

UNDERFUNDED TEACHER PENSION PLANS: It's Worse Than You Think

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To all the other fiscal travails facing this country's states and largest cities, now add their pension obligations, which are far greater than they may realize or are willing to admit. This paper focuses on the crisis in funding teachers' pensions, because education is often the largest program area in state budgets, making it an obvious target for cuts.

Although it is generally acknowledged that education is the foundation of every modern society's future prosperity, schools unfortunately will have to compete with retirees for scarce dollars. This competition is uneven, because retirees have a legal claim on promised pension benefits that supersedes schools' budgetary needs. Consequently, Americans can look forward to higher taxes and cuts in services, resulting in fewer teachers, bigger classes, and facilities that are allowed to deteriorate. In several states, these developments have already arrived.

The crux of the problem is the gap between assets and liabilities affecting the fifty-nine pension funds that cover most public school teachers in America. Some of these are general state-employee pension funds, while others cover only teachers. Among the findings of our study of these funds:

- All fifty-nine pension funds studied face shortfalls.
- California, the most populous state, has the largest unfunded teacher pension liability: almost \$100 billion.
- The worst-funded plan in our sample is West Virginia's, which we estimate to be only 31 percent funded.
- Five plans are 75 percent funded or better: teacher-dedicated plans in the District of Columbia, New York State and Washington State and state employee retirement systems in North Carolina and Tennessee that include teachers.

The general picture is not a good one. According to the fifty-nine funds' own financial statements:

- Total unfunded liabilities to teachers—i.e., the gap between existing plan assets and the present value of benefits accrued by plan participants—are \$332 billion.

According to our more conservative calculations:

- These plans' unfunded liabilities total about \$933 billion.

In addition, we have found that:

- Only \$116 billion, or less than one quarter, of this \$600 billion discrepancy is attributable to the stock market drop precipitated by the 2007 financial crisis.
- The Dow Jones Industrial Average would have to nearly double overnight to make up for the present underfunding of these plans.

What explains the rest of the gap between the funds' estimates and our own? The funds aggressively "discount" the cost of paying benefits in the future because they assume that stocks' values will be much higher by the time the funds have to pay out those benefits. This assumption permits public officials to contribute fewer dollars toward satisfying these plans' obligations, and thus to avoid taking the cautious but unpopular step of raising taxes or cutting services.

Under current guidances, which are prepared by separate bodies, state pension funds are able to set aside fewer assets than their counterparts in private companies to cover equal liabilities. Private pension plans may invest in stocks and other higher-risk assets, but those plans may not reduce their pension funding on the basis of the superior

performance expected of these types of assets. This is because those higher returns are accompanied by greater risk that returns will fall short of expectations. Yet pension funds' obligation to retirees present and future does not diminish accordingly.

By contrast, public pension plans *are* permitted to base the amount of money they need today to meet their future obligations on the higher expected performance of stocks, allowing sponsors to cut their contribution rates and hope the markets perform as anticipated. Unfortunately, markets can drop instead of rising, as they did in 2008-2009, when the large decline in the Standard & Poor's 500 index of stocks created especially severe shortfalls among public pension funds. With formal bond indebtedness of U.S. states and localities reaching approximately \$2.4 trillion, the shortfalls in teacher pensions alone increased the indebtedness of state and local governments by roughly one-third.

The purpose of this paper is not to instruct pension funds in how to invest their funds. Rather, it is to recommend that they account for their liabilities in the manner of private pension plans, which must estimate the present cost of future liabilities on the basis of the lower returns that high-quality corporate bonds pay. They do so because the likelihood that these instruments will fail to make payments to their owners, the pension funds, is about as great as the risk that retirees will not receive their promised payments in the promised amounts. Using these accounting rules, public plans (like private ones) would be denied the opportunity to short-change their pension plans by assuming strong asset performance.

Unfortunately, accounting reforms will not eliminate the accrued liability, which represents income already earned by public employees but not yet paid. States must simply amortize these costs over time, at taxpayer expense. In part they have grown so large because elected officials have not been held accountable for them: while the cost of higher retirement benefits is off in the future, the cost of higher wages is in the present, and thus visible and felt. Visible or not, the promise of future pensions is a very real cost of hiring teachers, one just as real as the teachers' current salaries.

States can start by accounting honestly for the current costs of future benefits. If they did so, they would reduce the temptation of their elected officials to be overly generous in awarding benefits. Going forward, there are structural changes they can take that would avoid funding shortfalls and rein in out-of-control public pensions:

- States should consider shifting to defined-contribution retirement plans, especially on behalf of new and young employees; this is the norm in the private sector and was adopted successfully by Michigan in the 1990s. States are not obligated under such plans to provide any particular level of benefit.
- In cases where defined-contribution plans face major political resistance, states should consider hybrid options like cash-balance plans and TIAA-CREF, the latter having provided a version of defined-contribution retirement saving for employees of public colleges and universities for decades.

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UNDERFUNDED TEACHER PENSION PLANS: IT'S WORSE THAN YOU THINK

Josh Barro and Stuart Buck

INTRODUCTION

Since the last quarter of 2007, the start of the most recent recession, nearly every state has experienced significant financial distress. This year, forty-eight states faced budget shortfalls ranging from 2 percent to 49 percent, with a weighted average of 17 percent.¹ California's fiscal situation was so desperate in 2009 that, for a time, it was forced to issue IOUs to employees and vendors in place of cash payments. Despite the help that federal stimulus money provided in bridging state budget gaps, nearly every state had to resort to spending cuts, tax increases, or both to achieve balance. And revenue is unlikely to improve enough by the time the stimulus expires, in 2011, to prevent more fiscal pain. As the National Association of State Budget Officers itself acknowledged in its December 2009 report, "Fiscal conditions significantly deteriorated for states during fiscal 2009, with the trend expected to continue through fiscal 2010 and even into 2011 and 2012" (NASBO 2009, p. vii).

Education, as the largest or next-to-largest program area in most state budgets, is an obvious target for budget cuts. Meanwhile, the cost of education, including pay increases in multiyear teacher contracts, continues to rise. These budget pressures will inevitably force localities either to raise property taxes or to reduce education spending. In March, for example, the governor of Illinois threatened to cut aid to school districts by \$1.3 billion, unless the legislature raised the income tax by 1 percent.

An ominous backdrop to schools' current funding difficulties is the underfunding of teacher pension plans, which would have to draw on the same pool of funds as current school operations if they were to return to solvency. Indeed, Illinois is facing annual contributions of over \$4 billion that it will have to make to pension plans for public employees, including teachers. This figure is four times what it was a decade ago.

State and local governments collectively admit to underfunding teacher pension plans to the extent of some \$332 billion, according to figures in their Comprehensive Annual Financial Reports. But that estimate is far too low. In order to produce such estimates, state governments are assuming, on average, that their investments will appreciate at about 8 percent per year for an indefinite period. Then, they use this 8 percent figure to discount future pension obligations to a present value, which is the estimate of funds that must be set aside currently to pay all future obligations.

Although this method of calculation is prescribed by the Government Accounting Standards Board, it is not a reasonable way to estimate out-year pension liabilities, even if 8 percent were a reasonable estimate of plan assets' rate of return. This is because states are not able to pass along any of the risks associated with these higher returns to plan beneficiaries. Such shortfalls would have to be borne by the obligor, not the beneficiary, as would be the case in a defined-contribution plan.²

Unlike public plans, private-sector pensions are required to use discount rates close to the yield on high-quality corporate bonds, which make regular payments in fixed amounts with a low degree of risk to the bondholder. Currently, the rates paid by such bonds are about 6 percent, which translates into a discount rate in the 6 percent range. Pension-plan assets may be invested in higher-return assets, but because the added risk they pose cannot be passed on to plan beneficiaries (except, in certain cases, in a corporate bankruptcy), the plans may not increase their discount rates to reflect higher expected returns.

If the same standards that govern private-sector pension plans are used and current stock-market values are

adjusted to reflect today's stock-market values, actual financial liabilities for public school teacher pension plans are approximately \$933 billion, which is close to triple the official estimate.

This actuarial deficit is not primarily the result of the recent stock-market decline. Of the approximately \$600 billion by which unfunded liabilities have been underestimated, in our view, only \$116 billion is due to the stock-market decline of the last two years. The lion's share of the underestimation (\$484 billion) stems from the funds' use of much too aggressive discount rates for future liabilities.

For the states, the most obvious answer to the underfunding problem is drastically increasing their annual contributions, but beleaguered taxpayers, already struggling to provide for their own retirements, may balk at suffering steep cuts in state services or paying higher taxes so that state employees can retire comfortably. The Associated Press recently quoted a local resident on the underfunded status of state pensions: "I think it's ridiculous," said Larry Rausch, 71, of Lancaster, who retired from a sales job at Sears in 1998, before the owner of Kmart purchased the retailer and slashed retirement benefits. "I don't know how they can expect guys like me to pay their retirement."³ And the president of the Maryland Senate, facing a \$2 billion deficit in his state, has said that the cost of teacher pensions, which was approaching \$1 billion a year, was "not sustainable."⁴ While Ohio and Maryland have teacher pension funding problems that are worse than average (of the fifty-nine systems in our study, Ohio has the twenty-fourth worst funding ratio and Maryland the twenty-eighth), they are not outliers; many states face problems of similar magnitude.

Fully funding state teacher pensions would dramatically affect states' and localities' ability to fund other important commitments. For example, an Ohio newspaper found that fixing the teachers' retirement plan in Cleveland alone "could cost more than the Cleveland schools spend on textbooks each year and more than it spends to get students to school. The budget hit to Cleveland schools would be about what it costs to put 110 teachers in classrooms."⁵ Taxpayers need to realize that lavish teacher pensions come at the cost of denying funding to other important educational objectives.

I. BACKGROUND

A. NUMBER AND TYPES OF STATE PENSIONS

“Nearly 20 million employees and 7 million retirees and dependents of state and local governments—including school teachers, police, firefighters, and other public servants—are promised pensions” in their retirement (GAO 2008, p. 1). State pensions are tracked by the Public Fund Survey, an annual report compiled by the National Association of State Retirement Administrators and the National Council on Teacher Retirement, which contains statistics on major pension plans covering state and local government employees, including teachers.

In the Public Fund Survey’s database, there are fifty-nine state and local pension plans that cover teachers. The pension funds that we analyze in this report include more than 9 million active employees and 4 million retirees and manage over \$1.5 trillion in assets. In several states, such as Arizona, Florida, and New Hampshire, public school teachers are included in statewide public-employee pension plans. Where possible, we prorate the liabilities of such plans ac-

ording to the percentage of state employees who work for school districts.⁶

Every state administers a defined-benefit pension plan in which public school teachers participate, although Alaska’s plan is closed to new participants. Michigan has done the same with its main employee retirement plan, directing new state employees into 401(k)-style retirement plans, but teachers retain their separate defined-benefit pension plan (see Pew 2006, p. 33). Under a typical defined-benefit plan, teachers are promised a specific amount of money regardless of how well or how poorly the plan’s investments have done or any budgetary problems that the plan or the state might be experiencing. Generally, the plans base benefit levels on number of years of service, as well as income in the last few years preceding retirement. For the latter reason, benefits may be inflated by teachers who engineer a brief boost of income at the end of their careers—by taking on a department chairmanship or teaching in a summer program, for example.

Most states are legally bound to protect pension benefits. Several of them, including New York and Illinois, “provide through specific constitutional provi-

Pension Costs’ Threat to Education Quality

Education finance is a zero-sum game: the more that is spent on closing pension funding gaps, the less there is to spend on reducing class size or improving instruction. To see this effect in action, take a look at the Chicago Public Schools. In 2010, the CPS will make \$609 million in pension contributions on behalf of teachers and support personnel. (Employees will contribute an additional \$53 million or so, or 2 percent of their salaries.) Total employee salary costs are just over \$2.6 billion, meaning that CPS will be making a pension contribution equal to an astounding 23 percent of employee salaries. (The district’s total budget is \$6.8 billion.)

As a result of the recent market downturn, the district expects that pension contributions will have to rise by a further \$220 million in FY 2011. By our calculation, the unfunded liability of the Chicago Public School Teachers Pension and Retirement Fund tops \$9 billion. In that light, it is unsurprising that pension contributions will consume more than 10 percent of the CPS budget starting in 2011.

Indeed, the district’s FY 2010 budget contains a stark warning: “Without cost containment on the pension or wage fronts, we cannot continue to protect school budgets in FY2010: the classroom *will be affected.*” (Emphasis in original.)

With a plan that is 54 percent funded, which is the weighted average of the fifty-nine funds in our sample, Chicago is not in particularly bad shape; thirty-three systems rank lower.

sions that state retirement plans cannot be amended in any way that results in a participant receiving a lower retirement benefit than that which would be payable under the plan terms in effect as of the date the employee first became eligible to participate in the plan” (Monahan 2009, p. 6). “Michigan and Hawaii have state constitutional provisions that have been interpreted as protecting pension benefits accrued to date” (Monahan 2009, p. 9). Still other states, including California, have found pension plans to be akin to contracts; thus, “amending state pension plans may violate the contract clauses of both the federal and state constitutions” (Monahan 2009, p. 11). While such plans can theoretically be changed, the California Supreme Court has held that “changes in a pension plan which result in disadvantage to employees should be accompanied by comparable new advantages.”⁷ Consequently, many states find themselves in the “untenable position of being unable to amend their pension plans even with respect to future employee service” (Monahan 2009, p. 26).

B. THE PAST DECADE OF STATE PENSION ACTIVITY

The history of state pensions over the past decade is one of irresponsibility, hubris, and lack of foresight. The booming stock market of the 1990s resulted in stronger than expected asset performance, leading to pension-fund surpluses. Instead of setting aside investment gains for future pension payments, state governments started “shortening vesting periods, increasing the multipliers used in determining benefit amounts, decreasing the age at which employees could receive full retirement benefits and shortening the years of service needed to qualify. New York, New Jersey, Illinois, Pennsylvania, Kentucky, California, Colorado and other states increased benefits” (Pew 2006, p. 8).

Declining returns in the first decade of the new century rendered those gifts difficult to pay for. Indeed, we have now been through a period of over eleven years of essentially zero overall growth in the stock market—the Standard & Poor’s 500 index closed on

The Effect of Defined-Benefit Pensions on Mobility, Recruitment, and Retention

While the chief reason for states to move away from defined-benefit teacher retirement plans is the large and unpredictable liabilities that they create for state budgets, teachers’ varying career paths offer yet another. As Robert Costrell and Michael Podgursky point out in their recent *Education Next* article, “Golden Handcuffs,” defined-benefit plans significantly disadvantage teachers who do not work in the same state for their entire career.

Because plans typically accelerate the accrual of benefits in teachers’ third decade of service, veteran but mobile teachers who spend less than three decades in a single plan will be denied some or all of the benefits of acceleration. On average, Costrell and Podgursky estimate, a thirty-year veteran who spends the first half of her career in one retirement system and the second half in another will suffer a 50 percent reduction in the value of her retirement benefits. The desire to avoid this loss imposes the “golden handcuffs” to which the authors refer.

Defined-benefit plans have additional drawbacks affecting recruitment and retention. First, at a time when public schools are showing interest in attracting mid-career entrants to teaching, accrual acceleration (which disadvantages those entering with less than thirty years to retirement) is sure to be having the opposite effect. Second, because the value of accrued pension benefits often begins declining when a teacher works past age fifty-five or sixty, career teachers often choose to retire early.

If states were to move to 401(k) or 403(b) defined-contribution plans, cash balance plans, or a hybrid option like TIAA-CREF, as Part III of this paper recommends, teachers would accrue retirement benefits evenly over the course of their careers. They could take those benefits with them if they moved to a school system in a different state or left the profession entirely. And they would continue accruing benefits no matter how long they worked.

January 8, 2010, at 1141.69, a level that it first reached in July 1998.

In response, the New Hampshire pension system, which reported a \$1 billion loss in fiscal 2009, was forced to propose that municipal employers increase their pension contributions by an average of 22.7 percent.⁸ Likewise, in Alabama, the Board of Education “voted to recommend freezing the state’s contribution to teachers’ health and retirement programs, and to increase from 5 percent to 6 percent the portion of teachers’ salaries deducted for retirement” (Diel 2009).

Other jurisdictions have taken actions that have only pushed them further behind. New York City, which has the eleventh-largest teacher pension system in the country, has offered teachers several new pension sweeteners over the last decade, such as retirement at age fifty-five with full benefits, a policy of counting per diem payments to salaried teachers in determining the size of their pension benefits, and others.⁹ Over the same period, teacher salaries rose 43 percent, increasing final average salaries and therefore the level of retiree pension benefits. These developments have combined with declining asset values to more than quadruple the city’s annual required pension contribution, after adjusting for inflation. As *Gotham Schools* put it, “Together, the rising salaries and pension sweeteners have created a perfect storm: increasing costs just as the plan’s performance has plummeted in the down market.”

The need to pour more money into pension funds will force states either to cut back spending in other budget areas—classroom education, Medicaid, transportation, and so on—raise taxes, or both. For now, many states are deferring payments to pension plans in order to alleviate short-term budget stresses. But doing so only deepens the extent of underfunding. In March 2009, New Jersey passed (and Governor Jon Corzine signed) a pension deferral bill that “let local governments defer up to half of their employee pension obligations this year to stave off tax hikes or layoffs” (Rispoli 2009), even though New Jersey was already “\$52 billion, or 45 percent, short of what it should have on hand to cover pensions already

earned”¹⁰ (Fitch 2009). In 2003, Illinois governor Rod Blagojevich, who left office in 2009 in disgrace, embraced a plan to “issue debt at a cost of 5.1 percent and then earn 8.5 percent or so investing the proceedings [*sic*].” This turned into “a disaster” when the market dropped last year, leaving Illinois about \$60 billion short (Fitch 2009). Massachusetts, too, was seeking ways to avoid funding state pensions fully, as state law required: according to one state senator, “forcing a \$900 million spike in state pension funding would be devastating to other spending accounts” (Jourgensen 2009).

Deferring the inevitable is not a long-term strategy for achieving financial stability. States and cities will have to make up these deferred payments—with interest—in later years.

C. DISCOUNT RATES

Parties obligated to pay an amount at some future date need to know the size of that obligation in today’s dollars, which will tell them how much money to set aside. That sum can be smaller than the principal amount due because it can earn interest until the due date. If, for example, you owe \$10,000 in ten years, and your savings account offers an interest rate of 3 percent, you would need to set aside only \$7,441 today. In this example, you have assessed your future obligations using a 3 percent “discount rate”—the rate at which the principal due is discounted over a given period of time to produce the loan’s net present value.

Pension funds likewise rely on discount rates to tell them how they can meet their future financial obligations. In so doing, they follow the lead of the Government Accounting Standards Board (GASB), an organization that establishes financial standards for state and local governments. GASB “operates independently and has no authority to enforce the use of its standards,” but “many state laws require local governments to follow GASB standards, and bond raters do consider whether GASB standards are followed” (GAO 2008, p. 7).

In its Statement 25, “Financial Reporting for Defined Benefit Pension Plans and Note Disclosure for Defined

Contribution Plans,” GASB advises that a discount rate “be based on an estimated long-term investment yield for the plan, with consideration given to the nature and mix of current and expected plan investments.” So long as average returns are sufficient to cover a plan’s benefits, it is fully funded, according to GASB standards, even if the riskiness of its investment choices creates a greater than 99 percent chance of a funding shortfall, which taxpayers would at some point be responsible for repairing.

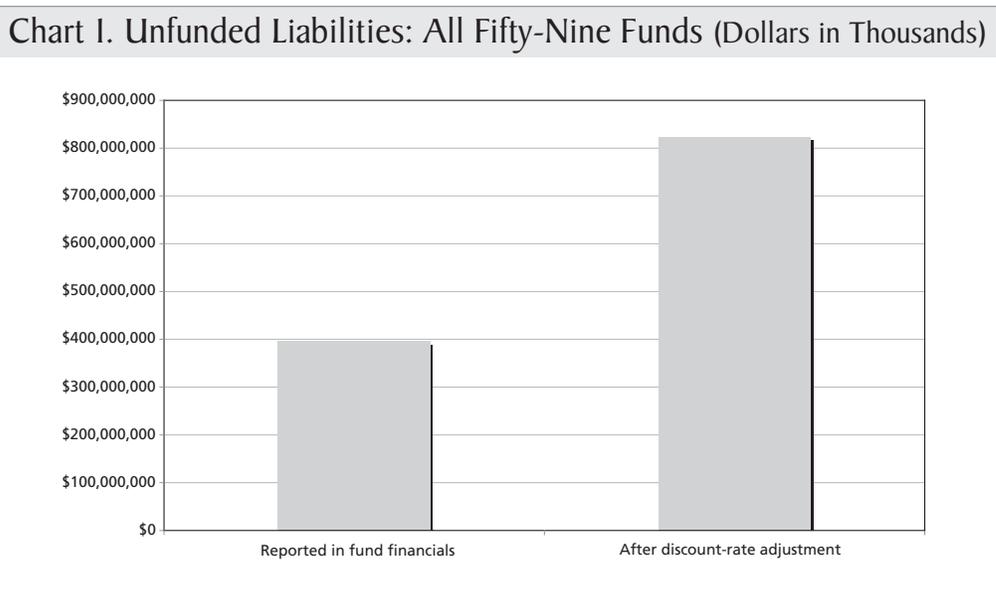
It is the view of many actuaries that discount rates should be set at an 8 percent level, more or less, and left there, so that participants needn’t vary their contributions and the plan’s projections can remain relatively consistent over the years (Jones, Murphy, and Zorn 2009). The argument in favor of this discount rate is that the stock market has historically performed at or above it and that this level of performance should continue if measured over a long-enough time span. Since governments, unlike private companies, rarely dissolve, the argument goes, their pension portfolios should have enough time eventually to match the historical rate of return.

Plans mostly invested in stocks and other equities use the stock market’s higher returns over long periods of time as their rationale for using discount rates in the 8 percent range. As University of Chicago economists

Robert Novy-Marx and Joshua Rauh point out, GASB permits underfunded pension plans to increase their liability discount rates, and thus eliminate their funding gap, simply by increasing the risk profile of their asset portfolio.

Unfortunately, a plan may fail to meet its 8 percent return target for an extended period, or even see asset values fall significantly, as most portfolios did in 2008-09. If such a period should persist long enough, pension reserves can drop to the point where states are forced to close the gap by drastically increasing pension contributions. Governments’ own indefinite existences do not give them the luxury of waiting indefinitely for the market to recover.

Instead of using expected asset returns to discount liabilities, some financial economists call for a discount rate that reflects “the riskiness of the liabilities, not the assets” (Brown and Wilcox 2009, p. 10; echoed in Waring 2009, p. 19). Their thinking is that public pension plans are providing a benefit that is essentially guaranteed, come what may. But the gains and income on which pension plans rely to provide that benefit are not guaranteed. To eliminate this mismatch, “discount rates should be derived from securities that have as little risk as the liabilities themselves” (Brown and Wilcox 2009, p. 8), the “risk” of these liabilities being that a pension plan would be



able to escape its obligations to beneficiaries, which is exceedingly unlikely. The theory underlying this approach is commonly known as the “market value of liability” (MVL).

Just as GASB oversees public plans, the Financial Accounting Standards Board (FASB) oversees private plans. It directs them to discount their pension liabilities on the basis of the risk profile of pension liabilities, not assets. FASB’s directive rests on the recognition that firms cannot pass the risk associated with higher returns on to plan participants. Paragraph 44A of FASB Statement 87 reads:

[A]n employer may look to rates of return on high-quality fixed-income investments in determining assumed discount rates. The objective of selecting assumed discount rates using that method is to measure the single amount that, if invested at the measurement date in a portfolio of high-quality debt instruments, would provide the necessary future cash flows to pay the pension benefits when due. Notionally, that single amount, the projected benefit obligation, would equal the current market value of a portfolio of high-quality zero coupon bonds whose maturity dates and amounts would be the same as the timing and amount of the expected future benefit payments.

Private plans generally choose a discount rate based on a blended average of corporate bonds in the Moody’s Aa rating range, pegged by Mercer Consulting as of February 2010 at 6.06 percent over a fifteen-year plan horizon, the typical period used by public-sector plans.¹¹ This yield reflects the risks associated with high-quality corporate bonds; nearly risk-free assets such as U.S. Treasury bonds usually pay considerably less. The inclusion of a risk premium reflects the possibility that the sponsoring corporation could go bankrupt and thus default on its pension obligations.¹²

It is beyond the scope of this paper to tell public pension funds what their asset mix should be; as with private plans, it can be perfectly appropriate for such funds to invest in a pool of assets whose risks exceed those of fund liabilities. However, we do contend that

California

As the most populous state, it’s no surprise that California has the largest unfunded teacher pension liability in the country. In January 2010, the California State Teachers’ Retirement System (CalSTRS) announced new financial results showing a funding shortfall of \$42 billion, though we estimate the shortfall at \$97.5 billion. (The difference is explained by the lower discount rate we use and our more complete recognition of the recent drop in asset values.)

Using its \$42 billion figure, CalSTRS estimates that fully funding the plan over the next thirty years would require a 14 percent increase in contribution rates; in other words, teachers, school districts, and the state would have to cough up over \$900 million in additional contributions in the first year and more in subsequent years as payrolls rose. According to our calculations, however, the increase in the contribution rate would have to rise by 32.5 percent, or over \$2 billion in the first year. Total spending on public K–12 education in California was \$68 billion in 2007.

Because California faces a \$20 billion budget gap this year, CalSTRS has indicated that it will wait until 2011 to request a contribution increase. However, there is little reason to believe that the state’s fiscal health will improve much in one year. Further postponements are likely.

public pension funds should adopt the private pension practice of discounting liabilities on the basis of the risk to plan participants that they will not receive their benefits, not on the basis of the expected returns of the funds’ asset pools.

GASB is currently considering whether to revise its rules on public pension accounting and, in particular, what discount rate(s) to mandate (GASB 2009, pp. 32–37). We examine the solvency of teacher pension plans, should they be subjected to the same standards that FASB imposes on *private* pension plans.

II. OUR CALCULATION OF STATE GOVERNMENTS' TRUE LIABILITIES FOR TEACHER PENSIONS

A. USING A PRIVATE-SECTOR DISCOUNT RATE ADDS \$484 BILLION IN UNFUNDED LIABILITIES

Most state and local government pension plans discount their future liabilities at approximately an 8 percent rate, which is set to match the expected return on plan assets. However, as discussed in the previous section, this practice is not in line with the accounting standards of private-sector pensions, which recognize that taxpayers are on the hook for pension obligations even when plan assets underperform. Therefore, we adjust the calculations of teacher pension plans' present-value liabilities on the basis of discount rates resulting from methodologies in wide use in the private sector.

This is not an innovation on our part. Novy-Marx and Rauh assembled a data set of state pension-plan liabilities and then calculated what the true liabilities of those plans were likely to be if the discount rate were either the fifteen-year Treasury bond rate or a municipal bond rate. In their words, "while the plans appear almost fully funded under government-chosen discount rates, there is a large probability of significant shortfalls in the future." They go on to say that the cost of fully insuring future taxpayers and plan participants against these shortfalls—that is, the present value of liabilities above what can be covered by plan assets—approaches \$2 trillion, or over 80 percent of the value of all outstanding state and municipal bonds in the United States.

Our analysis draws on Novy-Marx and Rauh's methodology but treats the typical public pension plan far more generously by adopting the discount rates used by private pension plans that are in compliance with federal law and FASB standards. Like Novy-Marx and Rauh, we assume a fifteen-year duration for pension plans, which means that accrued plan liabilities are to be paid on average in fifteen years. (Accrued liabilities range from payments due this month to existing retirees to payments that will be made decades from now to workers who are young today.)

Public Funds Survey data include the estimated actuarial liabilities of fifty-nine state and local teacher pension plans, which we then updated with more recent data from each plan's Comprehensive Annual Financial Report (where available).¹³ Following the Novy-Marx/Rauh formula, we adjust the plan's liability discount rate (typically between 7.75 percent and 8.25 percent) to the Mercer index figure of 6.06 percent.

The result is a more realistic estimate of state teacher pension liabilities—around \$817 billion, or \$484 billion more than state governments currently admit. (A complete table of shortfall amounts for each individual pension plan is included as Appendix A.)

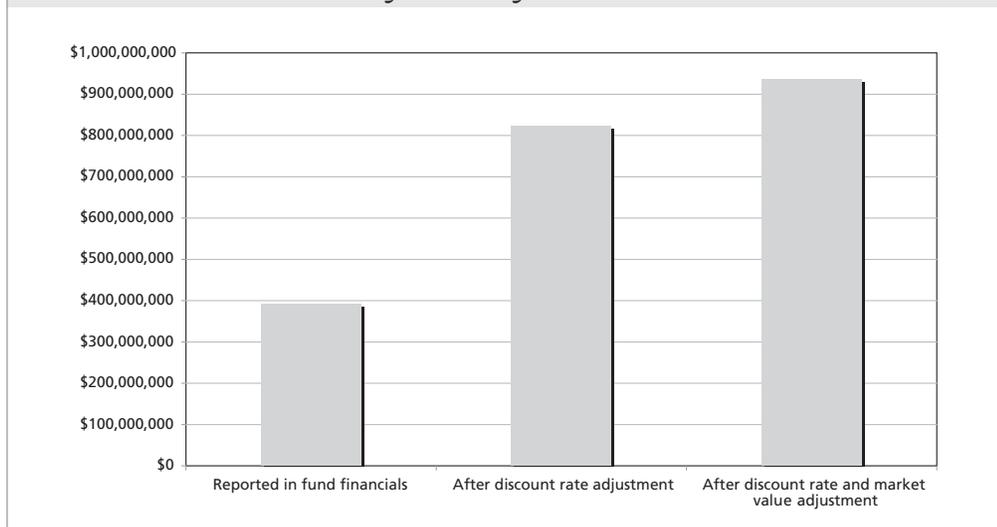
B. TAKING STOCK-MARKET DECLINES INTO ACCOUNT ADDS ANOTHER \$116 BILLION IN UNFUNDED LIABILITIES

The picture gets even worse. Besides understating their actuarial liabilities (and therefore their unfunded liabilities, which equal the gap between actuarial liabilities and assets), many plans are overstating their asset values. They do this by failing to immediately recognize asset returns that differ from their target return rates; instead, they amortize the deviation in the rate of return over a number of years, most commonly five. Rising stock prices produce a conservative actuarial valuation; however, the significant drop in stock prices over the last two years, because it is not yet reflected in plan financial statements, has produced actuarial asset valuations that exceed the true market value of plan assets.

The S&P 500 was 24 percent lower on December 31, 2009, than it was on June 30, 2007. Although we do not draw upon unofficial statistics in this analysis, we know that many public pension plans suffered devastating losses. For example, the Pennsylvania teacher pension plan, PSERS, announced in a press release that it lost over \$20 billion between June 30, 2007, and October 1, 2009 (PSERS 2009, p. 5).

We do not have a clear asset valuation figure for most plans that is more recent than their most recent annual financial report, whose reporting dates vary from June 30, 2007, to June 30, 2009. In an effort to approximate

Chart 2. Unfunded Liability: All Fifty-Nine Funds (Dollars in Thousands)



these plans' current asset market value, we have used a two-step process. First, we substitute the "market value" of assets that each plan reported in its most recent financials for the "actuarial value" or "funding value" that is typically used to calculate funding gaps. Second, we adjust the value of the equity portion of the fund's investment portfolio to reflect the change in value of the S&P 500 since the date of the last financial statement.¹⁴ After making such an adjustment, the difference between assets and liabilities (as calculated in the previous section) comes to a staggering \$933 billion, a further increase of \$116 billion.

Of course, fluctuations in the stock market may reduce the underfunding problem or exacerbate it. Currently, weak stock-market performance is a significant contributor to underfunding, but not the predominant one. Even if the stock market rebounded strongly in the next several years, it would need to rapidly reach levels on the order of Dow 25,000 to offset the effects of overly aggressive discount rates.

III. OUR RECOMMENDATIONS

The insufficiency of assets in state teacher pension funds is massive and unsustainable. In order to maintain their creditworthiness and satisfy liabilities, states need to take the following steps:

1. Account for and fund the existing liability; and
2. Reduce the cost of future benefits.

Achieving step one won't be easy. Existing accrued but unpaid pension liabilities are functionally equivalent to a state's unsecured debt. (Indeed, under some state constitutions, they hold an even more privileged position than bond debt.) Even if states can default on these obligations, they generally should not: accrued pension liabilities represent compensation earned for past labor, not compensation promised for future labor.

The \$933 billion in unfunded liabilities will simply have to be paid off over time, with the help of higher tax revenues and/or cost savings in other areas of government. States that choose to put off remedying these funding gaps will see them grow only larger over time, and they will do near-term damage to their credit ratings and ability to borrow. Illinois, which has some of the country's largest unfunded pension liabilities, saw its Moody's general obligation bond rating downgraded from A1 to A2 last year. Only California has a lower rating. Among the challenges Moody's cited in downgrading Illinois were the state's large gaps in funding pensions and other post-employment benefits.

The good news is that several decent options are available for handling step two. Unfunded pension

liabilities have ballooned in part because states have preferred to incur hidden pension costs instead of imposing visible wage costs. Once states recognize how costly their pension dodges have become, they are likely to take action to contain future benefits.

One option is to shift away from defined-benefit pension schemes and to defined-contribution options such as 401(k) and 403(b) plans. In lieu of a pension plan, governments can make deposits into individual employee accounts, into which employees may also deposit their own funds. Defined-contribution plans cannot, by definition, develop funding deficits: the employer's role is limited to making deposits in the retirement account. No longer guaranteed a certain level of returns, it is the account holder who decides to invest the asset balance in stocks or bonds or some combination of the two.

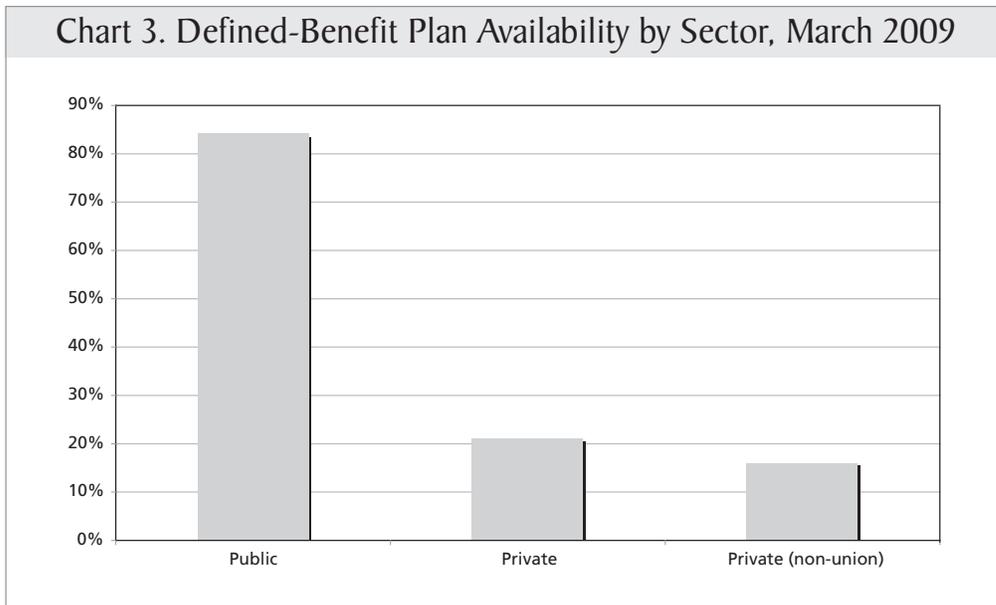
These sorts of plans have generally supplanted defined-benefit pensions in the private sector: while 84 percent of state and local government employees were offered participation in a defined-benefit pension plan as of March 2009, only 21 percent of workers in private industry (and only 16 percent of the nonunion workers among them) were offered participation.¹⁵

Michigan successfully implemented a defined-contribution reform in the 1990s, with state employees hired

since 1997 shifted to a defined-contribution system; teachers remain in a separate defined-benefit plan. Florida also offers a defined-contribution alternative to its defined-benefit plan.

Public-employee unions' opposition to defined-contribution retirement plans is often fierce, making such a shift politically infeasible in many states. However, allowing existing employees to remain in the defined-benefit system can dampen opposition, as it did in Michigan. A number of more moderate, compromise reforms are also available:

- o ***A shift from defined-benefit to "cash balance" pension plans.*** Cash balance plans are a sort of hybrid of defined benefit and defined contribution: employees and employers make contributions, and then the state plan guarantees a rate of return on those contributions. Employees are guaranteed not to lose money on plan investments, but a linear relationship is established between contributions and benefits. Nebraska, for example, started offering a cash balance plan as an option in 2003 (Pew 2006, p. 34). While these plans have the advantage of closely tying the size of the benefit to lifetime compensation (as opposed to, say, a participant's last three years of income), they do not prevent states from adopting overly aggressive investment targets. Nor do



such plans shield states from the consequences of market underperformance.

- o ***A shift to a TIAA-CREF-style hybrid plan.*** The Teachers Insurance and Annuity Association–College Retirement Equities Fund has been the leading provider of retirement products to college and university employees for nearly a century. TIAA-CREF offers a variety of products, including traditional defined-contribution pension investments such as mutual funds. The difference between TIAA-CREF and a standard 401(k) plan is more a matter of appearance than substance, but TIAA’s emphasis on variable-annuity investment products (which provide a defined-benefit-like certainty of payouts) could help reassure public employees that pension reform will not leave them destitute in retirement. The fact that many professors at state colleges and universities have long been offered TIAA-type plans instead of defined-benefit pensions should also help in making the case that these are not second-rate kinds of plans.
- o ***An honest accounting for future defined-benefit liabilities.*** This is something that all states with defined-benefit pension plans should embrace, but especially those that face significant political or constitutional barriers to fundamental pension reform. A key driver of ever-rising retirement benefit costs is their hidden nature: it is easier today to promise retirement benefits that won’t have to be paid out for years than to give pay raises that come out of present revenues. Accounting accurately in the current period for the future costs of promised benefits—particularly by using a more conservative discount rate for future pension liabilities, as this paper advocates—will raise the currently recognized cost of benefits and constrain the political impulse to

be overly generous. No matter what path pension reform may take, state governments have no excuse not to admit the true extent of their unfunded liabilities. They must take serious and substantive steps to prevent financial disaster in the future.

Who’s Best, Who’s Worst

Of the fifty-nine funds in our sample, fifty-six show a funding deficit in their financial statements. After we made adjustments, all fifty-nine showed funding shortfalls. But some funds are in much better shape than others.

On the bright side, five plans are 75 percent funded or better: teacher-specific plans in the District of Columbia, New York State, and Washington State, and state employee retirement systems in North Carolina and Tennessee.

The worst-funded plan in our sample is the West Virginia Teachers’ Retirement System, which we estimate to be only 31 percent funded. The four states whose plans have the next-worst funding gaps are Illinois, Oklahoma, Indiana, and Kansas; all are less than 40 percent funded.

The Illinois Teachers’ Retirement System has the third-largest funding gap in our sample (over \$70 billion, by our estimate), and the plan does not even cover Chicago, whose better-funded system faces a shortfall of its own of more than \$9 billion.

If the Illinois and Chicago plans were combined, they would have the greatest teacher pension funding gap of any state except California, outstripping Texas (\$72 billion), Ohio (\$63 billion), and New York (\$61 billion for the state and city systems combined).

ENDNOTES

1. Montana and North Dakota, the only states with no budget gaps to close, benefited from relatively strong performance in the agricultural and energy sectors, respectively.
2. Additionally, the past twelve years of stock performance (the S&P 500 Index is lower today than it was in 1998) suggests that return expectations of about 8 percent may be unreasonable for portfolios carrying significant risk. For this reason, CalPERS, the largest state employee retirement fund in America, is considering reducing its forecasted rate of return from 7.75 percent to as low as 6 percent. See Gina Chon, "Calpers Confronts Cuts to Return Rate," *Wall Street Journal*, March 1, 2010, available at <http://online.wsj.com/article/SB20001424052748703316904575092362999067810.html>.
3. Associated Press, "Ohio taxpayers asked to cover rising pension costs," 4 Jan. 2010.
4. "O'Malley asks superintendents to scour for savings," *Baltimore Sun*, 20 Oct. 2009.
5. "Fixing public-employee pension plans costly," *Columbus Dispatch*, 3 Jan. 2010.
6. In a few cases, state pension plans do not record or track the number of teachers or school-district employees at all. In such cases, we estimate that 45 percent of state pension liabilities have been accrued on behalf of teachers, which is the average figure in other states.
7. *Betts v. Bd. of Admin.*, 21 Cal. 3d 859, 864, 582 P.2d 614 (1978).
8. New Hampshire Retirement System press release, November 10, 2009, available at http://www.nhrs.org/News/Files/state_of_NHRS_2009_11_10_FINAL.pdf.
9. See <http://gothamschools.org/2010/02/04/teacher-pension-fund-lost-9-billion-last-year-while-costs-rose/>.
10. To be sure, Corzine was not the first New Jersey governor to engage in such irresponsible behavior. As *Forbes* noted, "Republican Governor Christine Todd Whitman played the game in the 1990s by using rosy investment-return projections to justify skipping two years of pension contributions. Her successor, Democrat James McGreevey, kept the practice going" (Fitch 2009).
11. See Goldman Sachs Global Markets Institute, "Accounting Policy Update: Big Contributions to Pension Plans, but Still Underfunded," September 16, 2009, available at <http://www2.goldmansachs.com/ideas/global-markets-institute/featured-research/big-contributions-doc.pdf>; Peter Fortune, "Pension Accounting and Corporate Earnings: The World According to GAAP," Federal Reserve Bank of Boston, Public Policy Discussion Papers No. 06-2, p. 15; and Mercer Pension Discount Yield Curve and Index Rates—December, updated January 5, 2010, available at <http://www.mercer.com/summary.htm?idContent=1213490&siteLanguage=100>.
12. There are good arguments for subjecting governments to even more conservative pension accounting than private firms must use. Because private firms can go bankrupt and default on their pension obligations, pension benefits

are not truly without risk to the beneficiary. Since a state is less likely to default on its pension obligation than a corporation is, especially states whose pension benefits are constitutionally guaranteed, a lower rate is probably called for, increasing the size of the unfunded liability. However, a risk-free discount rate is not called for, because even states with constitutional guarantees cannot be prevented from amending their constitutions and defaulting. For simplicity's sake, we treat public pensions like private ones, while recognizing that the former's unfunded liabilities are almost certainly greater than such treatment would indicate.

13. "Actuarial liabilities" are the estimate of the present value of liabilities accrued by a pension plan. The calculation is based on actuarial assumptions about future actions by plan participants and employers—for example, growth in employee salaries (which affect the size of pension benefits), average retirement age, and average lifespan in retirement. These liabilities are then discounted to the present day through the use of a discount rate.

14. We do not claim that this is a perfect estimation of asset values, as we do not have direct insight into the specific performance of plan assets since last reporting. While some plans invested a good portion of their non-stock assets in relatively safe bonds, many plans invested in hedge funds, real estate, or other investments that may have moved as much or more than the stock market. For funds that most recently reported asset values in 2009 (when markets were lower than today), we are likely overstating the funding gap; for those that last reported in 2008 or earlier, we likely understate it. However, we believe that our adjusted estimates are closer to today's reality than the funds' own reported actuarial asset values.

15. Bureau of Labor Statistics, "National Compensation Survey: Employee Benefits in the United States, March 2009."

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APPENDIX

Plan Name	Officially Stated Funding Gap*	% Funded	After adjusting discount rate*	% Funded	After adjusting market value*	% Funded
Alabama Retirement Systems	\$5,991,640	78%	\$14,366,523	59%	\$17,222,167	51%
Alaska Teachers Retirement System	\$2,682,202	65%	\$5,415,694	48%	\$5,795,202	44%
Arizona State Retirement System	\$4,403,404	82%	\$12,145,615	63%	\$11,775,612	64%
Arkansas Teachers Retirement System	\$2,015,000	85%	\$6,181,177	65%	\$7,116,316	59%
California State Teachers Retirement System	\$22,519,000	87%	\$78,051,571	67%	\$97,532,589	58%
Chicago Public School Teachers Pension and Ret. Fund	\$3,134,324	79%	\$7,884,697	60%	\$9,228,054	54%
Colorado Public Employees Ret. Assn.	\$9,266,873	70%	\$21,871,667	50%	\$24,867,439	43%
Connecticut Teachers Retirement Board	\$6,530,008	70%	\$15,394,382	50%	\$16,992,762	45%
Delaware Public Employees Retirement System	\$41,478	99%	\$1,108,019	75%	\$1,412,846	68%
Denver Public Schools Retirement System	\$548,719	84%	\$1,968,990	60%	\$2,150,346	56%
DC Retirement Board—DC Teachers	\$(140,500)	111%	\$97,159	94%	\$240,528	84%
Duluth Teachers Retirement Fund Association	\$85,545	77%	\$233,874	54%	\$316,426	38%
Ed. Employees' Supplementary Ret. Sys. of Fairfax County	\$521,344	77%	\$1,026,982	63%	\$1,144,470	59%
Florida Retirement System	\$7,469,813	88%	\$24,845,578	70%	\$29,241,129	64%
Georgia Teachers Retirement System	\$4,779,493	92%	\$18,037,327	75%	\$23,620,841	67%
Hawaii Employees Retirement System	\$2,298,048	67%	\$4,505,005	51%	\$4,887,731	47%
Idaho Public Employee Retirement System	\$219,379	93%	\$1,032,194	73%	\$1,181,183	69%
Illinois Teachers Retirement System	\$35,001,154	52%	\$64,694,277	37%	\$70,302,853	32%
Indiana State Teachers Retirement Fund	\$11,132,805	42%	\$15,429,079	34%	\$15,166,177	35%
Iowa Public Employees Retirement System	\$2,515,733	81%	\$5,513,787	66%	\$6,220,458	62%
Kansas Public Employees Retirement System	\$5,238,522	52%	\$8,656,012	40%	\$8,932,861	38%
Kentucky Teachers Retirement System	\$8,514,445	64%	\$13,760,837	52%	\$15,277,179	47%
Louisiana Teachers Retirement System	\$9,338,600	59%	\$17,532,569	44%	\$18,235,661	41%
Maine Public Employees Retirement System	\$1,612,826	74%	\$3,271,321	58%	\$2,767,336	65%
Maryland State Retirement and Pension System	\$9,172,188	65%	\$16,189,214	51%	\$16,847,479	49%
Massachusetts Teachers Retirement Board	\$8,071,951	74%	\$19,177,691	54%	\$22,529,476	46%
Michigan Public School Employees Retirement System	\$8,931,000	84%	\$25,993,141	64%	\$34,869,718	51%
Minnesota Teachers Retirement Association	\$5,232,394	77%	\$14,630,956	55%	\$16,573,312	49%
Mississippi Public Employees Retirement System	\$4,498,634	67%	\$8,800,272	51%	\$10,047,399	44%
Missouri Public Schools Retirement System	\$7,899,908	80%	\$20,247,266	61%	\$24,956,188	52%
Montana Teachers Retirement System	\$1,568,800	64%	\$2,727,809	50%	\$2,852,098	48%
Nebraska Retirement Systems	\$721,617	91%	\$3,113,259	69%	\$3,827,241	62%
Nevada Public Employees Retirement System	\$3,732,345	72%	\$7,969,390	55%	\$9,055,217	49%
New Hampshire Retirement System	\$1,298,098	58%	\$2,562,532	41%	\$2,500,534	43%
NJ Division of Pension and Benefits—NJ Teachers	\$15,090,187	71%	\$33,657,984	52%	\$42,174,116	40%
New Mexico Educational Retirement Board	\$4,517,000	67%	\$8,854,805	51%	\$10,032,232	45%
New York City Teachers Retirement System	\$16,765,000	67%	\$32,595,973	51%	\$35,919,352	46%
New York State Teachers Retirement System	\$(5,477,200)	107%	\$20,386,436	81%	\$24,813,691	77%

Plan Name	Officially Stated Funding Gap*	% Funded	After adjusting discount rate*	% Funded	After adjusting market value*	% Funded
NC Ret. Systems—NC Teachers and State Employees	\$190,122	99%	\$5,107,225	84%	\$6,684,694	79%
North Dakota Teachers Fund for Retirement	\$545,600	78%	\$1,309,816	59%	\$1,715,653	47%
Ohio State Teachers Retirement System	\$36,538,096	60%	\$65,108,608	46%	\$62,987,451	48%
Oklahoma Teachers Retirement System	\$9,511,900	50%	\$15,433,064	38%	\$16,476,380	34%
Oregon Employees Retirement System	\$4,284,200	80%	\$11,077,656	61%	\$8,996,037	68%
Penn. Public School Employees Ret. System	\$9,438,000	86%	\$36,514,996	61%	\$43,245,127	54%
Rhode Island Employees Retirement System	\$2,660,544	60%	\$5,066,240	44%	\$5,507,526	40%
South Carolina Retirement Systems	\$4,865,451	69%	\$9,810,432	53%	\$12,168,749	41%
South Dakota Retirement System	\$136,934	92%	\$581,533	72%	\$616,710	71%
St. Louis Public School Retirement System	\$144,000	88%	\$506,096	67%	\$752,785	51%
St. Paul Teachers' Retirement Fund Association	\$404,360	72%	\$995,689	51%	\$1,080,622	47%
Teacher Retirement System of Texas	\$21,646,000	83%	\$61,648,673	63%	\$71,822,832	57%
TN Consolidated Ret. System—TN State & Teachers	\$839,287	95%	\$4,680,120	78%	\$5,247,798	75%
Utah Retirement Systems	\$1,291,412	84%	\$3,474,334	66%	\$4,069,115	61%
Vermont Teachers Retirement System	\$727,759	65%	\$1,481,824	48%	\$1,503,839	47%
Virginia Retirement System	\$4,502,747	84%	\$10,813,888	69%	\$13,233,929	62%
Washington Teachers, Plan 1	\$2,491,600	77%	\$5,851,631	59%	\$6,994,369	50%
Washington Teachers, Plan 2/3	\$(417,000)	108%	\$1,227,724	82%	\$1,565,529	77%
WV Consolidated Public Ret. Board—WV Teachers	\$4,134,595	50%	\$5,988,397	41%	\$6,944,358	31%
Wisconsin Retirement System	\$110,909	100%	\$8,642,528	78%	\$10,935,480	72%
Wyoming Retirement System	\$646,905	79%	\$1,591,629	60%	\$1,342,107	66%
Total	\$332,435,200	78%	\$816,843,163	60%	\$932,517,307	54%

These figures come from plan financial statements, as adjusted by the authors' calculations. In cases where a pension plan covers teachers and other non-education public employees, the funding gap is pro-rated based on the share of teacher participation in the plan; except Hawaii, Mississippi, Utah, and Virginia, where that information was unavailable and the gap was pro-rated based on national average teacher participation in public employee plans (45 percent).

* Multiply dollar figures by \$1,000

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