



Statement before the Pennsylvania House Committee on State Government
Subcommittee on Public Pensions, Benefits, and Risk Management
On “Public Pension System Trends and State Policy Considerations”

Benefit Provisions and Funding of State and Local Government Employee Pension Plans

General Background and the Case of Pennsylvania

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Thank you for inviting me to your hearing on state government employee pensions in Pennsylvania. My name is Mark Warshawsky and I am a Senior Fellow at the American Enterprise Institute, a think tank in Washington, DC. I have an extensive research and professional background with retirement plans, both defined benefit and defined contribution. Today, I will be reviewing and contrasting the main benefit features of average private sector and state and local government employee defined benefit pension plans. Then I will summarize some of the literature on the trends in funding of private and government plans. Regarding the measurement of the latter, there are two streams of thought – one uses the expected investment return as the discount rate, and the other uses a low-risk bond yield, as is done in accounting for private sector plans. I will present data from both perspectives.

This fairly comprehensive review sets the stage for a comparison of national averages with the two main State of Pennsylvania retirement systems, the plans for teachers and state employees, both in terms of benefit provisions and funding. Note that in presenting funded ratios and actuarially determined employer contributions for the two Pennsylvania plans, I present reported measures and the measures adjusted using bond yields. I conclude with an assessment of where Pennsylvania stands, and offer several suggestions for further improvements and needed reforms beyond those adopted in 2017. Specifically, the funding situation for the Pennsylvania plans is poor, even compared to peers, especially when measured on a more realistic bond yield basis, and the defined contribution only plan option now being offered to new workers needs to be bolstered to give a real and fair retirement plan and to lower the costs and reduces the risk exposure of Pennsylvania taxpayers.

Background on the Benefits of State and Local Government Employee Pension Plans

Defined benefit (DB) pension plans determine retirement payments according to a fixed formula based on salary, years of service, and age. It is common that benefits are based on a percentage of average earnings during a specified number of years at the end of a worker's career (or when earnings are highest), multiplied by the number of years of service recognized by the plan. Normal retirement is the specific age, length of service, or a combination of both, at which plan participants may retire and receive all accrued benefits without a reduction or penalty. In most plans, participants must satisfy a minimum service requirement to be vested in the benefits of the plan. Typical vesting requirements are 5 years of service for private sector workers, and sometimes longer (ten is common) for government workers. Early retirement is the age, length of service, or combination of age and length of service, at which plan participants may retire and receive all accrued benefits, minus a reduction or penalty, according to various formula or actuarial calculations.

According to the Bureau of Labor Statistics (BLS), in 2020, only 15 percent of private sector workers had access to DB pension plans, mainly in high-wage unionized sectors such as utilities; this access rate is down from 20 percent in 2010. Moreover, nearly a quarter of those workers nominally covered by DB plans are now in frozen plans where no new benefits are still accruing. It is rare for private DB plans to give cost of living adjustments to retirees and it is unusual for full retirement benefits to be available before traditional retirement ages such as 65. Many private open DB plans are

now cash balance plans, which provide for the accrual of benefits in a more front-loaded manner over the worker's career, compared to traditional formulas which are back-ended, with more valuable benefits accruing at the end of the career, encouraging retention. The median annual accrual rate for traditional private sector plans is 1.4 percent, and the usual averaging period for final earnings is the highest consecutive five years. All private sector workers pay taxes to and are covered by Social Security. About 12 percent of private sector workers have access to retiree health care benefits, although these are often partly or fully paid for by the retiree and not the employer. Death benefits are nearly universal, but only about half provide disability benefits through the plan.

By contrast, in 2020, 86 percent of state and local government workers had access to DB retirement plans, covering all wage levels and subsectors; this is up from 84 percent in 2010. Although a few plans are excluding new workers, none, except prospectively in bankrupt Puerto Rico, are frozen. Few are cash balance plans. The median annual accrual rate is 2.0 percent, and the most common final earnings period is the highest three years, although five is also common. It is usual for government DB plans to give cost-of-living adjustments, sometimes with minimums regardless of price inflation, but also sometimes capped at maximums. Most have full retirement benefits available after 30 years of service or at age 62 or lower (the median age is 60); it is not unusual for full benefits to be available at age 55. About a quarter of state and local government workers do not pay taxes to and are not covered by Social Security; non-coverage is more common among higher-wage workers. Disability and death benefits are nearly universal across plans. About 70 percent of government workers have access to retiree health care benefits.¹

It is sometimes alleged that government workers need to get more generous retirement benefits in order to make up for their lower pay, that is, for reasons of fairness and for government employers to be competitive in the labor market. According to a careful study by Gittleman and Pierce (2012) using BLS data, however, after controlling for skill differences and costs of benefits, state government workers have compensation costs 3 to 10 percent higher than for private sector workers. For local government, the overage is 10 to 19 percent. They found that this positive differential has increased over time, especially because of the rising cost of benefits.² These facts are relevant when equity considerations are raised in political and policy discussions about changing government worker pension benefits.

For private sector workers, the assurance of payment by DB plans is made through federal minimum funding requirements (where failure to contribute is subject to penalty), extensive federal and strict private accounting disclosure requirements, legal liability on the plan sponsor to pay unfunded vested accrued benefits, and, subject to certain maximum levels, the backstop of a government insurance agency, the Pension Benefit Guaranty Corporation, if corporate bankruptcy occurs. By contrast, government DB plans have no national minimum standard for funding practices, less stringent accounting disclosures (as discussed below) and a patchwork of state laws regarding workers' rights to accruing benefits. In particular, there are varying degrees of rigidity to which government plan sponsors

¹ The statements in this paragraph are based on statistics found in Bureau of Labor Statistics, National Compensation Survey – Benefits, various publications and years.

² See M. Gittleman and B. Pierce, "Compensation for State and Local Government Workers," *Journal of Economic Perspectives*, 26(1), February 2012, pp. 217 – 241.

are bound to the terms of the plans, for various populations (retirees, all current workers, older workers), provisions, time periods, and in various circumstances.

In general, government workers have stronger legal protections than do private sector workers to stated benefit provisions. For example, in most states, once a worker starts employment, the terms of the pension plan are fixed for her for the rest of her career with the government sponsor, whereas terms going forward, given past accruals, are often changed in the private sector. In the common contract legal approach of most states, changes can be made only in dire circumstances where a vital public purpose is served. Some state courts have allowed reductions in cost of living adjustments and increases in employee contributions and premiums for retiree health plans when plan funding gets low but other courts have not. Universally, governments are legally allowed to change the terms of pension plans for new workers by, for example, lengthening vesting periods, increasing retirement ages, cutting accrual percentages, and so on. But these changes are slow to reduce costs because, initially, few workers are affected and the savings only show up after many years. There are also practical constraints on top of the process including union bargaining and political influence which make any labor cost reduction difficult, even outside the four corners of the plan, such as slowing wage increases, layoffs, less vacation time, and so on. In the rare experience of government bankruptcy, however, federal courts have allowed cuts in accrued pension benefits, even in payout status to retirees.³

Recent Funding of State and Local Government Pension Plans

There is a regular stream of data and analysis on the funding of state and local government employee pension plans. It starts with the various actuarial and accounting reports required to be put out by government plan sponsors on a regular basis, often annually, and then the analysts collect and organize that data. However, the analysis often goes beyond simple tabulations and creates other measures and indicators, in line with different views and methodologies, of the burdens and risks the plans represent to employers, employees, and retirees. Below, we divide the data and analytical stream into two – the conventional view represented by Boston College Center for Retirement Research which takes the actuarial assumptions as data, and works from there, and the alternative view represented by Stanford Business School Professor Joshua Rauh which challenges a basic actuarial assumption on the discount rate nearly universally used in state and local government reporting, as misleading and incorrect.

The Conventional View

According to Boston College estimates for 200 of the largest state and local government employee pension plans representing 95 percent of members and assets, the actuarial funded ratio in aggregate was 74.7 percent in 2021, up from 72.8 percent in 2020.⁴ This level is still down from a decade earlier, 75.8 percent in 2010, and significantly lower than the just over 100 percent ratios seen in 2000 and 2001. The recent improvement came from good asset returns, even as liabilities continued to

³ For a fuller discussion of these legal and practical issues, see Mark J. Warshawsky and Ross A. Marchand, “State and Local Public Pension Finances and Reform Proposals: Are Lump-Sum Payout Offerings a Solution?” *Journal of Retirement*, 4(2), Fall 2016, pp. 71 – 89.

⁴ See Jean-Pierre Aubry and Kevin Wandrei, “2021 Update: Public Plan Funding Improves as Workforce Declines,” Issue Brief Number 78, June 2021, Center for Retirement Research at Boston College. It should be noted that the Boston College data base does not include Puerto Rico despite its large size -- \$32 billion pension liability and 250,000 participants in 2017.

rise. The actuarial funded ratio is the actuarial value of assets divided by actuarial liabilities. Actuarial value of assets result from a smoothing algorithm applied to market value, generally over five years.⁵ Actuarial liabilities are valued using plan benefit provisions and assumptions about generally optimistic views of the discount rate based on expected investment returns on plan assets, as well as on expected wage growth, price inflation, and, in the most commonly used actuarial cost method, future benefit accruals. Demographic matters are also key, like the number of covered workers and retirees, and expected future rates of retirement, disability, and death, as chosen by the actuary and the plan.

This aggregate funded ratio hides a wide range of funding among plans. Boston College separated plans into funded ratio thirds. For 2021, the lowest third has funded ratios from 15 to 66 percent, averaging 54 percent, the middle third from 67 to 81 percent, averaging 74 percent, and upper third from 81 to 117 percent, averaging 93 percent. The calculations also show that over time this divergence in funded ratios has increased, with the bottom third falling continuously and seriously behind, from an average 92 percent in 2001, while the upper third has improved slightly recently, although still down from 107 percent in 2001.⁶ An earlier Boston College analysis attributed the widening gap to particularly inadequate contributions compared to actuarial requirements by the lower third group, as well as slightly lower investment returns than peers.⁷

Another conventional measure of plan funding and the burden it represents to government sponsors is the actuarially determined employer contribution rate. According to Boston College calculations, this rate increased from 21.3 percent of payroll in 2020 to an estimated 22.0 percent in 2021. The actuarial contribution rate is composed of two parts – the normal cost – the present value increase in employee’s accrued benefits in the year – and the amortization payment – the amount determined by the actuary needed to pay down the unfunded actuarial liability over 10, 20, 30, or even more years. The average normal cost has held steady over the years at around seven percent, while the amortization payment has steadily increased in line with the decline in reported funded ratios. Note that employee contributions are not included in the actuarially required employer contribution rate. Although most governments fix employee contributions as a percent of pay, a few plans explicitly share the burden of rising costs by formula with employees.

According to the Boston College researchers, using a lower investment return assumption equal to actual performance since 2001 of 5.5 percent instead of the 7.1 percent currently assumed, and using a more stringent amortization approach of the level dollar method, paying a larger portion of unfunded liabilities in earlier years, instead of the more common level percent of pay method, would result in an average actuarial contribution of 39.1 percent of payroll in 2021, or about double the actual. This may be viewed as a more realistic measure of the true burden on government plan sponsors of the cost of the pension plan, to be used in funding, investment and plan design decisions. A lower discount rate and/or shorter amortization period would result in even higher required contributions. Also note that actuarially determined contributions are not always paid in full by the government plan sponsor (there are no federal penalties for such failures as exist for private pension plans). In tough economic times

⁵ Actuarial value of assets is fairly close to market value except in years with big equity market movements up or down, like 2009 and 2021; see Appendix A in Aubry and Wandrei, *op. cit.*

⁶ See Appendix B in Aubry and Wandrei, *op.cit.*

⁷ See Jean-Pierre Aubry, Caroline V. Crawford and Kevin Wandrei, “Stability in Overall Pension Plan Funding Masks a Growing Divide,” Issue Brief Number 62, October 2018, Center for Retirement Research at Boston College.

like the Great Recession, such payments fell to around 80 percent of required contributions. In 2020 actual payments were estimated to be 97.4 percent of the actuarial determination.⁸

An Alternative View

As mentioned above, for funding purposes, states measure their pension liabilities using discount rates that reflect assumed expected returns on plan assets.⁹ Professors Novy-Marx and Rauh challenged this practice based on sound logic – that is, the liability should not be measured by the rate of return on risky assets used to fund the liability because the asset allocation decision of the plan sponsor, and hence the level of risk and the expected rate of return, is independent of the value of the liability to the plan sponsor and participants.¹⁰ It is rather appropriate to assume that the notional risk of default on promised pension payments is low or zero, as presented to and understood by taxpayers, workers, and retirees, and to use this consideration in the choice of the discount rate in measuring liability and deciding on funding. Novy-Marx and Rauh do this by revaluing the state government pension liabilities using a standard low risk rate, the yield on US Treasury securities. Even taking a conservative approach to liability measurement by not considering benefits arising from future accruals or from wage increases or over more years of service (this is called the accumulated benefit obligation), by using US Treasuries as the basis for the discount rate, they calculate the aggregate state and local pension liability in 2009 as \$4.4 trillion compared to the reported liability of \$3.1 trillion. With \$2 trillion of pension assets, this change in measurement reduces the aggregate funded ratio from 65 percent to 45 percent. Indeed, by the latter measure, 21 states are less than 40 percent funded, with Illinois, Connecticut, Rhode Island, and South Carolina around 30 percent funded.

It is worth noting that large single-employer corporate pensions generally have had funded ratios exceeding 80 percent and often higher in the last twenty years, even when using conservative discount rates and including an assumption of future wages increases (projected benefit obligation) and some added liability for intentionally unfunded executive plans. In 2020, the aggregate funded ratio for the largest 100 corporate plans was 88.3 percent using a 2.56 percent discount rate, based on the current yields on high-grade long-term corporate bonds.¹¹ As a parallel discount rate for state government plans, the current yield on taxable high-grade state government bonds could be used instead of the Treasury rates.

Professor Rauh updated and expanded the analysis through 2017, as shown on the Hoover Institution website.¹² For 619 state and local plans, he found a reported 70.8 percent funded ratio in

⁸ See Appendix C in Aubry and Wandrei, 2021, op. cit.

⁹ For accounting statement purposes, this practice is tempered when the plan is so poorly funded that asset returns cannot be expected to fund the plan; in those circumstances, currently applied in relatively few cases, a portion of the liability must be measured using the governmental unit's municipal bond rate as the discount factor.

¹⁰ Robert Novy-Marx and Joshua Rauh, "Public Pension Promises: How Big Are They and What Are They Worth?" *Journal of Finance*, 66(4), August 2011, pp. 1211 – 1249.

¹¹ See Brendan McFarland, "WTW Pension 100: Year-end 2020 disclosures of funding, discount rates, asset allocations and contributions," *Willis Towers Watson Insider*, 31(5), May 2021.

¹² See [Hidden Debt, Hidden Deficits: The 2019 Update | Hoover Institution](#).

accounting statements, using an average 7.05 percent discount rate. He calculated, however, a 48.2 percent funded ratio using duration-matched Treasury yields, averaging a 2.50 percent discount rate. The five states with lowest alternative funded ratios (around 30 percent) were South Carolina, Kentucky, New Jersey, Illinois, and Connecticut. Cities with the worst funded ratios (from just above 20 percent to just above 30 percent) were Chicago, Pittsburgh, Philadelphia, Fort Worth, and Omaha.

Rauh also reported on cash flows. Benefit payments totaled \$251.2 billion, while total contributions (employer, employee, and state subsidies combined) were \$185.5 billion; these contributions represented 8.0 percent of every dollar the governments raised in revenue, up from 4.9 percent in FY2015. Under the market valuation method based on Treasury discounting, an additional \$152.1 billion would need to have been contributed to prevent a rise in the unfunded liability. This total cost of \$337.6 billion amounts to 14.56 percent of state and local government revenue including from governments that do not sponsor pension plans, up from 12.7 percent of revenue in 2015. Again, here, some states and cities were worse off. California would need to contribute nearly 25 percent of state revenues to prevent an increase in the unfunded market value liability, compared to its actual contribution of 12 percent. Nevada, Illinois, Kentucky, and Ohio similarly show alternative required contributions above 15 percent, compared to actual contributions significantly below those amounts. Similarly, despite making large current contributions as a share of revenues, Chicago, Milwaukee, Omaha, Los Angeles, San Francisco, and Fort Worth would need to at least double them to prevent a rise in market value unfunded liability. None of these calculations include amounts needed to pay down unfunded liabilities.

Summary

Across all measures and analytical approaches, the funding status of plans has worsened and the cost burden on state and local governments (and taxpayers) of employee pension benefits has increased significantly in the last twenty years. If lower, more accurate, discount rates are used, these burdens would at least double. A significant share of plans are truly struggling even under current standards and represent risks to beneficiaries as costs rise rapidly, increasing taxes and crowding out other vital government services and benefits. A good case has been made that the funded status of plans is misreported and is actually significantly lower. While government plans may not need to be as completely funded as corporate plans because the risk of bankruptcy is lower, it is not zero, and moreover, prudent management argues for accurate measurement of cost and liability and adequate funding, particularly in locations where economic growth is slow. Further, as a matter of intergenerational fairness, it is appropriate that the citizens who received the government services that are compensated for, in part, through employee benefits, should pay for them during their lifetimes and not pass them along to future generations. This is particularly true if benefit levels were originally overly generous and there is some opportunity to recapture the excess at least partially through benefit changes. Hence the correct funded measures are important because they influence current decisions about the provision and design of pension benefits and the investment and funding decisions of plan sponsors.

Benefits of Two Large State of Pennsylvania Pension Plans

In this section of the testimony, I focus on two large Pennsylvania employee pension plan systems – the Public School Employees’ Retirement System (PSERS) and the State Employees’ Retirement System (SERS). I will describe the benefit provisions of the plans in these systems and then,

in the next section, the state's contribution practices for these systems and the resulting funded situations – historical and current.

All employees who have entered PSERS since 1966 are covered by Social Security. There are several classes of employees in PSERS with different benefits depending on when they started employment. Those who started work before 2001 are in one class of benefits and employee contributions, those from 2001 to 2011 or transferred from the first class are in a second class, those who started after 2011 but before 2019 are in third class with some choice of plan, while those who started in 2019 are in a fourth class, with even more choice, including a defined contribution only retirement plan. The first class gets two percent of final salary averaged over any three years of service times years of service; they are eligible to retire with no reduction at age 62, age 60 with 30 years of service or any age with 35 years of service. Their required contribution is 5.25 percent if hired before July 22 1983; 6.25 percent if hired after that date. The second class has similar benefits and eligibility to the first except the per-year-of-school-and-military service benefit accrual is higher, 2.5 percent, (non-school-service has 2.0 percent), with higher employee contributions, 6.50 and 7.50 percent, depending on a hire date before or after July 1983.

The third class has raised full retirement eligibility requirements – age 65 with a minimum of three years of service or a combination of age and service that totals 92 with at least 35 years of service. The pension here is limited to 100 percent of final average salary but there is the same one-time choice as in the first two classes between 2.0 and 2.5 percent annual accrual rates. The base employee contribution rate is higher in the third class – 7.5 and 10.3 percent for the different accrual rate plans, respectively. Furthermore, these contribution rates are shared risk, that is, they depend on plan investment performance within the prior ten-year period compared to the assumed return for the plan plus or minus one percent, and can range within 5.5 and 9.5 percent, and 8.3 and 12.3 percent, respectively, with adjustments every three years in 0.5 percent increments.

The fourth and newest class is enrolled in one of two combinations of DB and DC plans or entirely in a DC plan, at the choice of the worker. For the DB portion, the annual benefit accrual rate is either 1.25 (default) or 1.0 percent, but for both the final average salary base is now any five years of service. The employer contribution to the DC plan for the first accrual plan is 2.25 percent, while it is 2.0 percent for the second accrual plan. The required base employee contributions are 5.5 percent (within an investment performance-related range of 2.5 and 8.5 percent, moving in .75 increments) for the DB plan and 2.75 percent for the DC plan for the first accrual rate plan. The base employee contribution is 4.5 percent (within a range of 1.5 and 7.5 percent) for the DB plan and 3.0 percent for the DC plan for the second accrual rate plan. If the worker chooses a DC only plan, then she gets a 2.0 percent employer contribution and must make a 7.5 percent employee contribution. Eligibility for full retirement benefits are increased to age 67 with three years of credit, or, for the first, default, plan, any combination of age and service that totals 97 with at least 35 years of service.

There are actuarial reductions for early retirement for all these classes, but if retirement is at age 55 and 25 years of service (age 57 for the fourth class) the reduction is limited. There are also disability and death benefits, except for the DC only plan. Vesting to a pension benefit requires five years of service for the first two classes, and ten years for the other classes. There is a return of employee contributions to the DB plan with interest if the worker leaves service before vesting. There is no cost of living adjustment; the default payout is a single life annuity with a guaranteed payment equal

to member contributions with interest. Most retiring workers, however, apparently choose a lump sum actuarial equivalent. There is a retiree health benefit. Workers are immediately vested in the balances of their DC accounts funded by their own contributions, but require, essentially, two years and some months of service to receive and vest in employer contributions to the DC plan. The actuary assumes that only 5 percent of eligible members in the fourth class will choose the DC only plan option.

Because the system's investments did not meet benchmarks in the most recent measurement period, the various classes subject to shared risk experienced contribution rate increases. Therefore, for the third class, the employee contribution rates are now, for at least three years, 8.0 and 10.8 percent for the two accrual rate plans, respectively, while for the fourth class, the employee contribution rates are 9.00 and 8.25 percent, respectively, inclusive of the employee contribution to the DC plan.

For PSERS as of June 30, 2020, there were 256 thousand active members and 240 thousand retirees and beneficiaries. The number of active members was 279 thousand in 2011 when there were 195 thousand retirees and beneficiaries; the system is clearly aging significantly. Almost \$6.9 billion in pension benefits was paid out in 2020 while about \$1.1 billion in employee contributions and \$4.7 billion in employer contributions were made. In 2011, \$5.4 billion pension benefits were paid, and \$1.0 billion and \$0.7 billion in employee and employer contributions were made, respectively. The DC plan has about 17 thousand members with about \$22 million in assets as of June 30, 2020.

SERS has broadly similar benefits and eligibility classes as PSERS, in terms of class definitions, accrual rates, retirement ages, plan choices, employee contribution rates, salary averaging periods, and vesting. The main differences are that members of the General Assembly and employees in hazardous duty positions can retire with full benefits at age 50 or 55, with three years of service, depending on class, and that police and judges have higher accrual rates. Also, there have been no shared risk changes to the employee contributions for the more recent classes for SERS.

For SERS as of December 31, 2020, there were 101 thousand active members and 133 thousand retirees and beneficiaries. The number of active members was 107 thousand in 2011 when there were 115 thousand retirees and beneficiaries; the system is clearly aging significantly. About \$3.6 billion in benefits were paid out in 2020 while about \$0.410 billion in employee contributions and \$3.2 billion in employer contributions were made. In 2011, \$2.7 billion in benefits were paid, and \$0.351 and \$0.392 billion in employee and employer contributions were made, respectively. The DC plan has about 13 thousand accounts with about \$40 million in assets as of December 31, 2020.

According to the categorization scheme of think tank researchers Mark Warshawsky and Ross Marchand, Pennsylvania is a four, that is, a high level of difficulty to change plan provisions for need or at will, for both past and future benefits to current retirees and workers, owing to state law and constitution, short of bankruptcy. Whereas in other states, automatic cost of living adjustments (COLAs) have been reduced or removed for need even in category four, that option is not available for Pennsylvania because its plans do not have COLAs. Retiree health benefits, however, can be reduced or eliminated, according to legal experience in states. Changes in employee contribution rates have also been made for current workers, although it is unclear whether that could be done in Pennsylvania because of its formal investment-performance-related structure.

Funding of Two Large State of Pennsylvania Pension Plans

The actuarial funded ratio for PSERS, its ratio of actuarial value of assets compared to its actuarial accrued liability, was 58.1 percent as of June 30, 2019. This represents a slight improvement from a historical low of 56.3 percent in 2017, but is still considerably below 85.8 percent in 2007 and 123.8 percent in 2000. For the DB pension in 2019, this ratio represents \$61.1 billion in actuarial assets (a ten-year moving average of market value) and \$105.2 billion in pension liability (using the entry age normal method), for an unfunded liability of \$44.1 billion, or almost 325 percent of annual covered payroll. More than half of the pension liability is for retirees and beneficiaries. Under the GASB 67 accounting standard, where assets are measured at market, the funded ratio is 54.3 percent as of June 30, 2020. The discount rate used was 7.25 percent.

Measuring funding through the actuarially determined employer contribution rate, the pension for 2021 had a rate of 33.51 percent of payroll, composed of 7.37 percent for normal cost and 26.14 percent for the amortization of the unfunded liability, over 24 years, as a level percent of pay. This contribution rate is up substantially from four percent in 2010 when it was limited by legislation and only a small portion of actuarially required contributions were being made, but it is also up from 29.2 percent in 2017 when the limit no longer applied. The 2022 pension rate increased again, to 33.99 percent. It is worth noting that actuarial experience (the difference between actual realizations and actuarial assumptions) has generally been negative over the last decade, mainly because of investment losses (compared to assumed rates). No projections of future funded ratios or required contributions are given by the actuary.

The actuarial funded ratio for SERS was 59.4 percent as of December 31, 2020. This is based on the actuarial value of assets (a five-year moving average of market values) of \$32.7 billion and a pension liability of \$55.1 billion, resulting in \$22.4 billion unfunded liability, or almost 350 percent of payroll. The 2020 funded ratio was increased on a one-time basis by 1.9 percentage points owing to a pension buyout by Penn State. The ratio increased from 56.0 percent in 2018, its low point, but is still considerably below 65.3 percent for 2011, and 116.3 percent in 2001. More than half of the pension liability is for retirees and beneficiaries. Under the GASB 67 standard, the funded ratio is 67.0 percent. The discount rate used was 7.0 percent.

Measuring funding through the actuarially determined employer contribution rate, the pension for 2021 had a rate of 34.51 percent, composed of 8.29 percent for normal cost and 26.22 percent for the amortization of the unfunded liability, over 30 years, as level dollars. This contribution rate is up from the actuarially determined rate of 26.30 percent in 2011, limited by legislation to 11.5 percent. It is worth noting that actuarial experience has been negative in the last few years, for various reasons, including changes in actuarial assumptions and methods, investment losses, higher pay increases, and demographics. The actuary, however, projects, under current assumptions, that the required employer contribution rate will decline to 25.6 percent and the funded ratio will rise to 81.1 percent by 2030.

Professor Rauh has generously shared his unpublished funded ratio calculations, using duration-sensitive Treasury rates, for the two Pennsylvania plans. For PSERS, based on a duration-matched Treasury rate of 0.8 percent at the end of 2020, the pension liability is \$214.5 billion, leading to an actuarial funded ratio of 27.3 percent, down from 32.1 percent in the prior year. Using the adjusted accumulated benefit obligation of \$192.6 billion, the funded ratio is 30.4 percent. For SERS, based on a duration-matched Treasury rate of 1.07 percent, the pension liability is \$98.5 billion, and the actuarial funded ratio is 35.6 percent, down from 38.1 percent in the prior year. Using the adjusted accumulated

benefit obligation of \$86.4 billion, the funded ratio is 40.5 percent. As seen, by all measures, whether the actuarial pension liability (which includes future salary increases and benefit accruals) or the accumulated benefit obligation (which does not), using Treasury market rates as the discount factor, the funded situation is shown to be much poorer than reported and to have deteriorated over the year, despite good investment performance.

Comparative Assessment and Policy Implications

The funding situation of the two Pennsylvania pension systems is poor, as measured by both funded ratios and actuarially determined employer contribution rates – funded ratios are in the lowest third of the states, and contribution rates are nearly 50 percent higher than the average. Among the obvious causes are that funding requirements were not met for fifteen years in Pennsylvania and that past plan provisions were too generous – in the upper range among other states and certainly compared to the private sector, in terms of high benefit accrual rates, young retirement ages, subsidized early retirement, short final average salary periods, and so on. Only the lack of an automatic cost of living adjustment was a prudent move. Also, actuarial experience has been consistently negative, indicating that the plans' actuarial assumptions and methods are too optimistic, essentially reducing needed funding over time.

In the latest class of benefit plans, most of the relevant provisions have been amended in the right direction, along with increased employee and employer contribution rates, with a shared risk element. So one might say that past bad decisions are water under the bridge and not worth comment. That is not correct for four reasons. First, the changes may take some time to appear in improved funding and lower contributions, so the legacy is present for many years. Second, if funded ratios do not rise and employer contributions increase according to assumptions (such a failure is a strong possibility), further changes will be needed. Third, in government as well as in personal life, one cannot overemphasize the need for prudence, despite temptations and momentary difficulties, and that eventually the price must be paid for profligacy and irresponsibility. In this instance, it is certainly regrettable and unfair that future generations of Pennsylvania taxpayers and state workers must pay for the underpriced labor services provided to earlier generations. Fourth, there are still elements in the current system, where the true cost of the pension benefits are not being recognized. The chief cause is the still too high discount rate being assumed. For a liability that is being put forward as essentially risk free, it is simply an error and misleading to use the expected rate of return on a portfolio composed of risky assets.

I have three other suggestions. Particularly given the role of choice for workers among plans, including a DC only plan, it is important that workers themselves have good basic knowledge of the current and expected future funding situation of their systems. As put forward in Warshawsky and Marchand, for conditions to be understood and choices correctly evaluated, Pennsylvania should provide to all plan participants, in laymen's language, information on the accurately measured funded ratio of their plan and projected required contributions compared to current rates, in the context of the state budget. These numbers would be calculated using tightly controlled assumptions, including a conservative discount rate based on current taxable state government bond yields, currently 2.8 percent for Pennsylvania, a conservative funded ratio goal, and a reasonable amortization period. Moreover,

more extensive sensitivity analysis in the actuarial reports is needed on the main assumptions, in particular, the discount rate.

My second suggestion concerns the DC only plan. It seems to be designed to discourage its use by workers. Its employer contribution is small, it does not contain disability and death benefits, and its expected retirement benefits are surely lower than the alternatives on reasonable investment return assumptions. The only employees who would seem to rationally choose the DC only plan would be those who expect to leave state or teacher service sometime after a couple of years and who expect high investment returns. If the reason for offering a DC only plan is for the state of Pennsylvania to begin the transition away from the deepening hole of accruing pension liabilities and from tying workers to their jobs for a lifetime, a better DC only option is needed. This change no doubt would also make Pennsylvania state government and schools more competitive with the private sector where DC only retirement plans are the norm. Indeed, the next logical step in pension reform for Pennsylvania is to increase the employer contribution rate to the DC only plan significantly, to 7.5 percent, around the normal cost of the DB plans, to close the DB plans to new employees, and to offer that same package to existing workers. This offering would be popular with employees, would free up career choices efficiently, and would save the state money. With the current 7.5 percent employee contribution rate, the resulting total contribution rate of 15 percent would be sufficient, combined with Social Security, to produce a comfortable retirement.

My third suggestion is about improving the shared risk mechanism. Although it is true that plan investment performance is one of the largest elements influencing the funding status of the plan, it is not the only one. There are significant demographic and economic factors of the plan population, such as disability, salary increases, turnover, early retirement, and so on that can strongly influence funding outcomes compared to expectations. Moreover, some of these elements are, at least in part, controlled by the system and state through, for example, asset allocation changes, early retirement campaigns, strategic alterations in wage policy, and other decisions. And, because the shared risk formulas reference results relative to expectations, the setting of actuarial assumptions, which is also, at least in part, controlled by the system, expose workers to employer strategic decision-making and not only the results of truly exogenous events. In the particular case of investment returns, if the system is counting on increased employee contributions, there is a disincentive to reduce the discount rate, which it needs to do. So it would be fairer if the shared risk formula were calibrated to several external measures, such as a fixed combination of stock and bond indexes compared to Treasury yields, changes in state-wide wage levels compared to expert projections, and so on.