoption;
4. Cost of living adjustments (COLAs) that are granted responsibly, for example through an ad hoc COLA that is amortized quickly, or an automatic COLA that is capped at a modest level;
5. Anti-spiking measures that ensure actuarial integrity and transparency in pension benefit determination;
6. Economic actuarial assumptions, including both the discount rate and inflation rate, that can reasonably be expected to be achieved over the long term.

## INTRODUCTION

The financial crisis of 2008 and 2009 brought about one of the sharpest declines in stock market value worldwide, resulting in a substantial drop in the value of investment assets held by investors, including public pension plans. This in turn caused a short-term drop in public pension plans' funded ratios and an increase in unfunded pension liabilities. As of the end of fiscal year 2009, public pension plans were in aggregate 80% funded, meaning that they had enough assets on hand to pay 80% of all current and future pension liabilities,<sup>5</sup> a funding level that most retirement experts consider adequate in the public sector.<sup>6</sup>

In the wake of the financial crisis, however, media attention on public pensions has increased significantly. The reporting often focuses on the plan's current funded status and on systems that were not well-funded before the crisis. The reporting also focuses on a handful of public employees retiring with pensions that are significantly higher than average. This negative attention has led to calls for public pension reform, ranging from modest reforms, such as curbing pension spiking, to quite drastic measures, such as replacing the traditional defined benefit (DB) plan with defined contribution (DC) accounts.

In the current discussion on unfunded liabilities and pension reform, what is often missing is an understanding of the considerable variation in the financial health of public pension plans. While it is true that some state and local pension plans are not well-funded, and a few are severely underfunded, there

are still many public pension plans that are consistently well-funded, even in the wake of the Great Recession. The existence of such well-funded pension plans illustrates that public pensions can be designed to be affordable and sustainable, even through one of the most substantial economic downturns. This research is aimed at finding the practices utilized by these well-funded plans—in terms of funding policy, benefit design, and economic assumptions—that resulted in their better financial condition.

Now is a particularly good time to do this research. Since 2000, the financial market experienced significant volatility, resulting in minimal investment returns over a 10-year period. As these pension plans remained well-funded despite these minimal investment gains, certain measures they have practiced may provide guidance for public pension reforms going forward.

Only state-level plans were considered for selection for this study. The primary reason is that surveys of state level pension plans are available (such as the NASRA/NCTR Public Fund Survey<sup>7</sup> and that of the Wisconsin Legislative Council), making it easier to find appropriate plans for study. There is currently no comprehensive survey of local pension plans, most likely due to the large number and small size of many local pension plans.<sup>8</sup>

Six pension plans were selected for this study, listed here in alphabetical order:<sup>9</sup>

1. Delaware Public Employees Retirement Systems' State Employees Pension Plan (hereafter referred to as Delaware SEPP),
2. Idaho Public Employee Retirement Systems' Public Employee Retirement Fund Base Plan (hereafter referred to as Idaho PERF),
3. Illinois Municipal Retirement Fund (hereafter referred to as Illinois MRF),<sup>10</sup>
4. New York State Teachers' Retirement System (hereafter referred to as New York STRS),
5. North Carolina's Teachers and State Employees' Retirement System (hereafter referred to as North Carolina), and
6. Teacher Retirement System of Texas (hereafter referred to as Texas TRS).<sup>11</sup>

(The Technical Appendix provides a brief discussion of each of these pension plans, the criteria used in selecting these plans, as well as detailed descriptions of these plans' funding policies, benefit designs, and economic assumptions.)

These six plans represent a fairly diverse group of pension plans, in terms of size, which ranges from very large to relatively small, and of the employees they represent, from state employees only, to state and local employees, teachers only, and local employees only. They are also located in states that are traditionally considered both conservative (such as Idaho) and liberal (such as New York) in terms of their approach towards government finance. At the end of 2010, the total market value of assets held in state and local pension funds was \$2.93 trillion.<sup>12</sup> The market value of assets held in these six plans at about the same time was approximately \$300 billion, or about 10% of total public pension assets.<sup>13</sup> The six plans cover about 2.7 million active and inactive members and retired beneficiaries in 2009; these plans accounted for about 10% of the 26.8 million members and retirees covered by all state and local pension plans in 2008, the latest year for which such data are available from the Census Bureau. See Table 1.



Figure 1 shows the overall funded ratio of these six plans over the ten-year period. Five of the six plans, using the actuarial value of assets<sup>14</sup> (AVA) in arriving at the funded ratio, had a funded ratio over 80% from 2000 to 2009. The exception is Idaho PERF, which uses only the market value of assets (MVA) in arriving at the funded ratio. As all other five pension plans' AVA was higher than their MVA in June 2009, Idaho PERF's funded ratio would most likely surpass 80% if it used an AVA. For all plans, the funded ratio based on MVA was above 70% throughout 2000 to 2009, with the exception of Texas TRS, which was just slightly below that threshold in 2009.

Since a pension plan's funded ratio is based on its pension liabilities and pension assets, this study focuses both on plan asset management and liability management practices. Pension liability levels are determined in part by the benefit design, and the level of pension assets is determined by pension contributions (which in turn are determined by funding policy) and investment returns. In this study, we examine these six plans' management of assets in terms of funding policy, benefit design, and economic assumptions. For each topic, we tease out common elements and draw lessons learned.

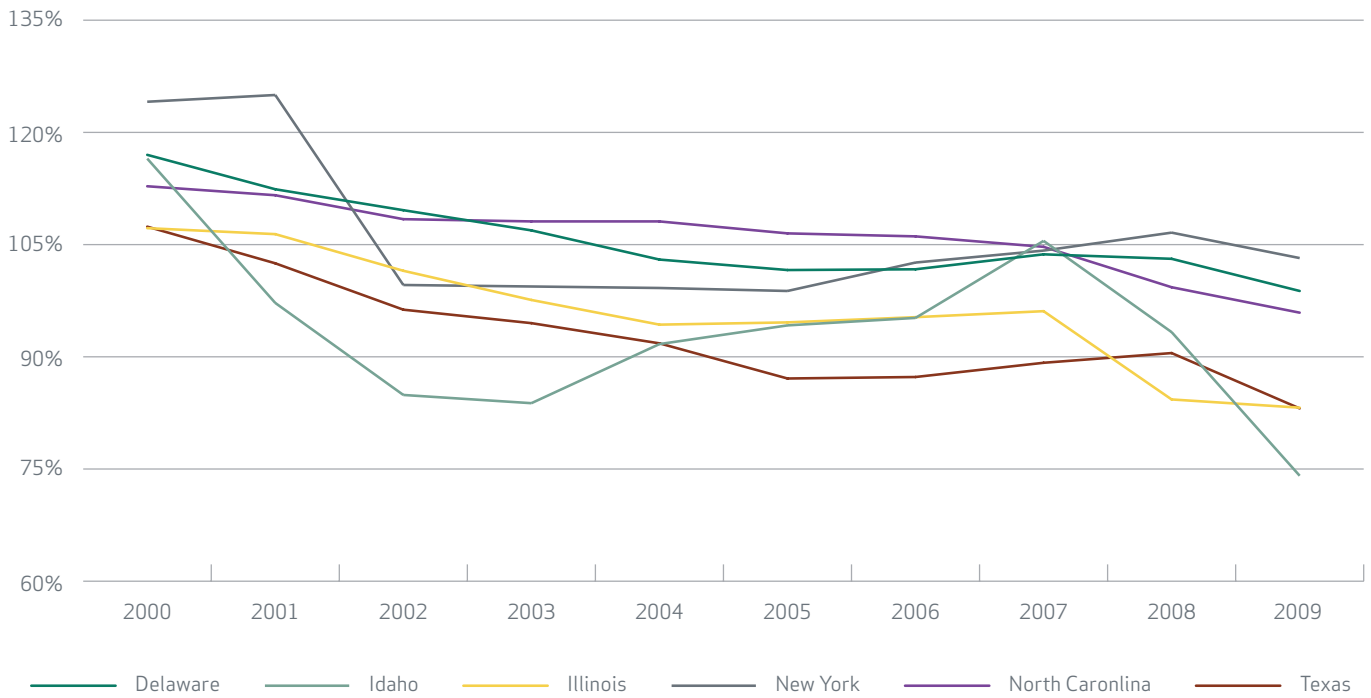
**Table 1. Snapshot of Six Study Pension Systems (as of 2009)**

	Delaware SEPP	Idaho PERF	Illinois MRF	New York STRS	North Carolina	Texas TRS
Total No. of Members	58,000	123,000	275,000	419,000	578,000	1,300,000
Total Assets under Management	\$5.8 billion	\$8.7 billion	\$22.3 billion	\$72.4 billion	\$50.4 billion	\$88.7 billion
Benefit Formula	2% for years prior to 1997 and 1.85% after that	1.67%: up to 9/30/92; 1.75%: 10/1/92 - 9/30/93; 1.83%: 10/1/93 - 9/30/94; 1.92%: 10/1/94 - 6/30/00; 2%: after 7/1/00	1.67% of FAS for the first 15 years and 2% after	Tier 4 ('83-'10) 1.67% for less than 20 years; 2% for first 30 years and 1.5% for years after;  Tier 5: after 2010: 1.67% for less than 25 years; 2% for first 30 years and 1.5% for years after	1.82%	2.3%
Employee Contribution Rate	3% of salary over \$6,000	60% of employer rate	4.5%	Tier 4: 3% for the first 10 years;  Tier 5: 3.5%	6%	6.4%
Employer Contribution Rate	5.50%	10.44%	9.27%	7.63%	3.36%*	6.58%
Social Security Coverage	Yes	Yes	Yes	Yes	Yes	No
Replacement Rate**	55.5%	60%	55%	60%	54.6%	69%

\*North Carolina's employer contribution rate will be 7.44% as of July 1, 2011.

\*\*Replacement rate includes just the DB pension benefit, and not any Social Security benefits. It is for someone hired now and retires after 30 years of service.

Figure 1: Actuarial Funded Level of Six Study Plans, 1999-2009



## PENSION FUNDING POLICY

Pension benefits are funded through contributions and investment income over the working career of employees. In most public pension plans, contributions come from both employers and employees. (This is in contrast to private-sector pension plans, where contributions are almost always made solely by the employer.) As an employee's contribution rate is typically fixed, a pension plan's funding policy usually refers to how the employer's annual contribution rate is determined.

### Employer contributions

An actuarially determined employer contribution rate consists of two parts, the normal cost and the amortization cost. The normal cost is the portion of the present value of benefits that is attributable to the current year under the actuarial cost method. The amortization cost is the current year's portion of the unfunded accrued actuarial liability (UAAL),<sup>15</sup> amortized over a certain period of time. In other words, if the pension plan is fully funded with no unfunded liability, then the employee and employer contribution rates equal the total normal cost for that year. Since the employee contribution rate is typically fixed, the normal cost rate is associated with the employer contribution rate. If the pension plan has an unfunded liability, then the employer's normal cost plus amortization cost constitute the employer's annual required contribution (ARC) for that year.

Under Governmental Accounting Standards Board's (GASB) Statement 25, for financial reporting purposes, the maximum time period allowed to amortize an unfunded actuarial accrued pension liability is 30 years,<sup>16</sup> either open or closed.<sup>17</sup> GASB is currently considering adopting an amortization period of the "future working lifetime" of active members, which for most plans will mean somewhere between 10 and 15 years. For the purposes of funding, however, the pension system or its sponsor (i.e., state and local governments) can set an amortization period that is

different from GASB's requirement. Some systems choose to use a shorter amortization period than 30 years, either as a Board policy or mandated by state statute, in order to pay off the UAAL more quickly. (North Carolina, for example, uses an amortization period of just nine years.) The shorter the amortization period, the greater the annual amortization cost, and the sooner the unfunded liability will be paid off. The employer's actuarially determined contribution is calculated by subtracting employee contributions from total contributions.

If the employer contributes its full actuarially determined contribution each year, the pension plan will make progress toward full-funding (assuming it is not already fully funded). If contributions are less than the full actuarially determined contribution, the unfunded liability of the plan is likely to grow. If this occurs repeatedly, the problem is likely to worsen over time—the funded status of the plan will continue to deteriorate and each year the contribution rate will escalate. In other words, failure to pay the full annual required contribution each year only shifts costs into the future.

### Lessons

The most fundamental principle in ensuring a plan achieves a 100% funding ratio is ensuring that the plan sponsors pay the entire amount of the annual required contribution (ARC) each year, because anything short of a full ARC payment will have a negative impact on the plan's funding ratio in the long run.



Several policy options are available to ensure that employers consistently pay the entire amount of their actuarially determined contribution each year. One way, as practiced by Texas TRS, is mandating payment through the state constitution. Statutes can also be implemented that would require either the local municipalities to pay (as in Illinois MRF) or the state to pay (as in Idaho PERF). Having strong legislation essentially takes the contribution requirement out of the budget appropriation process and thus out of the political process. This, however, generally only works with local governments that contribute to a state-level pension plan; it can be much more difficult to apply to the state government in a state-level pension plan. The difficulty arises because the state legislature can rewrite the law at any time to decrease the pension contribution. This can be avoided by writing the pension contribution into the state's constitution.

While meeting the actuarially determined contribution is of paramount importance, government funding policy may also emphasize a second goal of stability and predictability. Pension contributions tend to be pro-cyclical—burdens are lowest when the economy is at a cyclical peak, and burdens are greatest at the economy's nadir. If contribution rates are determined using a process that quickly and directly transmits the ups and downs of the stock market into decreases and increases in contribution requirements, they become volatile and unpredictable, which can introduce substantial volatility into government budgets.

Policies can be put in place to ensure that the contribution rate remains more stable over a long period of time. When a plan becomes overfunded due to a large pension surplus, the required contribution rate is reduced. Eventually, when the pension surplus disappears, the required contribution rate rises. Policies and legislation can be put in place to make sure that the contribution rate will remain adequate and stable in the future. The pension plans in this study have demonstrated several ways of meeting this goal.

One method, used by Idaho PERF, requires that the employer contribution rate can never be lower than the normal cost rate. As the normal cost rate tends to remain fairly stable over a long period of time, this promotes long-term stability in the employer contribution rate. It also makes sure that when the pension plan is overfunded, no surplus is amortized to reduce the normal cost rate. This is done in recognition that

any surplus due to greater than expected investment gain is temporary and will eventually even out.

A slight variation of this method is the policy of Illinois MRF: only when the funding ratio is substantially above 100%, say 120%, can the overfunded amount above the 120% be used to reduce the normal cost rate. An advantage of this type of policy is that it prevents benefits from being improved without a complementary increase in contributions. If an increase in benefits increases the normal cost, this policy automatically requires the plan sponsors to begin paying these additional costs within the first year.

Another method, practiced by Texas TRS, is to set into law a requirement that the employer contribution rate cannot fall below a certain level. This way, when the pension is overfunded and the ARC falls below this set rate, the additional contributions are paid nonetheless. Then, if the plan becomes underfunded and the employer has difficulty meeting the increased contributions, those additional contributions that were previously made help to ensure that the employer can at least pay this minimum amount.

A third method, used by New York STRS, delays the recognition of as much of the unexpected investment gains as possible into the next four years, so that the contribution rate will not decline as much, and there is more surplus left over to offset any potential deficit in the future.

## Employee contributions

The employee contribution is typically set by state statute and does not change, unlike the employer contribution rate. The five states in this study excluding Idaho PERF follow this practice; over the study period, the employee contribution rate did not change. (See Table 1.) All plans differ, however, on the employee contribution level. Texas TRS has the highest contribution rate, which is not surprising, as its benefit multiplier is the highest of the six. (Texas TRS is also the only plan in this study that does not participate in Social Security, which explains its higher benefit multiplier.)<sup>18</sup> North Carolina's employee contribution rate is twice that of Delaware SEPP's, even though their benefit levels are comparable in terms of the multiplier. In Idaho PERF, the employee contribution rate is set at 60% of the employer rate, meaning that when the employer rate changes, the employee rate changes as well.

## Lessons

Because most employee contribution rates are fixed and typically account for less than half of the total annual pension contribution, any increase in pension contributions—due to investment underperformance or longevity increases, for example—is usually born by the employer. Moving forward through the Great Recession, many states are currently looking to increase employee contribution rates. As states consider such changes, they may look to structure the employee contribution rate so that any cost volatility is shared between employees and employers. The studied plans point to two ways that such a rate can be structured.

One is to implement an adjustable employee contribution rate. If the unfunded accrued liability grows, resulting in an increase in the overall contribution rate, then the employee contribution rate will increase along with the employer contribution. On the flip side, if the overall contribution decreases, then the employee will reap the benefit of a reduction in their contribution rate. Of the six plans in this study, Idaho PERF is the only one that has an adjustable employee contribution rate, although there are plans in other states outside this study group that have an adjustable rate, such as plans in Arizona and Iowa. A similar adjustable mechanism (called an “automatic contribution

stabilizer”) was recently passed in Minnesota as well, but has yet to be implemented; the law is designed to increase employer and employee contribution rates evenly, if needed.

However, an adjustable employee contribution rate will bring more uncertainty to employees’ take-home salary every year. Another method that would mitigate such uncertainty, while still allowing employees to share in the cost volatility, would be to have a relatively fixed employee rate that pays for a specific portion of the long-term expected pension cost—for example, half. This fixed rate includes two components: a set portion of the normal cost, plus an additional rate for potential cost volatility that can lead to an increase in the unfunded accrued liability. (In a sense, this is very similar to how Idaho PERF arrives at its total contribution rate, which is equal to the normal cost rate plus an additional rate for investment return volatility.) Even if this fixed rate will not change from year to year, it can still be subject to change if the underlying normal cost rate changes in the case of a benefit enhancement. For Texas TRS and North Carolina, the fixed employee contribution rate is fairly similar to the employer normal cost rate, and the Illinois MRF employer normal cost rate of 4.67% for the new tier of pension benefits is also similar to the employee contribution rate of 4.5%.

The main goal in benefit design is generally to provide an adequate pension benefit that will maintain one's living standard in retirement when all sources of retirement income are included. Benefit adequacy is commonly measured by the "replacement ratio," which is defined as the percentage of pre-retirement income replaced by all forms of post-retirement income.<sup>19</sup> Generally, there are three main sources of income in retirement: Social Security benefits, personal savings (including DC plans), and employer-provided pension benefits. Many experts believe a replacement ratio of between 77% to 90%, depending upon household income, to be adequate.<sup>20</sup> A public sector pension benefit, in combination with additional personal savings and Social Security,<sup>21</sup> would preferably satisfy this replacement ratio.

Also, employers' needs and priorities may evolve over time, along with changes in the overall labor market, increased longevity, and other factors. As a result, employers may find that periodically updating benefit design is consistent with achieving their human resource management objectives and/or budgetary constraints. But for such changes to be consistent with the long-term health of the pension system, the cost (or savings) associated with such changes must be integrated with the plan's funding policy. The Government Finance Officers Association, for example, recommends that all benefit enhancements be actuarially valued before they are adopted in order to ensure that stakeholders have a complete understanding of their long-term financial impacts.<sup>22</sup> In addition, it is prudent for benefit improvements such as multiplier increases to be properly funded upon adoption, so as to avoid creating large unfunded liabilities.

Beyond the pension multiplier and any benefit increases, two design issues can substantially affect benefit levels. First, cost of living adjustments (COLAs) are critical in ensuring the long-term adequacy of pension benefit. Second, the practice of pension spiking can undermine the transparency and fairness of pension benefits. This section on pension benefit design addresses each of these factors in turn.

### COLAs

Even if a pension benefit seems adequate at the time of retirement, its value can erode over time without adjustments for inflation. Because of the damaging effects of inflation, most public retirement systems provide COLAs. Especially for the 30% of state and local employees who are not covered by the Social Security<sup>23</sup>—which provides CPI-indexed benefits to all covered Americans—having a COLA in the pension benefit is all the more important. Yet COLAs do cost money. The COLA can thus be designed to maintain balance between providing inflation protection to retirees and keeping the cost affordable.

One key design feature of a COLA is whether it is automatic or ad hoc in nature. An automatic COLA means the retiree's benefit increases automatically every year by certain percentage. An ad hoc COLA is granted at the discretion of the plan sponsor, usually when the fund is in a well-funded position and investment gains have exceeded expectation.

Another design element of the COLA is whether it is simple or compound. Under a simple COLA, the adjustment each year is calculated based on the employee's original benefit.

This is in contrast to a compounded COLA, which includes past benefit increases in each new COLA calculation.

### Lessons

All six plans in this study demonstrate various levels of restraint in keeping a balance between the two goals of adequacy in the value of the pension benefit and keeping the cost affordable. None of the six plans in this study has a particularly high automatic COLA. Delaware SEPP, North Carolina, and Texas TRS have ad hoc COLAs; Idaho PERF has a hybrid (a 1% guarantee and the rest up to CPI discretionary); New York STRS has an automatic compound COLA of half of CPI applied to the first \$18,000; and Illinois MRF currently has a simple 3% COLA. For new members first hired on or after January 1, 2011 the COLA is a simple 3% or half of CPI, whichever is less.

Based on these plans' experiences, a prudent COLA benefit can be structured in at least two ways. Ad hoc COLAs can be granted in a sensible and responsible manner—for example, the COLA is only granted when the pension plan is well-funded and the COLA will not increase the overall annual employer contribution rate in any significant way. Since an ad hoc COLA creates an immediate unfunded liability, it can be amortized quickly—as practiced by Delaware SEPP and North Carolina—rather than over the traditional 30-year period. Since the granting of an ad hoc COLA typically is based on the funded condition of the pension plan, amortizing it as quickly as possible will help to make sure that it is granted prudently, without adding to the long-term cost of the pension system.

**Table 2. Summary of COLA/Anti-Spiking Policies, Funding Policy, and Economic Assumptions of Six Study Plans**

	COLA and Anti-Spiking Policies	Funding policy	Economic assumptions
Delaware SEPP	Discretionary COLA; Anti-spiking	Amortization period not longer than 20 years; discretionary COLA amortized over 5 years	Rate of return of 8%; inflation of 3.75%; real rate of 4.25%
Idaho PERF	Discretionary COLA; Anti-spiking	Statute requires that employer contribution rate be no lower than the normal cost rate; amortization period is no longer than 25 years; employees share the increase in the contribution rate	Rate of return of 7.75% (7.25% net of fees); inflation of 4%; real rate of 3.25%
Illinois MRF	Simple COLA;* Anti-spiking	Meet the ARC; Board has the legal authority to collect contribution from local governments.	Rate of return of 7.5%; inflation of 4%; real rate of 3.5%
New York STRS	Very modest COLA; Anti-spiking	Amortization period equal to remaining career, which is roughly 14 years; conservative asset valuation to reduce volatility in the contribution rate.	Average rate of return of 8%; inflation of 3%; real rate of 5%
North Carolina	Discretionary COLA; Review of large pension benefits	Amortization period no longer than 9 years; discretionary COLA amortized over 9 years.	Rate of return of 7.25%; inflation of 3.75%; real rate of 3.5%
Texas TRS	Discretionary COLA; Anti-spiking	Amortization period no longer than 31 years; Constitutional requirement of 6% to 10% employer contribution rate; statutory requirement of 6.4% employee contribution rate.	Average rate of return of 8%; inflation of 3%; real rate of 5%

\*Under a simple COLA, the adjustment each year is calculated based on the employee's original benefit. This is in contrast to a compounded COLA, which includes past benefit increases in each new COLA calculation.

Automatic COLAs can be provided at a modest level, for example, half of CPI. Such a COLA gives retirees some certainty in the amount of benefit increase, while also keeping the cost affordable. It is prudent to prefund any automatic COLAs.

## "Pension Spiking"

A public pension benefit is generally a function of an employee's years of service, pay at the end of his/her career (also referred to as "final average salary," or FAS), and a fixed multiplier determined by the plan. "Pension spiking" refers to an increase in a pension benefit by substantially increasing the FAS beyond what is expected from normal salary increases. This can happen when the FAS includes unusually large overtime payments, unused sick leave or vacation time added to the FAS, or a larger-than-normal salary increase in the final years of employment. Although pension spiking is not all that common<sup>24</sup>—even just a few isolated cases can create the impression of widespread abuse.

To the extent it occurs, pension spiking can be harmful to the financial health of the pension plan, because the prefunding of pension benefits assumes certain levels of salary growth over the course of employees' working lives. An unusual increase in FAS above these assumptions will immediately create an

unfunded liability, which is detrimental to the pension plan and unfair to other plan participants as well as taxpayers.

One method to ensure against pension spiking is increasing the number of years over which salaries are averaged to arrive at the FAS, as well as not including overtime pay or unused sick or vacation pay. The greater the number of years, the more diluted the effect of a large one-time payment. While a three year FAS is fairly standard, some pension plans use more than three years (five years has become more common recently), and some have additional specific measures to counter spiking.

### Lessons

It is interesting that all pension plans in this study have put measures in place to prevent pension spiking. Based on the practices of these plans, beyond averaging the salaries over an appropriate number of years, spiking can be minimized in one of three ways. First, the FAS that determines the pension benefit cannot include a one-time payment at the time of termination. Second, the growth rate in total salary in the final year or two, including any overtime payments, cannot exceed a certain percentage, such as the average salary growth for the entire government, or a preset percentage (for example, 10%). Third, the FAS that is used to determine pension benefits can be capped. See the Technical Appendix for a detailed review of the six study plans' anti-spiking practices.

## ECONOMIC ASSUMPTIONS

Funding policies and investment policies are necessarily intertwined, because contributions are invested in financial markets, and the corresponding investment earnings help finance the benefits that will ultimately be paid. Accurately assessing expected returns is important, because if contribution rates are based on an interest rate that is either above or below the rate that is most likely to be earned on investments, in the future there is likely to be a mismatch between the size of the plan's assets and its liabilities.

In terms of asset allocation, most public pension plans maintain a balanced portfolio of equities (such as domestic and international stocks), corporate and Treasury bonds, alternative investments (such as hedge funds or real estate), and cash.<sup>25</sup> In doing so, plans are following the general tenets of modern portfolio theory, which holds that an investor can reduce risk and enhance return by diversifying assets across the entire portfolio, rather than focusing on the risk and return of any individual stock or asset.<sup>26</sup>

It should be noted that one major investment advantage inherent in public pension plans is a very long investment horizon. Because of this, funds can withstand short- to medium-term investment losses, and stick to an asset allocation strategy in a disciplined way through different phases of an investment cycle. This allows pensions to achieve an investment return that is better than individual investors can achieve on their own, on average, over the long term.<sup>27</sup> In addition, unlike an individual who ages and should adopt a more conservative investment strategy over time, pension funds do not age, and are able to take advantage of the enhanced investment returns that come from a balanced portfolio.<sup>28</sup>

In general, asset allocation for these six plans is in line with their rate of return assumptions, at least in terms of the allocation to fixed income securities. North Carolina has the most allocation to bonds (about 40%), and also has the lowest assumed rate of return, at 7.25%. Illinois MRF, with a 7.5%

return assumption, has a target of 29% for bonds and 1% for cash. The other plans, with an expected return at or close to 8%, typically allocate between 25 to 30% to fixed income and cash. The rest is divided between public equity (accounting for 50 to 70% for these six systems), real estate, and alternative investments (such as private equity funds and hedge funds). All systems invest the vast majority of their assets (80 to 90%) in publicly traded securities.<sup>29</sup>

On an annual basis, five of the plans' overall annual returns were fairly similar to each other. While some differences are certainly expected, the difference was not very large. The plan with returns consistently different from the others is North Carolina. Its return was not quite as high in years when equity markets was doing well, and not quite as low in years when equity markets did poorly. This is not surprising, as North Carolina has the most conservative asset allocation strategy. The difference is even smaller for the ten-year annualized return. As of June 30, 2008, the ten-year annualized return was in the 6% range for all five plans. By the end of 2010, all of these plans had already recouped a significant portion of the assets lost in 2008 and 2009. For example, by September 30, 2010, Texas TRS's net asset value stood at \$100.3 billion, an increase of \$11.7 billion from June 30, 2009; most of the plan's deferred losses from 2008 and 2009 have been eliminated.<sup>30</sup> By December 30, 2010, Idaho PERF's asset value stood at \$11.5 billion, an increase of \$2.9 billion from June 30, 2009.<sup>31</sup> Table 3 (next page) shows the annual and average ten-year returns for the six study plans.



Despite the difference in allocation between public equity and fixed income, the overall traditional asset allocation of the six systems allows them to achieve a fairly similar rate of return over a long stretch of time,<sup>32</sup> although plans with a larger allocation to fixed-income securities experienced less volatility over time. As shown in Table 3 and Figure 2, these plans have historically achieved relatively high rates of return, with five plans' average rate of return exceeding 9% during the last 25 year period.

Economic assumptions related to investments can affect the pension contribution levels, cost estimates of benefit elements (e.g., FAS), and proposed benefit improvements. While the design of the pension benefit will largely determine the future pension liability, economic assumptions will determine the present value of the future liability, and thus how much needs

to be set aside now. Two significant economic assumptions are the rate of return assumption, which is used as the discount rate, and the inflation rate assumption. The inflation rate assumption is a component of the individual salary increase assumption,<sup>33</sup> and is critical in determining the FAS and thus future pension liability. The inflation rate is also a component of the rate of return assumption, and the difference between the two is the real rate of return for the pension system. The smaller the real rate of return assumption, the more conservative the economic assumptions are, in general. If the inflation rate is held constant and the discount rate is lowered, the present value of the pension liability will increase and contribution rates will be higher. Pension liabilities and contribution rates will also increase if the rate of return is held constant and the inflation rate is increased.

**Table 3. Investment Returns of Six Study Plans (Fiscal Year Ending June 30\*)**

Year	Delaware SEPP	Idaho PERF	North Carolina	New York STRS	Texas TRS	Illinois MRF
2000	16.8%	13.2%	9.0%	6.9%	7.9%	1.9%
2001	-5.1%	-6.1%	-2.0%	-5.7%	-5.0%	-6.1%
2002	-6.3%	-7.1%	-4.0%	-6.8%	-6.4%	-8.7%
2003	3.4%	3.7%	7.6%	4.0%	4.7%	22.6%
2004	16.3%	18.1%	12.0%	16.1%	15.7%	12.4%
2005	10.0%	10.9%	9.9%	10.6%	9.5%	8.7%
2006	12.4%	12.3%	7.2%	11.8%	10.4%	13.9%
2007	15.9%	20.0%	14.8%	19.3%	17.5%	8.5%
2008	-1.3%	-4.2%	-2.1%	-6.4%	-2.1%	-24.8%
2009	-15.8%	-16.0%	-14.2%	-20.5%	-21.9%	24.5%
Ten-year average, 2008	6.1%	6.8%	6.1%	6.0%	6.1%	3.9%
Ten-year average, 2009	4.2%	3.8%	3.4%	2.2%	2.4%	4.2%
Twenty-five year average, 2009	9.3%**	9.2%	N/A***	9.8%	9.2%	9.4%

\*Illinois MRF's return numbers are quite different from those of the other five systems, primarily because its fiscal year ends on the last day of the calendar year, rather than June 30, making it difficult to compare to other funds. Although the pension systems of North Carolina and Texas TRS end their fiscal year on a date other than June 30, they also calculate the investment return as of June 30 of each fiscal year.

\*\*Average 20-year return.

\*\*\*Data from North Carolina is not available as the system only publishes its 10-year returns. Also, North Carolina has changed its asset allocation substantially over this period, making the return less comparable to the other systems.

Much media attention has focused on the discount rate assumption. Several voices have recently advocated for public plans to discount pension liabilities using a risk-free rate of return. However, rules set by the Governmental Accounting Standards Board (GASB), the body charged with setting accounting standards for public pension plans, do not support this position. Therefore, for the purposes of this paper, current GASB rules are considered the standard. Beyond following GASB rules, there may be other reasons that valuing pension liabilities at a risk-free rate would be inappropriate for public plans.<sup>34</sup>

Less focus has been given to the inflation rate and real rate of return assumptions. However, these assumptions can be quite significant, as two systems with the same discount rate can have very different real rate of return assumptions. A Wisconsin survey of 87 large pension funds in 2008 found

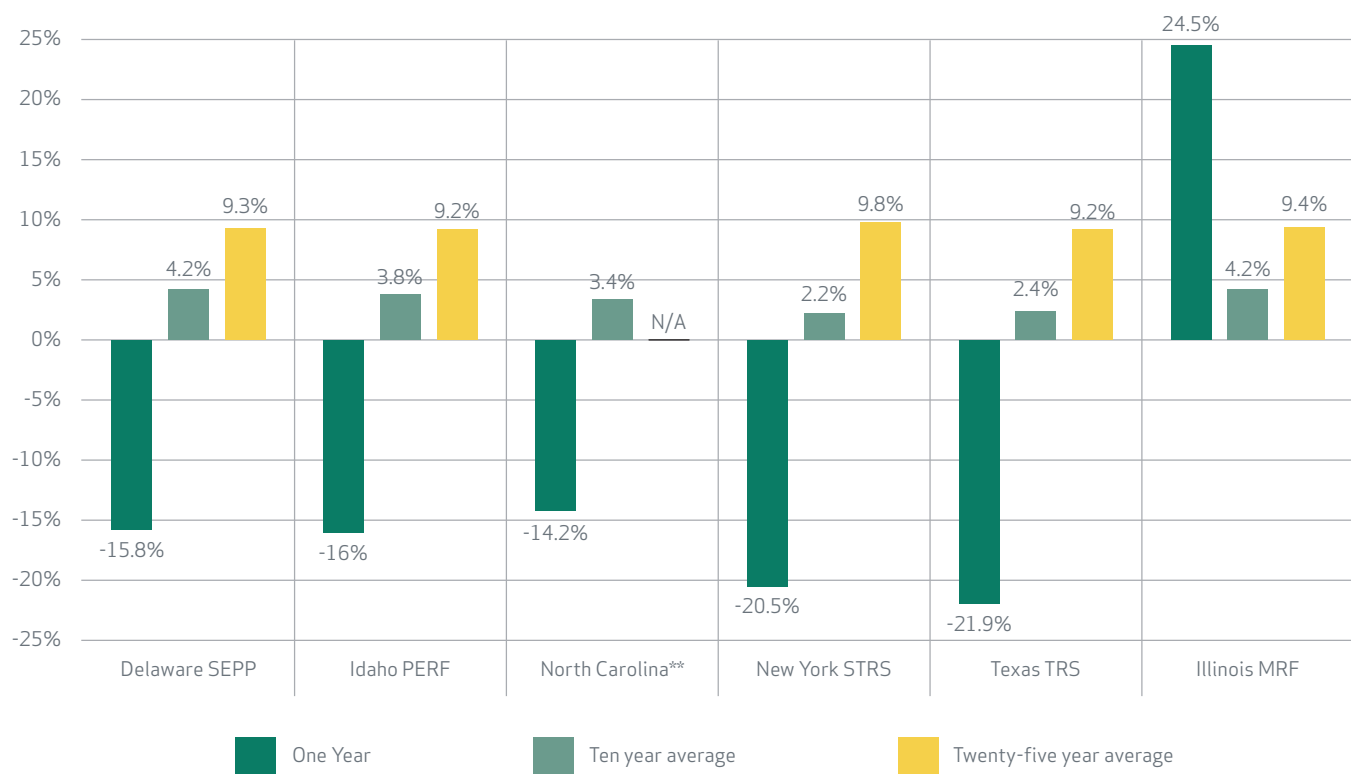
that the real return assumption varied from 3.25% to 5%.<sup>35</sup> Yet among plans with an assumed return of 8%, the real rate of return assumption can still vary from 3.5% to 5%.

### Lessons

Of the six plans in this study group, only New York STRS and Texas TRS use a discount rate of 8% and an inflation rate of 3%. The other four use either a lower discount rate, inflation rate, or both, resulting in a real return expectation close to or well below 4%.

When it comes to economic assumptions, we should not only look at the overall discount rate, but also look at the inflation rate and the real rate of return, which is the difference between these two. The experience of these six systems shows that it is important for these assumptions to be appropriate and achievable over the long term.

**Figure 2. One Year, Ten-Year Average, and Twenty-Five Year Average Returns for Six Plans (Fiscal Year Ending June 30\*)**



\* Illinois MRF's return numbers are quite different from those of the other five systems, primarily because its fiscal year ends on the last day of the calendar year, rather than June 30, making it difficult to compare to other funds.

\*\* Twenty-five year average data from North Carolina is not available as the system only publishes its 10-year returns. Also, North Carolina has changed its asset allocation substantially over this period, making the return less comparable to the other systems.

This research attempts to uncover common sense funding practices to ensure the long-term affordability and sustainability of public sector pension plans. State and local pension plans remain critically important to ensuring the financial security of millions of middle class Americans in retirement after a lifetime of work. For governmental employers, traditional pensions remain an attractive recruitment and retention tool, and the pooled nature of DB plans makes them a cost-effective way to provide retirement benefits. In addition, a large public pension fund can achieve strong investment performance over a very long period of time at a much lower overall cost as compared to a DC account.

Thus, a well-funded and well-managed pension plan continues to make sense for governmental employers. The research shows that no two systems are alike, and all six study systems have adopted different funding policies, benefit designs, and economic assumptions. Despite the differences, this analysis identifies similar practices in these policies that, taken together, increase the likelihood of maintaining a well-funded pension plan at an affordable cost.

This research finds that—despite the unpredictability of financial markets—the following features helped the six study plans remain affordable and sustainable over the long term:

- Employer pension contributions that pay the full amount of the annual required contribution (ARC), and that maintain stability in the contribution rate over time, that is, at least equal the normal cost;
- Employees contributions to help share in the cost of the plan;
- Benefit improvements such as multiplier increases that are

actuarially valued before adoption, and properly funded upon adoption;

- Cost of living adjustments (COLAs) that are granted responsibly;
- Anti-spiking measures that ensure actuarial integrity and transparency; and
- Economic assumptions that can reasonably be expected to be achieved over the long term.

DB pension plans have a track record of simultaneously meeting the goals of employers, employees, and taxpayers. While the Great Recession has presented some funding challenges to public pensions, when the economy recovers, government entities will have to compete for talent with private sector employers—who may be able to offer higher salaries, stock options, or profit sharing programs. Providing an adequate and affordable pension benefit is one way to help attract a quality workforce. This paper shows that even in the wake of the Great Recession, public pension plans can utilize common sense practices to ensure their long-term affordability and sustainability.

## TECHNICAL APPENDIX

### Pension Plan Section<sup>36</sup>

The selection of public pension plans for this study is based on the following six criteria.

1. **Funded ratio above 80% based on the actuarial value of assets as of the end of fiscal year (FY) 2009.** While a 100% funded ratio at any given time is certainly ideal for a pension plan, it is not absolutely necessary for a pension plan to have 100% funded ratio in order to be considered well-funded. As a matter of fact, a conventional standard of 80% is typically used as a threshold for an adequate funded ratio.<sup>37</sup> In this research, we also use 80% funded ratio as the criterion in determining whether a pension plan is well-funded. For most state plans, FY 2009 ended on June 30, 2009, only a few months after the stock market low, reached in March of that year.
2. **Funded ratio above 70% based on the market value of assets.** We also require that the funded ratio based on market value should be 70% (or very close to it) at the end of FY 2009. This is to avoid the situation in which there is a substantial gap between the actuarial value and market value of assets.
3. **The funded ratio decline from 2000 is steady and moderate.** All pension plans saw a drop in their funded ratio in the ten years after 2000, due to the minimal return in financial markets. Thus, a well-managed plan should have a moderate (defined by less than 25%) and steady drop in its funded ratio over this ten-year period.
4. **Only one plan is selected from any state.** As a state can have many different pension plans, in order to have a more diversified pool of plans for this study, only one plan is selected from each state.
5. **Entry age normal (EAN) should be used to determine the actuarial value of liabilities.** Because EAN is by far the most common actuarial cost method used by public pension plans, this criterion makes for consistent comparisons. Also, of all actuarial cost methods approved by GASB, EAN seems to be preferred, since GASB requires that systems using the aggregate cost method also calculate a funding ratio based on the EAN.<sup>39</sup> EAN also provides a more even distribution of pension costs over the life of employees, and thus can be a more prudent approach to pension funding.
6. **Financial information for FY 2009 was available at the time of study.** This also makes for consistent comparisons.

### Chosen Pension Systems

1. State Employees' Pension Plan (SEPP) of Delaware provides pension benefits to the employees of Delaware state government. As of 2009, it has 58,000 members and net assets of \$5.8 billion. It is managed by the Delaware Public Employees' Retirement System, which was established in 1970 after incorporating several pension plans. The System is governed by a board of seven members, and manages a total of nine pension plans with 68,000 members, as of 2009.
2. Public Employee Retirement Fund Base Plan of Idaho (PERSI Base Plan) provides pension benefits to state and

local government employees of Idaho, including teachers. It covers 724 public employers in Idaho with 123,000 members, and held a net asset value of \$8.7 billion in 2009. It is managed by the Public Employee Retirement System of Idaho, which was established in 1963 and is governed by a five-member board. In addition to the Base Plan, the System also manages the Firefighters' Retirement Fund.

3. Illinois Municipal Retirement Fund (IMRF) is the administrator of an agent multiple-employer public employee retirement system. It was established in 1939 to provide benefits to employees of local units of government in Illinois, and is governed by an eight member board. IMRF now serves 2,950 different local employers with 275,000 members, and held net assets of \$22 billion in 2009.
4. New York State Teachers' Retirement System (NYSTRS) was established in 1921 and provides pension benefits to most New York State public school teachers and administrators. The System is governed by a ten member board of trustees, which sets policy and oversees operations. NYSTRS serves 825 employers, including public school districts, BOCES, institutions of higher education, and charter schools that choose to participate in this System. NYSTRS has more than 419,000 active and retired members as of 2009, and its net asset value stood at \$72.4 billion in 2009.
5. Established in 1941, the Teachers' and State Employees' Retirement System of North Carolina provides retirement benefits to teachers and state employees. It covers 578,000 members and held a net asset value of \$50 billion at the end of 2009. It is managed by the Retirement System Division of the Department of State Treasurer, who serves as the System's sole trustee.
6. Teachers Retirement System of Texas provides retirement benefits to employees of the public state-supported educational institutions of Texas, including school districts and institutions of higher education. It is governed by a nine member board. It covers nearly 1.3 members, and held net assets of \$88.7 billion in 2009.

## Details on Employer Contribution Policies

### *Delaware SEPP*

Delaware SEPP has adopted a fairly straightforward policy for paying the actuarially determined contribution rate. Prior to 2007, any increase in the UAAL due to benefit increases after 2000 was amortized over a closed 30-year period, and any cumulative gain or loss was amortized over a rolling 15-year period. As of 2007, the portion of any unfunded liability not paid from a transfer from COLA funds is amortized over a rolling 20-year period. The purpose of this change is to smooth out the contribution rate, as it would slow down the amortization of the remaining pension surplus after 2007. This is more conservative than the traditional 30-year amortization period. Delaware SEPP has paid the full ARC during the entire period, over which the normal cost rate was stable at 6.85%. Since the pension plan was overfunded most of this time, the actual contribution rate was lower than the normal cost rate, as the amortization of the pension surplus offset part of the normal cost. By 2002, when the contribution rate reached a low of 1.35%, Delaware SEPP decided to put a floor of 2% underneath the contribution rate, and if the required rate is lower than 2%, the difference will go towards payment for health care benefits for retirees.<sup>40</sup>

### *Idaho PERF*

Beginning in 1994, Idaho PERF's asset valuation has been based on the market value of assets rather than the AVA.<sup>41</sup> As the market value introduces more volatility into the funding ratio and thus employer contribution rate,

**Table A1. Funding of Delaware SEPP (millions of dollars)**

Date	AVA	AAL	UAAL	AVA Funded Ratio	MVA	MVA Funded Ratio	ARC Rate	COLA Rate	Total Rate	ARC Paid
6/30/2000	4,409	3,769	(639)	117.0%	5,428	144.0%	3.85%	3.00%	6.85%	100%
6/30/2001	4,759	4,232	(526)	112.4%	5,057	119.5%	1.67%	3.19%	4.86%	100%
6/30/2002	4,956	4,521	(434)	109.6%	4,635	102.5%	1.35%	2.40%	3.75%	100%
6/30/2003	5,125	4,794	(330)	106.9%	4,649	97.0%	2.99%	1.93%	4.92%	100%
6/30/2004	5,387	5,229	(157)	103.0%	5,248	100.4%	4.20%	2.05%	6.25%	100%
6/30/2005	5,660	5,572	(87)	101.6%	5,608	100.6%	4.90%	2.40%	7.30%	100%
6/30/2006	5,998	5,901	(97)	101.7%	6,133	103.9%	6.10%	2.62%	8.72%	100%
6/30/2007	6,437	6,208	(229)	103.7%	6,920	111.5%	5.90%	2.62%	8.52%	100%
6/30/2008	6,751	6,549	(202)	103.1%	6,643	101.4%	6.10%	2.52%	8.62%	100%
6/30/2009	6,744	6,827	82	98.8%	5,392	79.0%	5.50%	2.20%	7.70%	100%

AVA: actuarial value of assets

AAL: accrued actuarial liability

UAAL: unfunded accrued actuarial liability

MVA: market value of assets

ARC rate: annual required contribution rate: contribution as a percentage of total payroll

COLA rate: the payment for COLA as a percentage of payroll

Paid: the percentage of ARC paid by the employer

strong legislation and a conservative funding policy are needed to help to mitigate that volatility. Idaho Code 59-1322 provides that the board cannot establish a contribution rate below the normal cost, as calculated by the actuary, plus the minimum amortization payment required to fund the Unfunded Actuarial Liability (UAL) within 25 years. Since only unfunded liabilities can be amortized, but not funding surpluses, the employer contribution rate can never fall below the normal cost. This legal protection eliminates the amortization of funding surplus when the plan is overfunded as a source of volatility in the employer contribution rate.

In addition to the statute, the pension system's board has also designed a thoughtful funding policy in order to maintain stability in pension contributions. This is done by maintaining a contribution rate above the normal cost rate. The reasoning is as follows:

Under common future capital market assumptions, it is expected (statistical projection) that once every six years the PERSI fund could experience losses of one standard deviation or greater. If contribution rates are to be stable, then some excess contribution above the normal cost rate must be



maintained within the total contribution rate level if it is reasonably likely that adverse market moves would drop the Funded Ratio below 100% in the near future. Therefore, permanent contribution rates should be maintained at a level, within a range of safety, which is reasonably likely to prevent usual and expected market volatility from triggering increases in permanent contribution rates. For purposes of these funding guidelines, the Board considers an adverse market move of within one standard deviation of the expected return of the fund to be "reasonably likely." Therefore, in order to maintain stable rates, the permanent total contribution rate should not be dropped to the normal cost rate unless it is reasonably likely that future adverse market movements or likely changes in actuarial assumptions would not cause the funded ratio to drop below 100%.<sup>42</sup>

The board considers the additional contribution rate required to fund the potential UAL, as well as the assets above the 100% funded ratio, to be maintained to provide the needed range of safety as a "Rate Stabilization Reserve." This reserve is not considered as available for benefit improvements or contribution relief. Idaho PERF's contribution history, as shown in Table A1, shows this funding policy at work. When examining the actual contribution rate versus the ARC, it is clear that the actual contribution is always higher than the ARC, the difference being the Rate Stabilization Reserve. The actual contribution rate also remained stable over the study period, with only one change in 2004. In FY 2002, when the amortization period was 39.3 years as a result of investment losses, the board approved three 1% contribution rate increases to take effect on July 1, 2004, 2005, and 2006, which would bring the amortization period to 19.4 years.<sup>43</sup> As the employee contribution rate is 60% of the employer rate, for each 1% increase in the contribution rate, the actual employer contribution rate would increase by only 0.63%. While the first 1% rate increase was implemented, the next two increases were postponed and then permanently eliminated in 2007, due to the improving investment performance and funding ratio.

As of July 1, 2009, there was an unfunded actuarial liability of over \$3 billion, resulting in an amortization period greater than 25 years based on the then contribution rate. In December 2009, the board proposed a rate increase to be phased in over a three-year period, a 1.5% increase on July 1, 2011, followed by a 1.5% increase on July 1, 2012, and a 2.31% increase on July 1, 2013. The scheduled contribution rates should be sufficient to amortize the UAAL in 17.5 years. At its December 2010 meeting, the board announced its decision to postpone the rate increase scheduled for July 1, 2011 for one year, due to the investment gain and improved funded ratio of 2010.

Another factor in Idaho PERF's solid contribution management is that the state statute gives the board the authority to collect contributions from local governments. In case of delinquency, the board may certify to the state controller the fact of such failure or refusal and the amount of the delinquent contribution, and the state controller may deduct the amount, together with interest charges, from any funds payable then or in the future to the delinquent employer, and pay the amount to the retirement fund.

Because of this provision, all required contributions have been paid in full every year without exception.

#### *Illinois MRF*

Illinois MRF follows a funding policy that requires local employers to pay the actuarially determined contribution rate. Beginning in 2010, IMRF offered employers the option to pay less than the ARC rate to soften the impact of the 2008 investment losses; rates are limited to a 10% increase until the ARC is achieved. As Illinois MRF experienced no benefit changes during the study period, its normal cost remained fairly stable at around 7.5%. The change in the total contribution rate is therefore mostly due to changes in the amortization cost rate.

**Table A2. Funding of Idaho PERF (millions of dollars)**

Date	MVA	AAL	UAAL	MVA Funded Ratio*	ARC Rate	Actual Rate	ARC Paid
7/1/2000	7,032	6,105	(998)	116.5%	8.32%	9.80%	117.5%
7/1/2001	6,492	6,751	186	97.2%	7.49%	9.80%	130.0%
7/1/2002	6,062	7,209	1,075	84.9%	7.34%	9.80%	132.5%
7/1/2003	6,297	7,578	1,214	83.8%	8.91%	9.80%	110.0%
7/1/2004	7,420	8,154	671	91.7%	10.09%	9.80%	97.0%
7/1/2005	8,208	8,778	508	94.2%	10.45%	10.43%	100.0%
7/1/2006	9,177	9,699	461	95.2%	9.89%	10.43%	105.0%
7/1/2007	10,945	10,431	(573)	105.5%	9.45%	10.44%	110.0%
7/1/2008	10,402	11,211	748	93.3%	9.59%	10.44%	109.0%
7/1/2009	8,646	11,732	3,026	74.1%	8.48%	10.44%	123.0%

*Actual rate: the actual contribution rate paid by the employer*

*\* Idaho PERF uses only the market value of assets (MVA) in arriving at the funded ratio, and not the actuarial value of assets (AVA).*

Illinois MRF's funding policy with regard to amortization period went through several changes. Initially, IMRF's policy was to amortize the unfunded liability over a 40-year rolling period. In 1990, the board changed the 40-year rolling period to a 40-year closed period, until the remaining period is 10 years, after which time the remaining period will be a rolling 10 years. By 2007, the amortization period was 23 years (the original 40 years minus the 17 years between 1990 and 2007). In 2008, due to the substantial investment loss and the increase in unfunded liability, the Board changed its funding policy with regard to amortization: if an employer's plan is less than 120% funded on a market basis, the amortization period is a 30-year rolling period. If the employer's plan is over 120% funded on a market basis, the employer has an option to amortize any overfunding over 120% over a 5-year period, and employers with 50 or more employees have the option to adopt a minimum contribution rate until the overfunding is reduced to 120%. The IMRF board also offered employers an optional phase-in plan, which limited the increase in contribution rates from 2009 to 2010 to 10%. This option was available for future years until such time as the phase-in rate equals the ARC.

Illinois MRF's asset valuation method is somewhat unique. While it uses a five-year smoothing technique, similar to many other plans, it adds a twist: in any year in which the actuarial value minus the market value of assets switches from a positive value to a negative value, or vice-versa, any prior gain/loss bases are wiped out, and the smoothing mechanism restarts. The purpose of this change is to keep the contribution rate more predictable and also to better reflect the underlying funding ratio. Table A3 shows that the difference between AVA and MVA is much smaller for Illinois MRF than for other plans, and also that its contribution rate has remained fairly stable since 2004.

Another important factor that contributes to Illinois MRF's strong contribution management is that the state statute governing employer contributions gives the board of trustees broad authority, similar to the one given to the Idaho PERF board. The statute empowers the board to sue in civil courts to collect delinquent payments from local employers. The statute also allows the board to certify to the state comptroller the amounts of such delinquent payments, and the comptroller may then deduct the amounts so certified from any grants of state funds to the municipality and pay the amount deducted to the pension fund. It may certify the fact of such delinquent payment to the county treasurer where the municipality is located, who will then remit the amount collected from the tax levied by the municipality directly to the fund. Due to this strong legislation, all required contributions were paid in full every year in the study period without exception. This stands in stark contrast to the five Illinois state pension systems, whose required contributions are chronically underfunded by the state government, and is the main reason that IMRF is much better funded than the other Illinois state pension systems.

#### *New York STRS*

New York STRS also follows a funding policy of paying the actuarially determined contribution rate. What is unique about New York STRS is that it uses the aggregate cost actuarial valuation method rather than the individual entry-age normal method. Under this method, no unfunded pension liability is calculated. Each year a normal rate percentage is developed as a level percentage of total member compensation. Actuarial gains and losses that result from the difference between actual experience and the actuarial assumptions are automatically amortized as part of the normal cost, over the expected future working lifetime of active members. This turns out to be a more conservative approach than the traditional valuation method. For New York STRS, the average working lifetime

**Table A3. Funding of Illinois MRF (millions of dollars)**

Date	AVA	AAL	UAAL	AVA Funded Ratio	MVA	MVA Funded Ratio	ARC Rate	ARC Paid
12/31/2000	15,169	14,153	(1,016)	107.2%	16,064	113.5%	8.16%	100%
12/31/2001	16,305	15,318	(986)	106.4%	14,966	97.7%	6.64%	100%
12/31/2002	16,800	16,559	(240)	101.5%	13,501	81.5%	5.87%	100%
12/31/2003	17,529	17,966	436	97.6%	16,356	91.0%	6.22%	100%
12/31/2004	18,315	19,424	1,108	94.3%	18,299	94.2%	7.82%	100%
12/31/2005	19,698	20,815	1,116	94.6%	19,873	95.5%	9.25%	100%
12/31/2006	21,427	22,488	1,061	95.3%	22,507	100.1%	10.04%	100%
12/31/2007	23,274	24,221	947	96.1%	24,223	100.0%	9.72%	100%
12/31/2008	21,601	25,611	4,010	84.3%	18,022	70.4%	9.47%	100%
12/31/2009	22,754	27,345	4,590	83.2%	22,303	81.6%	9.27%	100%

**Table A4. Funding of New York STRS (millions of dollars)**

Date	AVA	AAL	UAAL	AVA Funded Ratio	MVA	MVA Funded Ratio	ARC Rate	ARC Paid
6/30/2000	83,421	67,201	(16,220)	124.1%	89,247	132.8%	1.43%	100%
6/30/2001	87,295	69,817	(17,478)	125.0%	81,664	117.0%	0.43%	100%
6/30/2002	71,374	71,693	319	99.6%	73,041	101.9%	0.36%	100%
6/30/2003	71,780	72,209	429	99.4%	72,391	100.3%	0.36%	100%
6/30/2004	72,044	72,604	560	99.2%	80,276	110.6%	2.52%	100%
6/30/2005	74,074	74,961	887	98.8%	84,908	113.3%	5.63%	100%
6/30/2006	78,335	76,353	(1,983)	102.6%	91,492	119.8%	7.97%	100%
6/30/2007	82,858	79,537	(3,322)	104.2%	104,912	131.9%	8.60%	100%
6/30/2008	88,254	82,777	(5,477)	106.6%	95,769	115.7%	8.73%	100%
6/30/2009	88,805	86,062	(2,744)	103.2%	72,471	84.2%	7.63%	100%

*Note: Prior to 2006, the AVA funded ratio was based on aggregate cost method, which is not comparable to an AVA funded ratio based on entry age normal cost method, and they are listed here for information only. GASB Statement 50 requires that a pension plan which uses the aggregate cost method also needs to calculate the funded ratio based on the entry age normal method for system comparison. The funded ratio after 2005 is calculated using the entry age normal cost method and thus is comparable to the funded ratios of other plans in this study.*

comes out to about 14 years, meaning that when the plan is underfunded, the unfunded liability is amortized over 14 years, rather than over the traditional 30 years.

As can be seen from Table A4, over this period the actuarially determined normal cost exhibits volatility, especially in the early 2000s, when the System was overfunded by a big margin and the contribution rate dropped nearly to zero. Since then, the System implemented two strategies to lessen future contribution rate volatility. First, in FY 2002, a separate reserve, a “Provision for Adverse Market Deviation,” was created in order to decrease the volatility of the employer contribution rate as a result of capital market fluctuations. Second, in 2007, the pension system made changes to its valuation in terms of smoothing. Instead of recognizing 20% of the difference between the actual return and the expected return of 8% each year, it now recognizes 20% of the difference between the actual return and 3%. This is a more conservative approach. Under this rule, when the actual return is above 8%, more of the positive return will be pushed into the future, thus providing a future cushion and lessening the decrease in the contribution rate when investment gains are high. On the flip side, when the actual return is below 8%, then more of the losses will be recognized immediately in the current year.<sup>44</sup> As a result of this fairly conservative funding approach, the contribution rate has remained stable since 2005, and the actuarial funded ratio was above 100% in 2009.

### *North Carolina*

In North Carolina, statute requires a full ARC payment, although it is subject to legislative appropriation. Since the mid-1970s, North Carolina has taken a very conservative approach to its funding policy, mostly in terms of the amortization period, which is set by Board, but can be overridden by the state legislature.

In 1974, the amortization period was set at 27 years and the funded ratio was 68%. Since then, the legislature gradually shortened the amortization period, to nine years by 1992, when the funded ratio was 97%. The nine-year amortization period has remained intact since then. The effects of shortening the amortization period while the funded ratio was improving are twofold. First, it led to a much faster and earlier payoff of the unfunded liability, and thus a healthier pension system. Second, it led to a more stable contribution rate. When the funded ratio was improving in the 1980s and early 1990s due to above average investment returns, the unfunded liability was shrinking. This would lead to a lower amortization cost and thus a lower overall contribution rate, assuming the normal cost remains the same. However, by shortening the amortization period and thus increasing the amount to be amortized, the amortization cost rate would remain more or less unchanged. As a result of this conservative management practice, from 1974 to 1998, a year before it reached full funded status, the employer contribution rate varied within a fairly narrow range, from about 8% to 10%, even though the funded status improved substantially. The contribution rate moved towards 8% in the late 1990s only because the unfunded liability was almost paid off, and the amortization cost rate was gradually reduced to zero.

**Table A5. Funding of North Carolina (millions of dollars)**

Date	AVA	AAL	UAAL	AVA Funded Ratio	MVA	MVA Funded Ratio	ARC Rate	ARC Paid
12/31/2000	39,774	35,249	(4,525)	112.8%	45,942	130.3%	8.15%	100%
12/31/2001	42,104	37,714	(4,390)	111.6%	44,082	116.9%	5.33%	76%
12/31/2002	43,227	39,864	(3,363)	108.4%	40,584	101.8%	1.97%	100%
12/31/2003	45,118	41,734	(3,384)	108.1%	46,350	111.1%	0.00%	–
12/31/2004	47,384	43,828	(3,556)	108.1%	49,711	113.4%	0.22%	99%
12/31/2005	49,670	46,625	(3,046)	106.5%	51,558	110.6%	2.17%	100%
12/31/2006	52,421	49,392	(3,029)	106.1%	55,729	112.8%	2.34%	100%
12/31/2007	55,283	52,815	(2,468)	104.7%	58,619	111.0%	2.66%	100%
12/31/2008	55,128	55,519	391	99.3%	45,629	82.2%	3.05%	100%
12/31/2009	55,818	58,178	2,360	95.9%	50,382	86.6%	3.36%	100%

Table A6. **Funding of Texas TRS (millions of dollars)**

Date	AVA	AAL	UAAL	AVA Funded Ratio	MVA	MVA Funded Ratio	ARC Rate	Actual Rate	ARC Paid
8/31/2000	79,328	73,882	(5,446)	107.4%	89,987	121.8%	4.92%	6.00%	122%
8/31/2001	86,352	84,217	(2,135)	102.5%	79,427	94.3%	4.12%	6.00%	146%
8/31/2002	86,035	89,322	3,287	96.3%	71,695	80.3%	5.70%	6.00%	105%
8/31/2003	89,033	94,263	5,230	94.5%	77,550	82.3%	7.15%	6.00%	84%
8/31/2004	88,784	96,737	7,953	91.8%	84,202	87.0%	7.39%	6.00%	81%
8/31/2005	89,299	102,495	13,196	87.1%	93,707	91.4%	7.31%	6.00%	82%
8/31/2006	94,218	107,911	13,694	87.3%	100,238	92.9%	7.19%	6.00%	83%
8/31/2007	103,419	115,964	12,545	89.2%	112,128	96.7%	7.02%	6.00%	85%
8/31/2008	110,233	121,756	11,523	90.5%	104,910	86.2%	6.47%	6.58%	102%
8/31/2009	106,384	128,030	21,646	83.1%	88,652	69.2%	6.10%	6.58%	108%

This short amortization period also led to a faster amortization of the funding surplus when the plan was overfunded. As a result, by 2003 the employer contribution rate was reduced to zero, and stayed low until 2007.<sup>45</sup> After the 2008 market downturn, when the System's funded ratio finally fell below 100%, the employer contribution rate increased steadily. The ARC rate will increase to 6.71% in 2011 and 7.94% in 2012. For the first time, the legislature did not appropriate the entire contribution amount in 2011.<sup>46</sup> It should be noted that this rate is based on an amortization period of nine years, and would have been lower had it been 30 years, as is more common among pension systems. It should also be noted that even after such an increase, the 2012 rate is still below the rate the state paid just before it reached full funding. Had the employer contribution rate not been reduced, or reduced by a smaller amount during the time of the funding surplus, it would have made it easier for the legislature to pay the current contribution rate. Overall, the conservative management practice since the 1980s has rendered North Carolina one of the best funded pension systems in the country, and its employer contribution rate remains at a modest level throughout this period and beyond.

*Texas TRS*

Texas TRS has a unique funding policy in that the employer and employee contribution rates are written into the state constitution. The constitution requires the legislature to establish a member contribution rate of not less than 6% of the member's annual compensation, and a state contribution rate of not less than 6% and not more than 10% of the aggregate annual compensation of all members of the System during that fiscal year. The member contribution rate is set by state statute at 6.4%. In 2007, the legislature passed a law saying that the employer contribution should be at least equal to the employee contribution of 6.4%.



This state constitutional requirement of no less than 6% has kept the state contribution stable throughout the study period, as can be seen in Table A6. The impact of this was particularly evident in the late 1990s and early 2000s when the plan was overfunded. Instead of amortizing the surplus, which would have resulted in a lower contribution rate, the state “over-contributed” the full 6% through 2002. This allowed it to under-contribute to some extent in 2003 and 2004. In 2005, while the employer contribution was not increased to the ARC, the state decreased pension benefits for new employees in order to reduce future pension liabilities and ARCs. In 2007, the state increased the employer contribution rate to 6.58%, which led again to a slight overfunding in 2007 and 2008. Due to the strong constitutional protection, the employer contribution has remained remarkably stable during this entire period, between 6% and 6.58%. The relatively higher employee contribution also keeps the employer contribution in check. As the employee contribution has been slightly higher or equal to the employer contribution over this entire period, the pension benefit cost is basically shared equally between the state and employees.

## Details on COLAs

*Delaware SEPP:* The COLA is ad hoc. Over the study period, a COLA was not granted in 2002, 2007, 2008, or 2009 due to investment losses, even though the plan’s funded ratio was over 100% in some of these years.

In terms of funding its COLA, as Delaware’s COLA is discretionary, any COLA granted is unfunded and thus creates an immediate unfunded liability. In the early 1990s, when Delaware SEPP started granting COLAs, it created a Post-Retirement Reserve Fund (PRF) with seed money, and it requires that each discretionary COLA be paid off in five years. Every year, funds equal to the five-year amortization cost of the COLA granted are deposited into the PRF, and the required amount is then transferred to the pension fund. This short amortization period ensures that any COLA will not add to the future unfunded liability and also makes the cost of the COLA more visible to the employer. Due to the drop in its funded ratio, a COLA has not been granted since 2006, which also slowed down the growth in pension liability in 2008 and 2009. The total contribution rate, including that for the COLA, remained relatively stable and fairly modest over this period, as can be seen in Table A1. This serves in Delaware SEPP’s favor, because when the amortization rate for unfunded liabilities increases, it is offset by a decrease in the amortization cost for the COLA, as no COLA has been granted since 2006. This leaves the combined contribution rate little changed. Even though Delaware SEPP’s contribution rate will increase from 6.1% in 2006 to 8.37% in 2012, its COLA contribution rate decreased to 0.81% of payroll in 2011 from 2.62% in 2006, and it will drop to zero in 2012, as all the COLAs granted prior to 2007 will have been paid off.

*Idaho PERF:* The COLA is ad hoc with a 1% guarantee if inflation is 1% or higher. The Idaho PERF statute stipulates the board may authorize additional discretionary adjustments based on the CPI increase (up to a total maximum annual COLA of 6% or the CPI rate, whichever is lower) if it determines that the system can do so and still maintain an appropriately funded position as required by statute. The board’s policy is to maintain the purchasing power of retiree benefits by granting annual discretionary COLAs and/or through the award of retroactive COLAs, with the goal of keeping the COLA at the historical CPI rate over time. The history of COLAs granted reflects this policy and statute. Over this period, Idaho PERF granted the full amount of CPI every year except 2003 and 2009. In FY 2003, the COLA authorized and implemented was 1.0%; a discretionary COLA of 0.8% was not awarded due to the funding situation of the plan. This 0.8% COLA was retroactively granted in 2005. In 2009, a 1.0% COLA was granted, but a discretionary 4.4% was not. Part of that discretionary COLA—2.48%—was granted in 2010, when the funding situation of the pension plan improved.

*Illinois MRF:* The Illinois MRF COLA is a simple 3% a year. In 1993, a 13th payment was implemented, which is funded by an employer payroll contribution of 0.62%. Once a retiree receives benefits for twelve months, s/he is eligible for a 13th payment in July. The amount of the payment is the ratio of the June benefit payment to all annuities paid that month. Because retirement payments are currently increasing faster than employer payrolls, the value of the benefit has decreased from 90% of the June payment in 1993 to 52% in 2010.<sup>47</sup> For employees hired in 2010 and later, the COLA rate of 3% has been reduced to 3% or half of CPI, whichever is lower.

*New York STRS:* Although New York STRS provides an automatic COLA indexed to CPI, it is set at 50% of CPI, and only applies to the first \$18,000 of the pension benefit. As the average retirement benefit for all retirees as of 2010 was about \$37,000, a COLA at half of CPI applies to less than half of the retirement benefit on average. For those who retire with 35 years of service, it applies to less than a third of their benefit.

*North Carolina:* The COLA is ad hoc. A COLA was not granted in 2009, because the plan's funded ratio fell below 100%.

North Carolina's previously described shortened amortization period also affects the COLA. Since the COLA is discretionary, any COLA granted creates an immediate unfunded liability. In North Carolina, this unfunded liability must be amortized over a nine-year period. Similar to the Delaware SEPP practice, this has the effect of recognizing the cost of the COLA more immediately. Another major consideration when granting a COLA is how large of a COLA can be given while keeping the employer contribution stable. In some years, particularly in the early 2000s, the legislature approved a slight increase in the employer contribution in order to grant a COLA, because otherwise the pension benefits would have fallen significantly below inflation.

*Texas TRS:* The COLA is ad hoc. The current statutes provide that the legislature cannot grant any benefit increases, including COLAs, if the current amortization period is above 31 years, or if the increases would cause the unfunded liability to go beyond 31 years. Over the study period, the state legislature only once granted a COLA—of 6% in 2001—because its funded ratio fell below 100% after 2001, and its amortization period has exceeded 31 years in most of the years since then.<sup>48</sup>

## Details on Anti-Spiking Policies

*Delaware SEPP:* The FAS is the average of salaries over the final three years. In addition, in May 2011 the governor signed into law a bill eliminating overtime from pension creditable compensation for all employees hired on or after January 1, 2012.

*Idaho PERF:* The FAS is the average of salaries over each employee's highest-earning consecutive 42 months. In addition, the state has two rules. First, for employees hired after July 1, 1996, any salary in excess of the compensation limitations set forth in section 401(a)(17) of the Internal Revenue Code is disregarded. For 2011, the limit is \$245,000, which is indexed for inflation. Second, lump sum payments inconsistent with usual compensation patterns made upon termination from service—including, but not limited to: vacation payoffs, sick leave payoffs, early retirement incentive payments, and bonuses—are excluded from FAS.

*Illinois MRF:* The FAS is the average of salaries over the highest consecutive four years (48 months) in the last ten years of participation for those hired before 2011. For these members, Illinois MRF also has a provision, known as

the 125% Rule, which limits the amount of compensation recognized for pension calculation purposes. It provides that if the salary paid within the last three months exceeds the highest monthly salary in the previous 45 months, then only 125% of that high salary can be used in calculating the retirement benefit.<sup>49</sup> For those hired after 2010, the FAS is the average of the highest total earnings during any consecutive eight years (96 months) within the last 10 years of service. The FAS will also be capped at \$106,800 in 2011, which will increase annually by the lesser of 3% or one-half of the increase of the CPI.

*New York STRS:* The FAS is the average of highest three consecutive years of salary. Many forms of compensation are excluded from the FAS, such as bonuses, payments of unused leave, and payments made outside contract terms and on the eve of retirement. Also excluded from FAS are yearly increases in regular salary exceeding 10% of the average of the previous two years' salaries, for members who joined after July 26, 1976—a group which now represents the vast majority of New York STRS' current active membership. Although New York STRS still has some long-time active members who are subject to the prior rules, the issue of salary spikes was addressed by several legislative changes over the years. Members who joined before June 17, 1971 may also use a five-year FAS which may contain termination pay and other one-time payments, subject to certain restrictions. Members who joined before July 1, 1973 can also have a three-year FAS in which the salary limitation is 20% over the prior year's salary. Members who joined on or after July 1, 1973 and before July 27, 1976 can have a three-year FAS, in which the salary limitation is 20% over the average of the prior two years' salaries. The Internal Revenue Code income limit for calculating pension benefits also applies in New York, as well as to all qualified governmental retirement plans.

*North Carolina:* The FAS is the average of salaries over a four-year period. Also, the System reviews any benefit calculations that involve a large average pay to verify that the reported compensation meets the definition in the state statute. For example, if a school superintendent is retiring with a \$250,000 FAS, a breakdown of salary components would be requested. If it is found that some of the salary are not considered "compensation" under state statute (for example, a car allowance or contract buyout), then it would be excluded from the pension calculation.

*Texas TRS:* For employees hired after 2005, the FAS is the average of salaries over a five-year period. For those hired before 2005, the FAS is the average of salaries over a three-year period. Texas TRS also has a rule that the salary cannot increase by more than \$10,000 or 10% a year for the final three or five years of service. The Internal Revenue Code income limit also applies.

## Details on Plans' Economic Assumptions

Delaware SEPP reduced its rate of return assumption to 8% from 8.5% in 2004, and the underlying inflation rate assumption was also reduced from 4.25% to 3.75%, resulting in a real rate of return of 4.25%. The salary increase attributable to merit and productivity ranges from 0.5 to 6.14%. The actual average salary increase for the five-year period ending 2010 was less than 2%, which served to reduce the actuarial liability.

Idaho PERF reduced its rate of return assumption from 8% (gross of fees) to 7.75% (7.25% net of fees) in 2004, and the inflation rate was reduced to 4.5% from 5%, resulting in a real return assumption of 3.25%. By 2010, the inflation rate was reduced to 4%, mostly due to the much-reduced expectation of future inflation. The average salary growth in the five-year period ending in 2010 was 2.75%. The effect of the high inflation assumption embedded in the rate of return can best be seen in the following example. For FY 2010, due to low inflation, the actual salary gain was much less than predicted. As a result, the pension liability was reduced by \$260 million. This has the same effect of earning

an investment return of the same amount. With \$8.6 billion in assets in 2009, this is equivalent to an additional investment return of 3%. In 2009, Idaho PERF also realized a reduction in pension liability of about \$100 million due to slower salary gain.

For Illinois MRF, the discount rate assumption for the entire period has been 7.5%, and the inflation rate embedded in that assumption is 4%, resulting in a real return of 3.5%. This compares favorably with the actual salary increase of 3% over the five-year period ending in 2009.

For New York STRS, the discount rate assumption for the entire period was 8%, and the inflation rate embedded in that assumption was 3%, resulting in a real return of 5%, about the average for the universe of state-level pension systems.

In North Carolina, the assumed rate of return throughout the study period has been 7.25%, although it was reduced from 7.5% in 1998. The inflation assumption was 3.75% until 2008, and revised down to 3.5% in 2009, resulting in a real return of 3.5% until 2008 and 3.75% afterwards. This also compares favorably with the actual salary increase due to inflation. For the five-year period ending in 2010, the across-the-board increase was 2.75% for state employees.

For Texas TRS, the discount rate assumption for the entire period was 8%, and the inflation rate embedded in that assumption was 3%, resulting in a real return of 5%, about the average for the universe of state-level pension systems.

## ENDNOTES

- 1 The average public pension benefit was about \$1,900 per month in 2008. Source: U.S. Census Bureau. 2010. *State and Local Government–Employee Retirement Systems*. Washington, DC: U.S. Census Bureau.
- 2 Almeida, B., and Boivie, I. 2009. The staying power of pensions in the public sector. *CPER Journal*, No. 195.
- 3 Bender, K., and Heywood, J. 2010. *Out of Balance? Comparing Public and Private Sector Compensation Over 20 Years*. Washington, DC: Center for State and Local Government Excellence and the National Institute on Retirement Security.
- 4 Almeida, B., and Forna, W. 2008. *A Better Bang for the Buck: The Economic Efficiencies of Defined Benefit Plans*. Washington, DC: National Institute on Retirement Security.
- 5 Brainard, K. 2010. *Public Fund Survey: Summary of Findings for FY 2009*. Washington, DC: National Association of State Retirement Administrators and National Council on Teacher Retirement. See also Pew Center on the States. 2011. *The Widening Gap: The Great Recession's Impact on State Pension and Retiree Health Care Costs*. Washington, DC: Pew Center on the States.
- 6 U.S. Government Accountability Office. 2008. *State and Local Government Retiree Benefits: Current Funded Status of Pension and Health Benefits*. Washington, DC: U.S. GAO.
- 7 The membership and assets of systems included in the Public Fund Survey comprise approximately 85 percent of the entire state and local government retirement system community.
- 8 According to the Census Bureau, there are a little over 200 state-level pension systems whereas there are over 2,000 local pension systems.
- 9 Unless otherwise noted, all data with regard to these six systems in this study come from their comprehensive annual financial reports (CAFR) and the actuarial valuation reports of these plans over the period between 2000 and 2009. The only exception is North Carolina, which does not publish a separate CAFR for its pension systems. The data for North Carolina are collected from the following sources: North Carolina State Treasurer's Annual Report, North Carolina State's CAFR, the actuarial valuation report, and information supplied to the author by the North Carolina General Assembly's Fiscal Research Division.
- 10 Illinois Municipal Retirement Fund is distinct from the other five state-level pension systems in Illinois, whose combined funded ratio is the lowest among large state pension plans. These five pension systems are frequently the target of negative media reports.
- 11 The unit of analysis for this study is pension plan rather than pension system, primarily for the sake of simplicity in analysis. Some states offer several pension plans for different categories of employees. They can be managed by one pension system or by different pension systems. If a pension system only manages one pension plan, then the pension system is synonymous with pension plan. For the purposes of this study, when a pension plan selected is one of several pension plans managed by a pension system and the other plans are equally well-funded, the one selected is the largest.
- 12 Board of Governors, Federal Reserve System. 2010. *Flow of Funds Accounts of the United States*. Washington, DC: Board of Governors.
- 13 Brainard, K. 2010. *Public Fund Survey: Summary of Findings for FY 2009*. Washington, DC: National Association of State Retirement Administrators and National Council on Teacher Retirement.
- 14 The actuarial value of assets is a valuation that is calculated using an asset smoothing technique where investment gains and losses are partially recognized in the year they are incurred, with the remainder recognized in subsequent years. This method helps to minimize volatility in the employer contribution.
- 15 The unfunded accrued actuarial liability refers to the portion of the accrued actuarial liability which exceeds the actuarial value of assets. The accrued actuarial liability is the estimated current value of total benefits that will be paid to all beneficiaries, including current employees, vested inactive employees, and current benefit recipients.
- 16 GASB's requirement is for reporting purposes only.
- 17 An open amortization period means that every year the amortization is reset for a fixed period of years, whereas a closed amortization means that with each passing year, the amortization period is reduced by one year.
- 18 In order to make up for their lack of Social Security coverage, public employees who do not receive Social Security benefits tend to receive higher pension benefits.
- 19 Pension benefit design includes many factors, such as the benefit multiplier, early and normal retirement ages, cost of living adjustments (COLAs), final average salary (FAS) design, and vesting periods. To study each of these design elements in detail is beyond the scope of this study.
- 20 Aon Consulting. 2008. *Aon Consulting's 2008 Replacement Ratio Study*. Aon Consulting.



- 21 It should be noted that as many as 30% of public-sector employees do not participate in Social Security. (See U.S. Government Accountability Office. 2007. *State and Local Government Retiree Benefits: Current Status of Benefit Structures, Protections, and Fiscal Outlook for Funding Future Costs*. Washington, DC: GAO.) For these employees, public pension benefits are generally somewhat higher to compensate for the lack of Social Security income.
- 22 Government Finance Officers Association, Committee on Retirement and Benefits Administration. 2008. *Essential Design Elements of Defined Benefit Retirement Plans*. GFOA Recommended Practice. February.
- 23 U.S. Government Accountability Office. 2007. *State and Local Government Retiree Benefits: Current Status of Benefit Structures, Protections, and Fiscal Outlook for Funding Future Costs*. Washington, DC: GAO.
- 24 For example, of the 87 largest public pension plans, 55 use a three-year average to calculate the FAS and an additional 18 plans use a five-year average. One of the main goals of using multiple years in the FAS is to curb spiking. Source: Wisconsin Legislative Council. December 2009. *2008 Comparative Study of Major Public Employee Retirement Systems*. Wisconsin Legislative Council.
- 25 Board of Governors, Federal Reserve System. 2010. *Flow of Funds Accounts of the United States*. Washington, DC: Board of Governors.
- 26 Markowitz, H. 1952. Portfolio selection. *Journal of Finance*, 7(1), 77-91.
- 27 See Dalbar, Inc. 2010. *Quantitative Analysis of Investor Behavior 2010*. Dalbar, Inc.
- 28 Almeida, B., and Forna, W. 2008. *A Better Bang for the Buck: The Economic Efficiencies of Defined Benefit Plans*. Washington, DC: National Institute on Retirement Security.
- 29 Idaho has adopted an investment policy of 100% public securities and real estate with no allocation to other types of alternative investments.
- 30 Teachers Retirement System of Texas. 2010. *Quarterly Portfolio Performance Review*. December.
- 31 Public Employees Retirement Systems of Idaho. 2010. *PERSI Investment Report*. December 31.
- 32 The past ten years was a very unusual period in terms of investment returns. Over longer periods, such as 30 years, a larger deviation in returns between states with higher fixed income allocations and states with lower fixed income allocations may be seen.
- 33 This assumption also affects the growth rate for total payroll, the base which is used to amortize unfunded liabilities. The other components of the individual salary increase assumption include real wage growth (also known as productivity) and career scale. It should be noted that salary inflation and price inflation are not necessarily the same; however, public pension plans generally use these rates interchangeably.
- 34 Issues of taxpayer fairness can arise should plans become overfunded as a result of assuming too low a rate of return. Political challenges may also develop, should taxpayers or legislators become confused by the change in assumptions. For further discussion, see Lav, I. 2011. *Proposed Public Employee Pension Reporting Requirements are Unnecessary: Rules Would Create Confusion and Could Roil Markets*. Washington, DC: Center on Budget and Policy Priorities; and Zorn, P. 2011. *Research Memorandum: The Public Employee Pension Transparency Act*. Dallas, TX: Gabriel, Roeder, Smith, and Company.
- 35 Wisconsin Legislative Council. December 2009. *2008 Comparative Study of Major Public Employee Retirement Systems*. Wisconsin Legislative Council.
- 36 The Wisconsin Legislative Council's survey of mostly large state pension systems that cover a large number of state employees was used as a basis for selection. Of the pension systems included in the Wisconsin survey, only seven met all six of the selection criteria as described in the Technical Appendix. Other plans that met the full selection criteria but were not included in the study were the New York State and Local Retirement Fund, Texas County and District Retirement System, and Texas Employee Retirement System. These plans were not included simply so as not to have two systems from the same state.
- 37 Pew Center on the States. 2011. *The Widening Gap: The Great Recession's Impact on State Pension and Retiree Health Care Costs*. Washington, DC: Pew Center on the States.
- 38 "Entry age normal" is an actuarial cost method designed to fund an employee's total plan benefit over the course of the career. It is designed to produce stable employer contributions in amounts that increase at the same rate as the employer's payroll (i.e., level percent of payroll).
- 39 New York STRS is an example of a system that uses the aggregate cost method, but also reports the EAN calculations, in compliance with GASB.
- 40 This policy was never tested as the contribution rate since then moved higher and above 2%.
- 41 Interviews with Idaho pension officials noted that the reason for this switch is that since the main purpose of asset smoothing is to create stability in the pension contribution rate, this can be achieved with a more conservative funding policy and with other statutory provisions in the Idaho laws. The added benefit of this switch is that the use of market value brings more transparency to the funding situation of the pension system.
- 42 Excerpt from "PERSI Funding Guidelines" adopted by the Board of Trustees of the Public Employee Retirement System of Idaho on September 28, 1998.

- 43 By law, Idaho may postpone an increase for up to two periods of one year each during any four consecutive years.
- 44 A simple example will make this clear. Suppose the investment return is 10%. Under the 8% rule, then 80% of the difference of 2%, or 1.6% of the actuarial gain, is pushed into the future. Under the 3% rule, then 80% of the difference of 7%, or 5.6% of the actuarial gain, is pushed into the future. If the actual return is minus 10%, under the 8% rule, 80% of the difference of 18%, or 14.4% of actuarial loss, is pushed into the future, whereas under the 3% rule, 80% of the difference of 13%, or 10.4% of the actuarial loss, is pushed into the future.
- 45 There was discussion within the state legislature to increase the amortization period to 20 years so as to slow down the amortization of the funding surplus and thus have a more gradual decrease in the employer contribution, but no such legislation was adopted.
- 46 Over this period, it failed to pay the full contribution amount just once, in 2001 in the depth of a budget crisis, to the tune of \$127 million. This was mostly paid back in the following years over several installments when the budget situation improved.
- 47 See “Supplemental Benefit Payment (13th Payment)” at [http://www.imrf.org/pubs/tax\\_letters/TL19.pdf](http://www.imrf.org/pubs/tax_letters/TL19.pdf).
- 48 The Texas state legislature convenes every other year, and thus the 6% COLA covered a two-year period.
- 49 For example, an employee makes a \$1,000 a month in months 1-45. In his last three months, he is paid \$2,000 per month. When calculating the pension, only \$1,250 will be recognized for months 46-48.



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## Mission

The National Institute on Retirement Security is a non-profit research and education organization established to contribute to informed policymaking by fostering a deep understanding of the value of retirement security to employees, employers, and the economy as a whole.

## Vision

Through our activities, NIRS seeks to encourage the development of public policies that enhance retirement security in America. Our vision is one of a retirement system that simultaneously meets the needs of employers, employees, and the public interest. That is, one where:

- Employers can offer affordable, high quality retirement benefits that help achieve human resources goals;
- Employees can count on a secure source of retirement income to maintain a decent living standard after a lifetime of work;
- The public interest is well served by retirement systems that are managed in ways that promote fiscal responsibility, economic growth, and responsible stewardship of retirement assets.

## Approach

*High-quality research that informs the public debate on retirement policy.* Our research program focuses on the role and value of defined benefit pension plans for employers, employees, and the public at large. We also conduct research on policy approaches and other innovative strategies to expand broad based retirement security.

*Education programs that disseminate our research findings broadly.* We share our research findings with the public, policy makers, and the media by distributing reports, conducting briefings, and participating in conferences and other public forums.

*Outreach to partners and key stakeholders.* By building partnerships with other experts in the field of retirement research and with stakeholders that support retirement security, we leverage the impact of our research and education efforts. Our outreach activities also improve the capacity of government agencies, non-profits, the private sector, and others working to promote and expand retirement security.



The **National Institute on Retirement Security** is a non-profit research institute established to contribute to informed policy making by fostering a deep understanding of the value of retirement security to employees, employers, and the economy as a whole. NIRS works to fulfill this mission through research, education, and outreach programs that are national in scope.



NATIONAL INSTITUTE ON  
**Retirement Security**

Reliable Research. Sensible Solutions.

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