REGIONAL SPOTLIGHT

Pension Gap Perils

Are the significant shortfalls in tristate public pension funds actually far worse than official reports suggest?

BY ELIF SEN

Pennsylvania and New Jersey's underfunded public pension systems have severely strained their state budgets and put their taxpayers at risk of bearing a potentially significant financial burden. Though Delaware's gap is considerably narrower, its pension assets also fall short of liabilities. By some estimates, the shortfall between promised state pension benefits and available funding in the three states totals nearly $103 billion, and the potential per capita tax burden as of 2013 ranged from $1,179 in Delaware to $5,728 in New Jersey. Yet, as serious as this sounds, is the problem actually significantly worse?

The size of a state's pension gap matters of course to its active and retired workers, but also to all its residents. That's because pension obligations are promises — more legally binding in some states than others — to make payments to workers at a future time. Failing to accumulate enough money to make good on these promises can force states to raise taxes or cut programs, or both.

How can a pension plan be reasonably sure it will meet its obligations? First, a plan needs to adhere to an actuarially determined schedule of contributions to the pension fund. Second, plans rely on the growth of their funds, which are invested in stocks, bonds, and other investments.

These assets and future benefits — liabilities, from the plan's perspective — both need to be measured in today's dollars in order to determine the plan's health. Because of the time value of money, $100 to be paid out sometime in the future is worth less than $100 paid out today, so the *future value* of liabilities must be *discounted* to determine the *present value*.

Like most state plans in the U.S., tristate plans use the assumed rate of return on their invested assets as their discount rate to calculate the present value of total liabilities. Although economists, analysts, and legislators debate what is an appropriate discount rate assumption for pension funds, many financial economists argue that current assumptions are too high and that the discount rate should be independent of the rate of return of assets. As this article will show, the discount rate used can make a major difference in funds' health status.

SNAPSHOT OF PUBLIC PENSIONS IN OUR THREE STATES

The state retirement systems included in this article cover approximately 1.5 million active and retired public sector employees in a variety of occupations — including state government office workers, public school employees, and law enforcement personnel — through *defined benefit* pension plans for which the state is the sponsor, administrator, employer, or funder (Table 1).[1]

To get a picture of the health of these systems, we examine trends for each state from 2003 to 2013 in four key pension fund status indicators — actuarial accrued liabilities and assets, funded ratios, unfunded actuarial accrued liabilities, and annual required contributions.[2]

Actuarial accrued liabilities and assets. Actuarial accrued liabilities represent the present value of future obligations to pension plan members, and assets represent the value of the

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TABLE 1

Tristate Pension Plans Analyzed

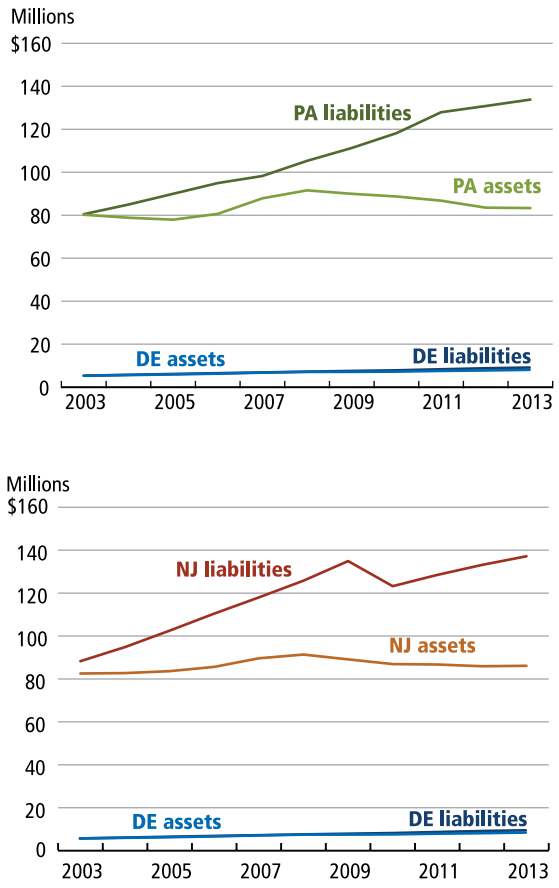
	Plans	Members		
		Active	Retired	Total
PA	State Employees' Retirement System Public School Employees' Retirement System	372,614	329,256	701,870
NJ	Public Employees' Retirement System Teachers' Pension and Annuity Fund Police and Firemen's Retirement System Consolidated Police and Firemen's Pension Fund Prison Officers' Pension Fund State Police Retirement System Judicial Retirement System Public School Employees' Retirement System	477,314	292,933	770,247
DE	State Employees' Pension Plan New State Police Pension Plan Judiciary Pension Plan County and Municipal Police Firefighters County and Municipal Other Employees Volunteer Firemen Diamond State Port Corporation State Police Retirement System (Closed) Teachers' Pension and Annuity Fund Police and Firemen's Retirement System Consolidated Police and Firemen's Pension Fund Prison Officers' Pension Fund State Police Retirement System Judicial Retirement System Public School Employees' Retirement System	46,420	26,180	72,600

Sources: Pew Charitable Trusts and individual plans' Comprehensive Annual Financial Reports (CAFRs).
Note: Membership counts are as of fiscal 2013 and were obtained from individual plan CAFRs. The listed plans are those included in the Pew state pension database.

FIGURE 1

Gaps Have Widened Since Recession

Total liabilities vs. actuarial value of assets.



Source: Pew Charitable Trusts.

pension plan's investments, or the *valuation assets* (Figure 1).[3] In all three states, the growth of total liabilities outpaced the growth of assets from 2003 to 2013, though the divergence was not as sharp in Delaware. Over that same period, liabilities grew 66.3 percent in Pennsylvania, 55.4 percent in New Jersey, and 74.3 percent in Delaware, while assets grew more slowly, at 3.9 percent, 4.4 percent, and 53.0 percent, respectively.

From these actuarial accrued liabilities and assets are derived two main indicators of a plan's health — the funded ratio and unfunded liabilities.

The funded ratio. The funded ratio is the ratio of assets to liabilities. It indicates how well funded a plan is at a given point in time. A funded ratio of less than 100 percent means a pension fund's assets do not cover its liabilities. Funded ratios declined among all 50 states on average from 2003 to 2013 (Figure 2). Though Delaware's funded ratio was comparatively high, it declined from slightly more than 100 percent — more than fully funded — in 2003 to 88 percent by 2013. Pennsylvania's funded ratio declined more, by 37 percentage points, to 62 percent. Similarly, New Jersey's fell 31 percentage points to 63 percent.

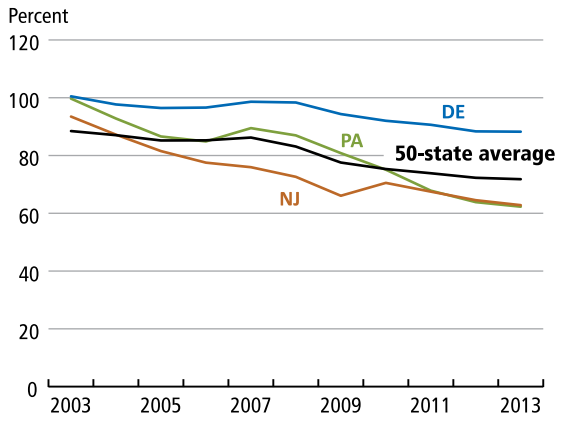
Unfunded actuarial accrued liabilities. The unfunded actuarial accrued liability — calculated as actuarial accrued liabilities less actuarial accrued assets — represents obligations not covered by assets, or pension debt. As one would expect given the increasing divergence of liabilities and assets, unfunded liabilities increased in all three states from 2003 to 2013 (Figure 3). Delaware's plans had been slightly overfunded in 2003, by $26 million, yet by 2013 its unfunded liabilities exceeded $1 billion. Pennsylvania and New Jersey's unfunded liabilities sat above $50 billion in 2013, more than two and a half times the 50-state average of $19.4 billion.

The trends in these indicators show deterioration in overall funding health for all three states and sharp increases in unfunded liabilities for Pennsylvania and New Jersey. So, what happened over those years? Many factors

FIGURE 2

Funding Deteriorated Everywhere

Funded ratios.

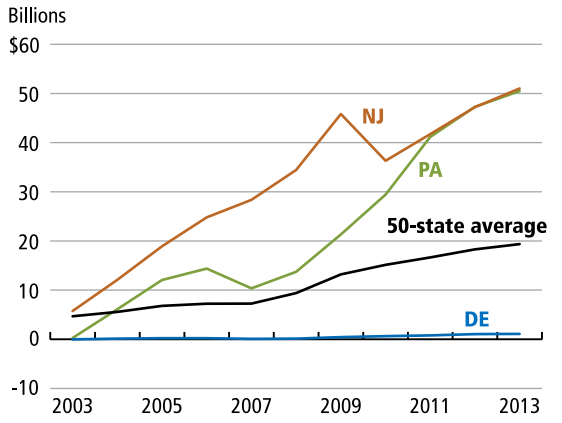


Source: Pew Charitable Trusts.

FIGURE 3

A Damaging Decade

Unfunded liabilities.



Source: Pew Charitable Trusts.

impact the size of unfunded liabilities, and in any given year, unfunded liabilities will grow or decline based on contributions and investment returns as well as on any changes to or deviations from plan benefits or assumptions.

For instance, market downturns can play a large role in the health of pension plans. A 2015 study examined the impact of some of these factors, including investment returns and contribution cutbacks, on the growth of unfunded liabilities for 150 state and local plans in the United States from 2001 to 2013 — a period that included both the aftermath of the dot-com stock bubble and the Great Recession.[4] The analysis found that more than 60 percent of the increase in unfunded liabilities occurred as a result of lower-than-assumed investment returns during this period. By contrast, the study attributed about 24 percent of the rise in unfunded liabilities to insufficient contributions — that is, contributions that were smaller than what was needed to cover obligations.

As might be expected, poor returns strongly affected every plan, and contributions likewise fell short for all plans during this period. Even so, plans whose average funded ratios were lower during the period generally experienced bigger increases in unfunded liabilities, with inadequate contributions accounting for a greater share of the rise than they did among well-funded plans. Among poorly funded plans, inadequate contributions accounted for about 33 percent of their increase in unfunded liabilities, versus 13 percent for well-funded plans.

By contrast, well-funded plans were hurt more than poorly funded plans by lower-than-assumed returns, which accounted for nearly 70 percent of the increase in unfunded liabilities among well-funded plans versus about 55 percent among poorly funded plans.

Unfunded liabilities pose potential financial burdens on taxpayers and increase pressure on government revenues and spending. On a per capita basis, unfunded liabilities soared in all three states from 2003 to 2013, from $21 to $3,950 in Pennsylvania, from $667 to $5,728 in New Jersey, and from negative $32 to $1,179 in Delaware. The size of Delaware's unfunded liabilities in 2013 amounted to nearly 33 percent of its total tax revenues. For Pennsylvania and New Jersey, unfunded liabilities amounted to 149 percent and 175 percent, respectively, of total tax revenues.

Annual required contributions. Pension plan financial reports also include information on annual required contributions, which are determined by actuarial methods. The required contribution for each year — "required" not in the legal sense but in the sense of staying on a path toward full funding — equals the sum of the cost of benefits earned by active employees during that year, known as the *normal cost*, and an amortization payment.[5] Put simply, if the annual required contribution is made over the next 20 to 30 years, the pension fund will meet all its obligations over that period. While Delaware made annual contributions in line with its required amounts, Pennsylvania's and New Jersey's contributions were consistently well below their required amounts (Figure 4).

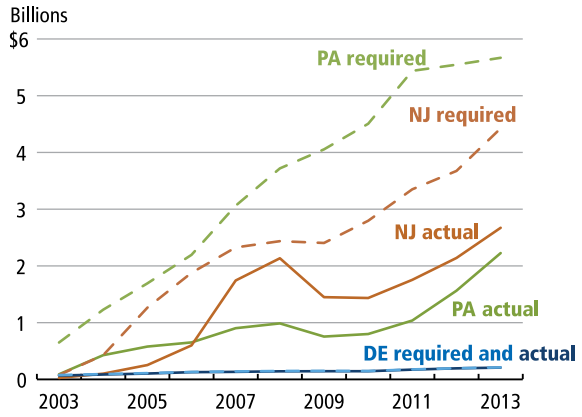
HOW BEST TO MEASURE LIABILITIES

Clearly, the four key indicators highlight significant gaps in tristate pension plans. Yet, are these shortfalls actu-

FIGURE 4

Pennsylvania, New Jersey Consistently Below Target

Annual required contributions vs. actual contributions.



Source: Pew Charitable Trusts.

ally far worse than official reports suggest?

The status of a pension fund, including its liabilities, depends on the actuarial methods and assumptions used, which vary by plan and state. Economists, analysts, and policymakers continue to debate how best to value plan liabilities and, thus, the true size of funding gaps.

Recall that actuaries incorporate demographic factors (retirement age, life expectancy, etc.) along with economic factors (salary increases, investment returns, inflation, etc.) in determining the total pension liability and then discount the total to arrive at the present value of future benefits. It follows then that the rate used to discount the total pension liability — another assumption that needs to be made — has a significant impact on the calculation of a plan's total liabilities.

Underlying the debate over how to value liabilities is disagreement over what an appropriate discount rate assumption is for calculating the present value of future pension fund obligations.

Most state pension plans in the U.S. apply a discount rate that corresponds to the assumed rate of return on their assets to discount liabilities. However, researchers Robert Novy-Marx and Joshua Rauh note that pension payments are extremely likely to be made, as they are legal obligations, while stocks and other risky investments have uncertain outcomes.[6] Therefore, they argue, liabilities should be measured independently of how pension funds are invested.

Most states, including our three states, use a discount rate of 7 to 8 percent. While this may be reasonable given the historical average stock market return of approximately 11 percent, Novy-Marx and Rauh speculate that, to be able to call their pensions funded, states could simply adopt riskier investment strategies with higher expected returns while still holding insufficient assets.

Is there evidence of the use of such strategies? According to a recent Pew report on state pension investments, three-quarters of state retirement systems' assets in the United States are invested in stocks and "alternative investments," which is an ambiguous term but generally includes private equity, hedge funds, real estate, and some commodities. These alternative investments "can be employed to diversify investment portfolios or to achieve higher rates of return, although often at higher levels of risk." From fiscal 2006 to fiscal 2013, the share of pension funds' portfolios allocated to these alternative investments more than doubled, from 11 percent to 25 percent, while the share invested in stocks decreased from 61 percent to 49 percent.

Citing standard financial theory, Novy-Marx and Rauh argue that pension obligations should be discounted at a rate that reflects their risk, and "in the case of state pension funds, the 'risk' is the level of certainty as to whether certain payments will need to be made." That is, since there is a 100 percent certainty that pension benefits will need to be paid out, pension funds should be invested in financial instruments whose returns are just as certain. That leaves U.S. Treasury bills and bonds, which, because they are backed by the full faith and credit of the U.S. government, are considered essentially risk-free. Note that such certainty comes at a steep cost: Interest rates on Treasuries are generally much lower than returns on riskier investments and currently remain near historical lows.

When Novy-Marx and Rauh used liabilities as officially reported by the 116 largest state public pension plans in the nation in 2008, they calculated total unfunded liabilities of more than $1 trillion. However, when they used liabilities discounted by the Treasury rate, total unfunded liabilities rose to $3.23 trillion.

Recommending what discount rate to use is beyond the scope of this article. However, to demonstrate the sensitivity of liabilities to the discount rate used, we can create simple estimates of the unfunded pension liability for each of the three states for 2013 under alternative discount rates. Table 2 shows total liabilities at different discount rates and the resulting unfunded liabilities and funded ratios for each of the three states. Here we can see, for example, that if a discount rate of only 4 percent were applied to Pennsylvania's pension funds instead of 7.5 percent, the reported unfunded liabilities would be more

TABLE 2

Assumed Discount Rate Has Big Impact

		As reported in 2013	Under alternative discount rates			
PA	Discount rate, percent	7.5	8	6	4	2
	Total liabilities, billions	133.8	126.0	160.6	205.8	264.9
	Total assets, billions	83.3	83.3	83.3	83.3	83.3
	Unfunded liabilities, billions	50.5	42.7	77.3	122.5	181.6
	Funded ratio, percent	62.3	66.1	51.9	40.5	31.5
NJ	Discount rate	7.9	8	6	4	2
	Total liabilities	137.1	135.5	172.8	221.3	284.9
	Total assets	86.1	86.1	86.1	86.1	86.1
	Unfunded liabilities	51.0	49.4	86.7	135.2	198.8
	Funded ratio	62.8	63.6	49.8	38.9	30.2
DE	Discount rate	7.5	8	6	4	2
	Total liabilities	9.3	8.7	11.1	14.2	18.3
	Total assets	8.2	8.2	8.2	8.2	8.2
	Unfunded liabilities	1.1	0.5	2.9	6.1	10.2
	Funded ratio	88.2	93.7	73.5	57.4	44.6

Sources: Pew Charitable Trusts and author's calculations.
Notes: Estimates are based on the assumed rate of return reported for the largest plan in each state and also use the discount rate as reported in the second column. For calculations under alternative discount rates, total liabilities as reported in 2013 were projected forward for 13 years at the assumed rate of return, and then discounted back at the alternative discount rate. Because plan durations vary, revaluations of liabilities are based on a common duration period of 13 years, consistent with Moody's Investors Service's propietary methodology to adjust state pension data, a description of which is available with subscription at http://www.moodys.com/viewresearchdoc.aspx?docid=PBM_PBM151398.

than double and the funded ratio would be more than 20 percentage points lower for 2013.

CONCLUDING REMARKS

Applying a lower discount rate would, of course, not resolve the pension crisis. At best, all it can do is make the magnitude of the problem clearer. That said, a more realistic picture could be a first step toward action to close the funding gap. ■

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NOTES

[1] Traditional defined benefit pensions promise set payments, while under today's more common *defined contribution* retirement plans, such as 401(k)s, no set payouts are promised.

[2] The data for the state retirement systems included in this article cover 2003 to 2013 and come from the Pew Charitable Trusts state pension database, which aggregates each state's plans' financial information. The systems included in the database are "those listed in the state CAFR [Comprehensive Annual Financial Reports] in which the state is a sponsor, administrator, employer, or funder," and "local pension systems with no direct state involvement are not included." For consistency in financial reporting standards, the data used in the analysis go through fiscal 2013.

[3] Assets are often reported as a smoothed market value to lessen the impact of short-term market volatility on reported values. The data shown in this article were reported using smooth five-year average asset values under the Governmental Accounting Standards Board (GASB) Statement 25. As a result, data for 2013 still included losses sustained in 2009 due to the financial market downturn during the Great Recession. Effective with fiscal 2014 reports, GASB adopted Statement 67, an amendment of Statement 25, which changes how assets and liabilities are disclosed in plans' CAFRs. Among the changes to reporting standards under GASB 67, unfunded pension liabilities or net pension liabilities (calculated as the difference between liabilities and assets) will be based on the market valuation of assets and not smoothed investment gains and losses over a period of years.

[4] See the analysis by Alicia Munnell, Jean-Pierre Aubry, and Mark Cafarelli. The Public Plans Database they used includes data for the Delaware State Employees, New Jersey Public Employees, New Jersey Police and Fire, New Jersey Teachers, Pennsylvania Public School Employees, Pennsylvania State Employees, Pennsylvania Municipal, and Philadelphia Municipal retirement systems and plans.

[5] The new accounting standards under GASB 67 replaced the annual required contribution with the actuarially determined employer contribution. Both measurements represent the normal cost plus an amortization payment; however, while GASB 25 had established parameters for the calculation of the annual required contribution, GASB 67 places no limitation on the calculation of the actuarially determined employer contribution. In their June 2015 brief, Munnell and Aubry found that most plans in their Public Plans Database continued to use the same methods and assumptions to calculate an annual contribution in fiscal 2014.

[6] The degree to which pension obligations are protected, however, varies by state. Most states, including our three states, protect pensions under contract theory. Any legislation changing the terms of the contract is subject to court review. See the brief by Alicia Munnell and Laura Quinby for more detail. Pension benefits are contractually protected for past and future accruals in Pennsylvania and past accruals in Delaware (once the employee is eligible for retirement) and New Jersey. Future accruals protection in New Jersey is unclear.