Forensic Analysis Series: How Did Pennsylvania SERS Become Underfunded?
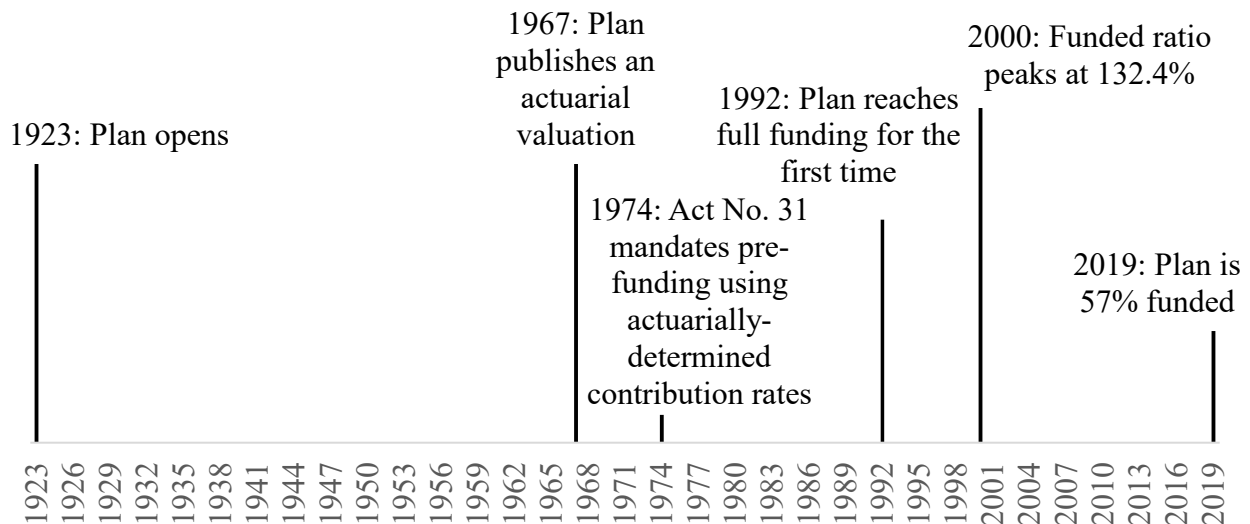
This testimony pulls from a preliminary analysis of Pennsylvania State Employees Retirement System (PA SERS) undertaken by the CRR as part of a series investigating the key factors contributing to the current unfunded liabilities of public pension plans and their options for moving forward. In particular, the series explores how the retirement benefits earned before governments began pre-funding retirement benefits created "legacy debts" that remain a burden on pension plans today. The data and analysis herein are not to be considered final, actionable, or policy recommendations.

The analysis will proceed as follows. The first section provides a brief overview of PA SERS' funding history. The second section details the major factors that have contributed to SERS' currently low funded ratio and large unfunded liability. The third section models the future finances for SERS under a typical actuarial approach, but notes that the status quo approach to financing pensions is what has brought SERS to where it is today. The fourth section presents a different path forward by first separating the funding of legacy liabilities from the funding of other pension liabilities and then transitioning the remaining plan to the funding approach that the government requires of private sector defined benefit plans. The final section concludes that such a grand bargain would 1) relieve plans and current workers of an inappropriate liability burden and 2) restore confidence in the sustainability of the pension system by correctly valuing benefits and shrinking unfunded liabilities.

I. A Brief History of SERS' Funding

SERS has been providing retirement benefits to its members since at least 1923 – longer than most state and local retirement systems in the United States (see Figure 1).

Figure 1. *Timeline of Key Funding Events for Pennsylvania SERS, 1923 to 2019*

At the time that SERS started pre-funding, an actuarial valuation in 1974 reported the actuarially accrued liability (AAL) for SERS as of December 31, 1974 to be $4.5 billion – meaning that the discounted present value of future pension benefits earned by SERS members equaled $4.5 billion. At that time, the plan held assets equal to roughly a third of its liability, leaving SERS with an unfunded actuarial accrued liability (UAAL) of $3.1 billion in 1974. From there, the plan began to intentionally put additional money aside, with the goal of paying down its unfunded liability. Importantly, this $3.1 billion initial legacy liability continues to affect SERS today.

In 1974, the State shifted from its long-standing practice of "funding" benefits on a pay-go basis to pre-funding retirement benefits on an actuarial basis (i.e. putting aside money in a trust each year while an employee is working in order to cover the cost of the employees' retirement benefits).

Figure 2 shows the funded status for SERS since it began pre-funding and provides, for comparison purposes, the average funded ratio for all state and local plans from 1990 forward (data prior to 1990 were not available).

Figure 2. *Funded Ratio of Pennsylvania SERS Compared to the National Average, 1974-2019*
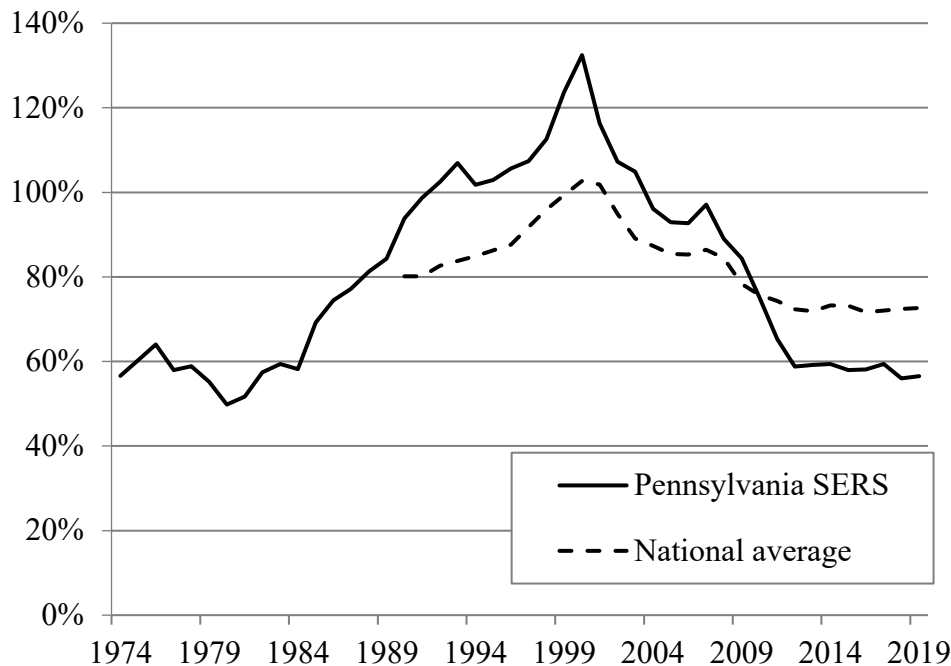
Note: CRR estimates missing data points using a straight-line approximation between actual data provided.

II. A Look Backward: Factors Behind the Current Unfunded Liabilities for SERS

Since 1974, SERS' UAAL has grown by $19.9 billion – from an initial value of $3.1 billion ($16.2 billion in 2019 dollars) to today's value of $23.0 billion. As the figure shows, the three largest contributors to the growth in the UAAL have been inadequate contributions, changes to actuarial assumptions, changes to the assumed return, and benefit increases.

Figure 3. *Sources of Change to SERS' UAAL, 1974-2019*
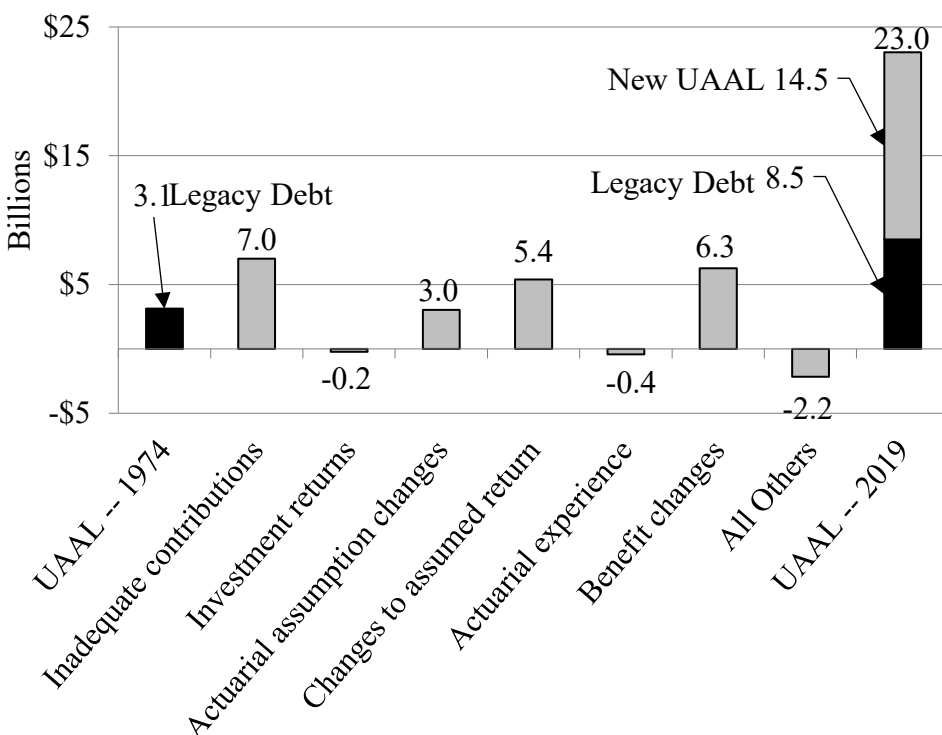
Source: CRR calculations based on various actuarial valuations for Pennsylvania SERS.

Legacy Debt

A significant portion of SERS' current unfunded liability stems from the many years of benefits promised without significant pre-funding – the legacy debt. To estimate the current value of this legacy debt, we roll the initial debt forward annually, presuming that SERS' contributions to reduce the unfunded liability are split proportionately between the initial debt and new unfunded liabilities.[1] This approach results in an $8.5 billion unfunded legacy debt in 2019, or about 37 percent of SERS' $23-billion total unfunded liability.

Inadequate Contributions

Paying down the unfunded liability is a two-step process. First, the sponsor must calculate an amortization payment that truly reduces the unfunded liability. Second, the sponsor must

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[1] This approach treats the liability as of 1974 as a frozen liability that is only affected by contributions and interest. For example, if the plan updates its mortality assumptions so that members are expected to live two years longer, the increase in the pension liability from that change is assigned to the new unfunded liabilities.

actually make the full payment. Over its history, SERS' failures in both areas have resulted in a combined $7 billion increase in unfunded liabilities.

Before analyzing the details of SERS' contribution history, it is important to introduce some basic elements of actuarial pension funding. Typically, the actuary calculates the discounted present value of future retirement benefits already earned by plan members. This is called the actuarially accrued liability (AAL). The unfunded actuarially accrued liability (UAAL) is the gap between the assets accumulated in pension fund and the AAL. The actuary also calculates the actuarially required contribution (ARC). The ARC is equal to the discounted present value of the retirement benefits earned by government employees in the current year (the total normal cost) plus an amount to amortize the UAAL (similar to a mortgage payment). The two most common approaches to amortizing the UAAL are level-dollar payments or level-percent-of-payroll payments. Level dollar payments ensures that the UAAL declines each year, while level-percent payments are more backload so that the UAAL does not decrease until many years into the payment schedule.

Figure 4 presents the level-dollar ARC, SERS ARC, and the actual contribution made from 1974 to 2019. SERS has always calculated its ARC using the more back-loaded level-percent approach. Until relatively recently, SERS received most of its calculated ARC, helping the plan exceed its funding goals in the early 2000's. However, SERS received substantially less than the ARC from 2005 to 2015 before the government began once again to pay the full ARC.

Figure 4. *ARC Used by SERS, ARC Using Level Dollar, and Actual Contributions for SERS, 1974-2019*
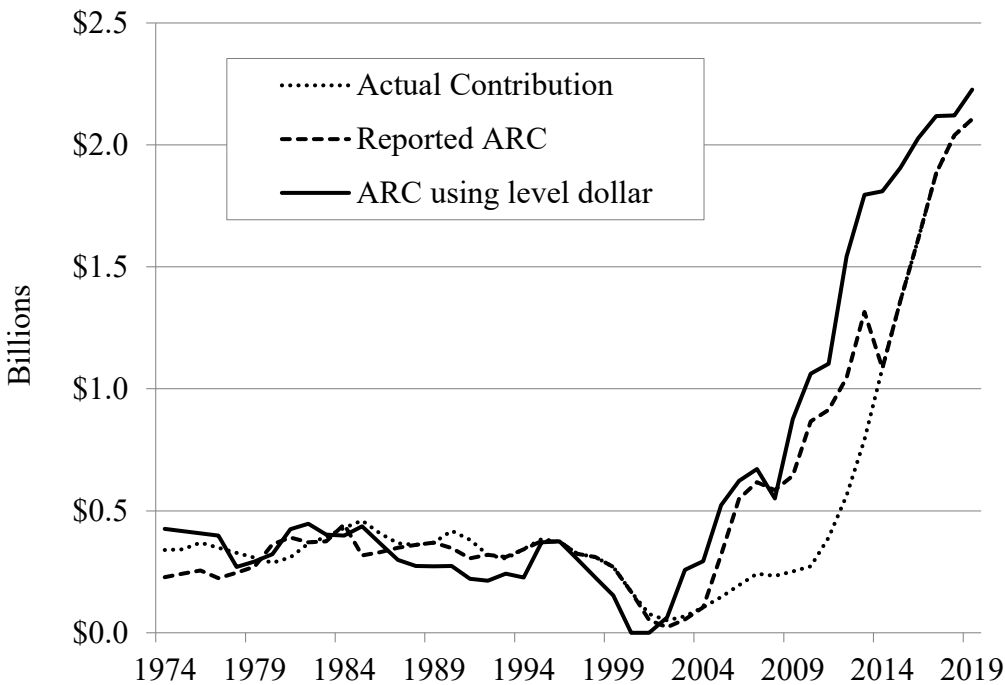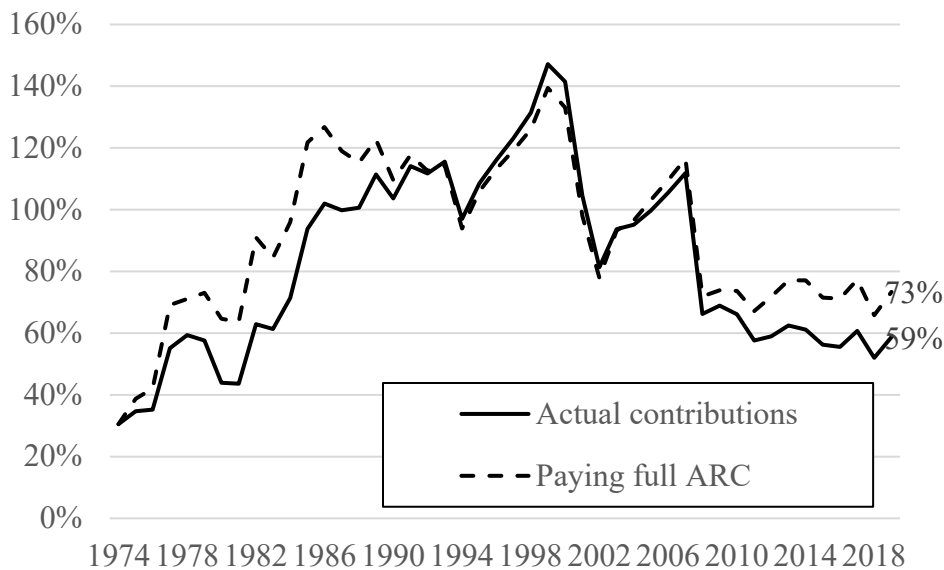

Source: CRR calculations based on various actuarial valuations for Pennsylvania SERS.

Note: For the year 2010, the above figure uses the restated UAAL from the 2011 AV ($4.1 billion instead of $6.8 billion, as stated in the 2010 AV).

So, what would the funded status of SERS be today if the State had received the full level-dollar ARC from 1974-2019? To answer this question, we recalculated SERS' funded ratio and contributions over time assuming that the plan received the full level-dollar ARC (see Figure 5).

Figure 5. *SERS' Market Asset Funded Ratio under Two Funding Regimes, 1974-2019*

Source: CRR calculations based on various actuarial valuations for Pennsylvania SERS.

The figure shows that if SERS had received the full level-dollar ARC, today's funded ratio would be about 73 percent -- 14 percentage points higher than the actual funded ratio today. Calculating a more stringent contribution was definitely within the control of SERS, and the government often knowingly underpaid the required contribution. However, this counterfactual analysis shows that only so much could be expected of SERS' current funded status even if the State had appropriately funded.

Changes to the Assumed Return.

One of the most impactful and contentious actuarial assumptions for public pensions is the assumed return. Unlike single employer plans in the private sector, public pensions use the actuarially assumed rate of return on their investments to value liabilities and set required contributions.[2] Thus, investing in riskier assets will increase the expected return for the investment portfolio and also reduce the reported value of benefits and, hence, the required contribution.

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[2] Single-employer plans in the private sector use the interest rate on investment grade corporate bonds to value benefits and set required contributions (because, it is presumed, the risk of default on bond payments is similar to the risk of default on benefits payments.)

From 1974 to 1990, SERS maintained its assumed return at 5.5%, as required by state statute at that time (see Figure 6). In 1990, the statute was lifted, and the Board abruptly increased the assumed return to 9.9%, which reduced unfunded liabilities by reducing accrued liabilities. From 1990 until 1995, the assumed return for SERS remained at 9.9 percent – nearly two percentage points above the national average for all public plans. In 1995, SERS reduced its return assumption to 8.5%. Since the Great Financial Crisis, SERS has incrementally reduced its assumed return further to 7.125 percent. On net, the changes to the actuarially assumed return since 1974 increased SERS' liabilities by $5.4 billion.

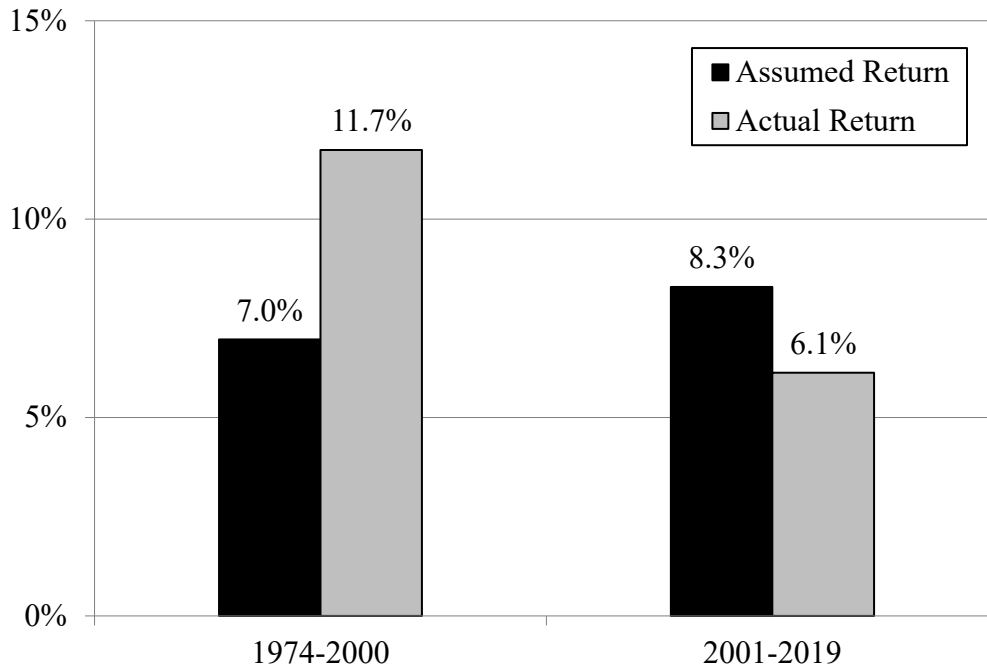Figure 6. *Assumed Return for SERS Compared to the National Average, 1974-2019*
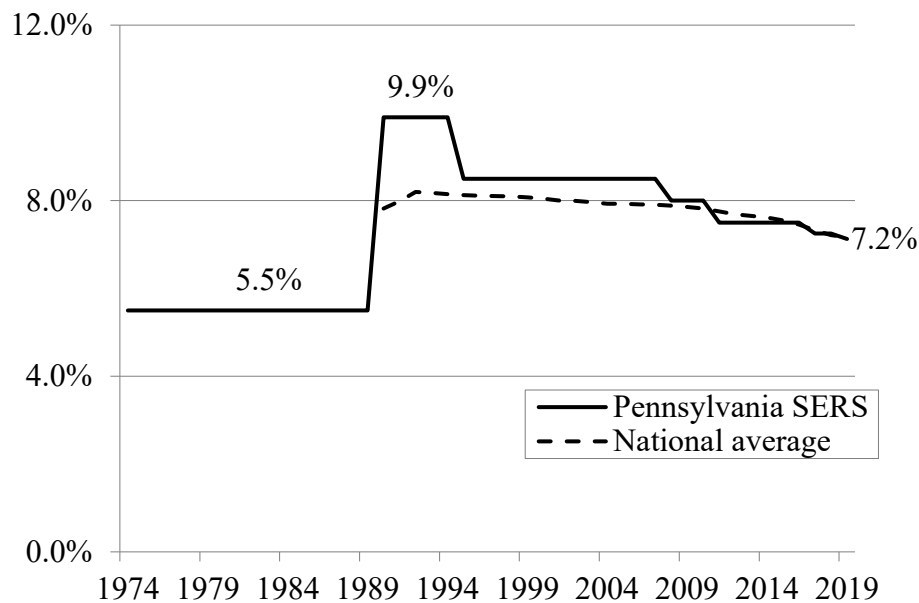
Sources: Various actuarial valuations for Pennsylvania SERS; CRR calculations based on PENDAT (1990-2000); and *Public Plans Database* (2001-2019).

Investment Returns. The impact of investment returns on the unfunded liability depends on the difference between the actuarially assumed return and the actual return. While increasing the assumed returns lowers required contributions initially, costs eventually surface through increased unfunded liabilities and amortization costs when actual returns fall short of expectations. For SERS, the difference between the assumed return and actual returns has reduced unfunded liabilities by $0.2 billion since 1974.

The investment return experience for SERS since 1974 can be broken down into two distinct periods – before and after 2000. For the period prior to 2000 (which included the stock market boom of the 1990s), the actual return was near five percentage points higher than the assumed return (Figure 7). However, for the period after 2000 (which included the 2002 market downturn and the great financial crisis of 2008-2009), SERS' annualized return was 2.2 percentage points below its assumed return.

Figure 7. *Annualized Returns for SERS, 1974-2000 and 2001-2019*

Conclusions from UAAL Analysis

In total, the forensic analysis of unfunded liabilities shows that today's underfunding stems from a myriad of factors – some more controllable than others. For example, calculating the appropriate contribution was definitely within the control of the plan, and the State often knowingly underpaid the required contribution. But, nothing could be done about the initial legacy costs (other than the unreasonable expectation to have had the State pre-fund benefits from the outset in 1923). And, investment performance is difficult to fully control. As a result, simply making appropriate contribution would have only slightly improved SERS current position.

III. Looking Forward at SERS' under the Status Quo

The historical buildup of unfunded liabilities weighs heavily on the future of SERS. As mentioned above. Figure 9 presents a breakdown of normal costs and UAAL payments for SERS compared to the national average for similar plans. The figure shows that the majority of pension costs for the State is due to the unfunded liability and the cost of benefits for current employees – which is equal to employee contribution plus the employer normal cost – is comparable to the national average.

Figure 9. *Actuarial Costs as a Percent of Payroll for SERS Compared to the National Average, by Element,* 2019
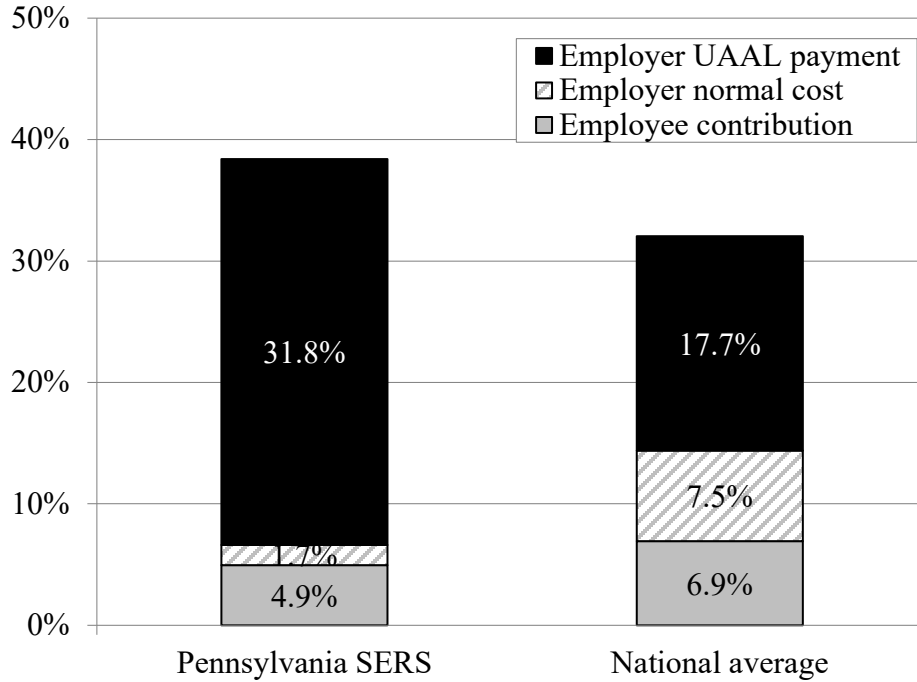
Note: The actuarial costs for SERS are based on a 7.0-percent discount rate, while the average for PPD plans is 7.2-percent.
Source: CRR calculations based on 2019 actuarial valuations for Pennsylvania SERS, projections by the SERS actuary, and *Public Plans Database* (2019).

To provide a baseline for SERS' finances going forward, Figures 10 and 11 project the SERS funded ratio and government contributions under two scenarios: 1) SERS current approach to achieve full funding by 2040 and 2) the more stringent level-dollar approach to amortizing unfunded liabilities. While both methods achieve a similar level of funding at the end of the projection period, the funded ratio rises more slowly and government contributions rise dramatically under the current schedule.

Figure 10. *Projected Funded Ratio for SERS under Alternative Funding Methods, 2019-2050*
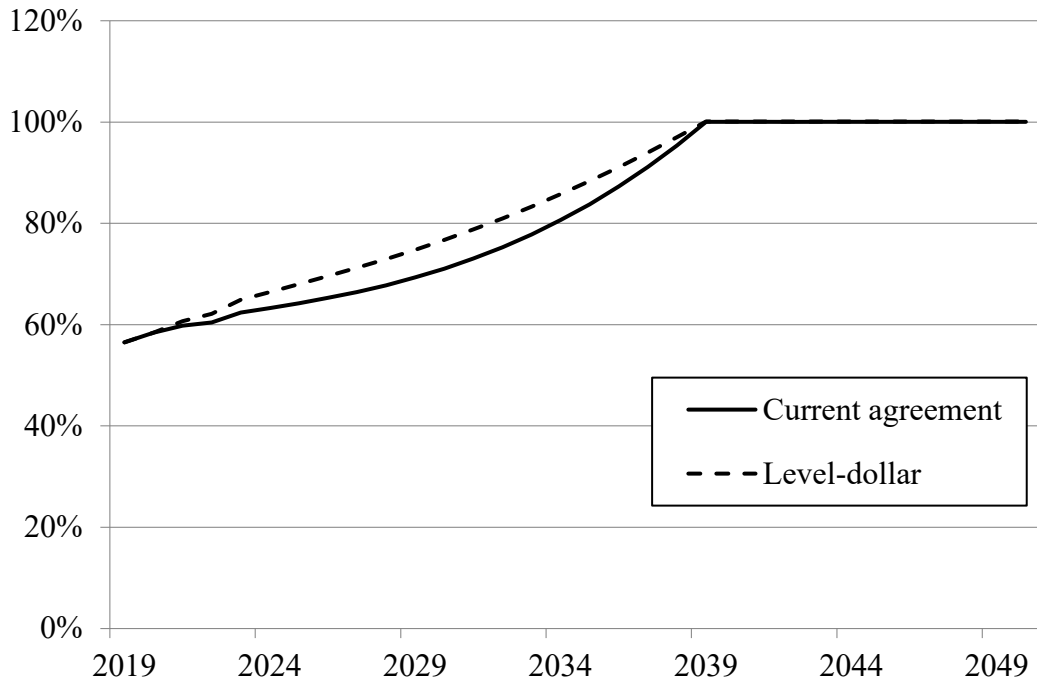
Sources: CRR calculations.

Figure 11. *Projected ARC for SERS under Alternative Funding Methods, 2019-2050*
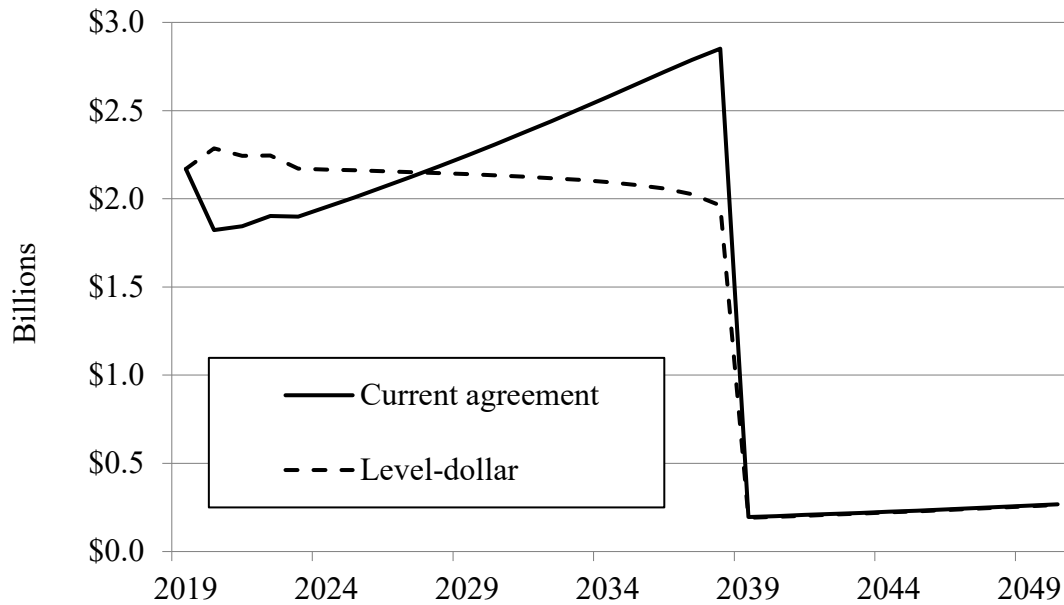

Sources: CRR calculations.

While the standard actuarial projections presented above portray a future of steady improvement in SERS, the actual history of SERS raises doubts about its likelihood for future success. To

illustrate how misleading simple actuarial projections can be, Figure 12 compares the future ARC payments that would have been projected by SERS in 2001 to the actual ARC payments.

Figure 12. *ARC Projected as of 2001 Versus Actual ARC, 2001-2019*
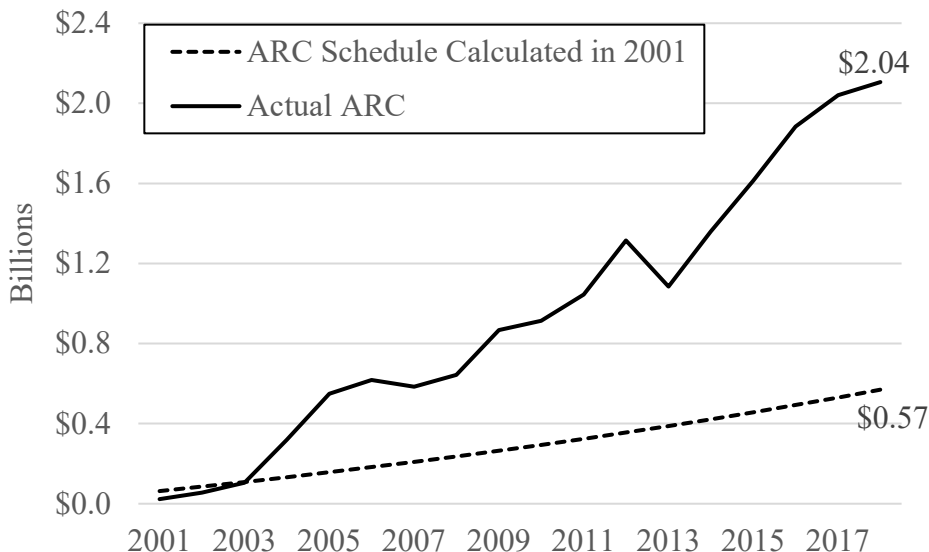
Since SERS' began pre-funding benefits, its saga has consisted of increasing unfunded liabilities and an inability to sustain steady progress towards full funding. SERS could continue with the same basic approach that it has used since 1974 and hope for the best, but its own history provides good reason to consider a break from the status quo. In that vein, the next section highlights a consequential flaw in the current paradigm for pension funding and suggests a new approach for going forward.

IV. A New Approach for SERS

What's Wrong with the Current Paradigm?

One of the goals of modern actuarial accounting is to allocate the costs of future pension benefits (pension liabilities) to the period when the benefit is earned. For that reason, actuarially required pension contributions equal the cost of future retirement benefits earned by workers in the year (the normal cost) plus an amount to pay down unfunded liabilities within 30 years – roughly the length of a generation.[3]

However, legacy liabilities do not fit well within this framework because they stem from an earlier era of pay-go financing and their costs cannot be reasonably allocated to the period when the benefits were earned. As such, the goal of paying down legacy liabilities within 30 years to limit spillover to future generations is much less compelling. The spillover has already occurred

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[3] With each year of employment, government workers earn higher pension benefits in retirement due to an increase in their salary – on which their pension benefit is based – and a greater tenure with the government.

and choosing any single generation to bear the full cost of legacy liabilities is, at this point, arbitrary (or, worse, unfair).

Additionally, the desire to minimize the significant costs associated with paying down unfunded legacy liabilities within 30 years has likely prolonged certain undesirable pension practices, such as the use of the actuarially assumed investment return to value future benefits and set actuarially required contributions. Indeed, studies show that increased risk-taking in public pension investment portfolios is related to the fact that actuarial contributions are based on the expected return of the portfolio.[4] And, most agree that actuarial accounting practices for public pensions understate the true value of pension benefits, which hampers government's ability to make appropriate personnel decisions and allocate its resources.

Given these issues, this *brief* suggests a new approach that:

1) Divorces legacy liabilities from the pension system so that the costs can be appropriately spread over multiple generations, and;
2) Follows the private-sector approach for funding future retirement benefits.

What Would a New Approach Look Like?

To establish a clear break between legacy liabilities and other pension liabilities, the government could create two new systems with separate trust funds to parse the current assets and liabilities of SERS into the Legacy System and the Pension System. The Legacy System would begin with no assets and a liability equal to the legacy liability. The Pension System would begin with all of SERS assets and a liability equal to SERS' total accrued liability minus the legacy debt.

Under the new approach, public plans would value liabilities (both legacy and otherwise) similarly to private-sector plans by using a discount rate based on the average yield for investment-grade municipal bonds (after adjusting for the tax-exemption).[5] Importantly, although the *present value* of future benefits (the liability) would increase under the new approach, future benefit payouts would remain the same (see Figure 13).[6]

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[4] Aubry and Crawford (2019), "Impact of Public Sector Assumed Returns on Investment Choices."
[5] The discount rate used by private sector plans, which is based on the yield for investment-grade corporate bonds, averages roughly 4.5 percent.
[6] To revalue liabilities, the analysis uses an actuarial rule of thumb that suggests accrued liabilities increase by about 12.5 percent for every 1-percenage point change in the discount rate.

Figure 13. *Unfunded Liabilities by Approach, 2019*
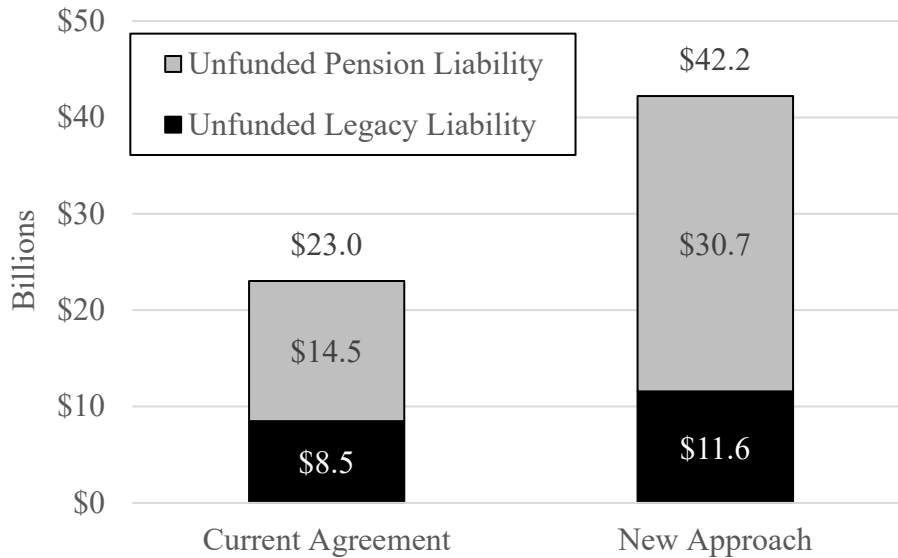
In terms of investments, we assume that – without the burden of legacy costs incentivizing risky behavior – assets in the Pension Fund are invested like those of a large private-sector plan (assets in the Legacy Fund are held in cash or invested in short-term liquidity so that they can be used immediately to pay benefits). The more conservative portfolio increases overall expected costs, but also lowers the variability around future projections so that declared goals are more likely to be realized.

In terms of contributions, the State would make annual payments into the Legacy Trust Fund that are only slightly more than the interest accruing on the Legacy liability to ensure that the liability is amortized slowly over multiple generations. For the Pension System, employee contributions continue to be deposited into the Pension Trust Fund according to current statute and the government contributes the employer normal cost plus an amount to amortize the unfunded pension liabilities – generated from years of funding under the current paradigm – within 25 years. Any unfunded pension liabilities generated under the new approach are amortized over 7 years, as in the private sector.

Crucially, all pension contributions under the new approach are based on the discount rate used to value liabilities, not the long-term expected return on the investment portfolio. And, retirement benefits are paid first from assets in the Legacy Fund and then, if that is insufficient, from assets in the Pension Fund.

How Would the New Approach Impact Government Finances?

At a high-level, the new approach presents a trade-off. Following the private-sector approach to valuing benefits and investing will increase the cost of providing retirement benefits relative to current actuarial methods. But, amortizing legacy liabilities over multiple generations will –

appropriately – reduce the burden on the current generation while increasing it for future generations. As such, the net impact is not obvious and depends the size of the legacy liability, how much of the legacy costs is shared with future generations, and the generosity of benefits provided to current workers and retirees.

Figures 14 and 15 below compare unfunded liabilities and government contributions under the new approach and current practices. Liabilities are valued at 4.5-percent under both approaches to show the progress towards reducing liabilities that are appropriately valued.[7] Additionally, annual pension fund returns under both approaches are projected to be 5.5-percent.[8] The average annualized return for public plans since 2001 is 5.6 percent.[9]

Figure 14 shows that the current approach doesn't really address unfunded liabilities once they are valued correctly. So, while figure 15 shows that contributions under the current approach are sometimes lower than the new approach, contributions under the new approach are much more consistent and – most importantly – adequately address unfunded liabilities.

Additionally, because the investment strategy under the new approach is relatively conservative and contributions are based on the discount rate instead of the expected return, the likelihood that actual outcomes differ significantly from expectations is much smaller. The predictability of the path will add to the credibility to the new approach as stakeholders witness professed improvements come to fruition.

Figure 14. *Projection of Unfunded Liabilities by Approach, 2019-2050*

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[7] The discount rate used by private sector plans, which is based on the yield for investment-grade corporate bonds, averages roughly 4.5 percent. To revalue liabilities and normal costs, the analysis uses an actuarial rule of thumb that suggests accrued liabilities increase by about 12.5 percent – and normal costs increase by about 22.5 percent – for every 1-percenage point change in the discount rate.

[8] The expected return and standard deviations are based on the average allocation reported in COMPUSTAT for 75 large open single-employer plans and the 2019 CAPM assumptions produced by Pension Consulting Alliance (who was recently acquired by Meketa).

[9] Aubry (2020), "2020 Public Plan Investment Update and COVID-19 Market Volatility".
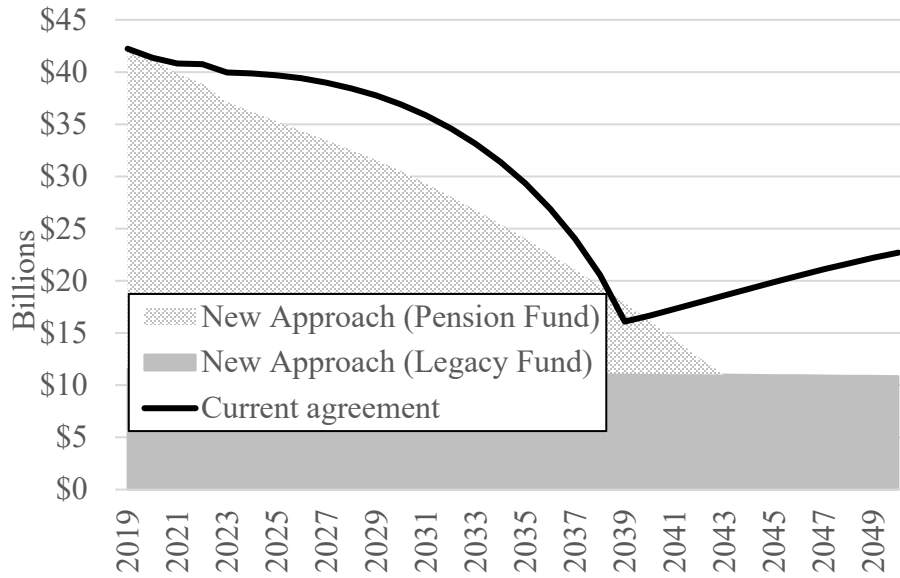
Source: CRR calculations.

Figure 15. *Projected Contributions for SERS under New Pension Accounting, 2019-2050*
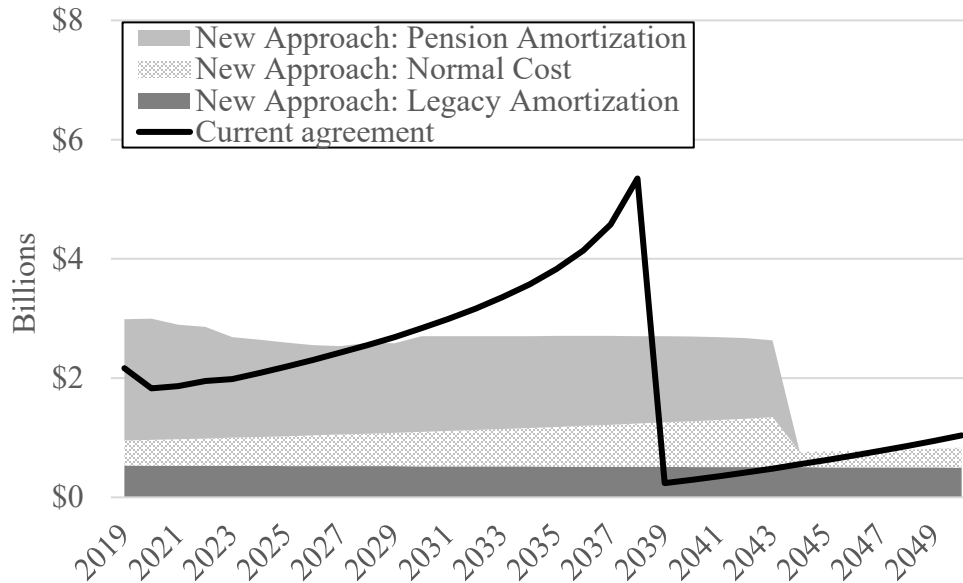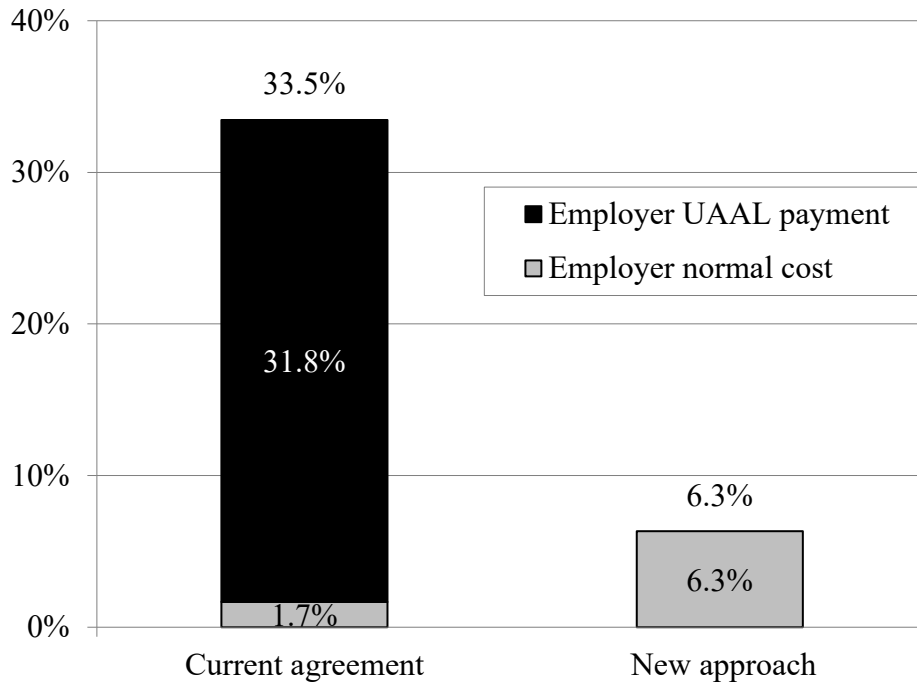

Source: CRR calculations.

The new approach would also impact the cost of labor for governments. While most financial economists agree that current actuarial accounting methods for public sector pensions understate the value of pension benefits, governments also overstate the cost of labor by using the actuarial contribution rate – which includes the unfunded liability as well as normal costs – in the employee fringe rate. Only the normal cost reflects the value of retirement benefits earned in exchange for government service.

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While the value of retirement benefits earned for year of work (normal cost) would be higher under the new approach, the pension cost of labor would no longer include unfunded liability costs. Figure 16 shows that – for SERS – the net result of the two adjustments would result in a lower pension cost of labor. The decrease in labor costs may change the way government departments view hiring employees versus other budgetary spending.

Figure 16. *Pension Fringe Rate, Current Agreement vs. New Approach*

Note: New approach employer normal cost is equal to total normal cost revalued at a 4.5% discount rate less employee contributions.

Sources: CRR calculations.

V. Conclusion

For PA SERS unfunded legacy liabilities accumulated from 1923 to 1974 – a period in which the State deliberately underfunded the retirement benefits accrued by government workers – are a major contributor to the large pension costs that SERS faces today. Although SERS attempted to fully pre-fund benefits from 1974 onward, unfunded liabilities continued to accumulate due to inadequate contributions, low investment returns (since 2000), and poor actuarial experience. As a result, SERS was only 57 percent funded in 2019 and faced pension costs of over a quarter of employee payrolls.

SERS could continue with the same basic actuarial accounting and funding methods, but its history provides good reason to break from the pension status quo. Specifically, forcing unfunded legacy liabilities to be paid off in a generation's time is inappropriate and has likely

prolonged undesirable pension practices aimed at reducing the associated cost – such as the use of the actuarially assumed long-term investment return to value future benefits and increased risk-taking in pension investment portfolios. As a result, the current approach to managing pension liabilities involves lofty assumptions and investment risk-taking, which has resulted in unfulfilled promises and confusion about how to improve on outcomes that have consistently fallen short of declared goals.

Given the failures of the current paradigm, this *brief* suggests a new approach:

1) Divorce legacy liabilities from the pension system so that the costs can be appropriately spread over multiple generations, and;
2) Follow the private-sector approach for valuing and funding future retirement benefits;

For SERS, the new approach would result in a quicker reduction in unfunded liabilities and provide predictable costs that would be somewhat higher initially, but ultimately fall below future costs. Perhaps the most compelling reason for the new approach is its ability to restore confidence in the sustainability of the pension system. Although the new approach would result in a one-time increase in the reported value of unfunded pension liabilities, it would – from that point forward – deliver on promises of declining long-term costs and shrinking unfunded liabilities, proving that the public pension liabilities can be managed competently.

References

Pennsylvania Employees' Retirement System. 1974-2019. *Actuarial Valuation Reports.* Providence, RI.

Public Plans Database. 2001-2019. Center for Retirement Research at Boston College, Center for State and Local Government Excellence, and National Association of State Retirement Administrators.

U.S. Census Bureau. 1983-2019. *State and Local Government Employee-Retirement System Survey.* Washington, DC.

Zorn, Paul. 1990-2000. *Survey of State and Local Government Retirement Systems: Survey Report for Members of the Public Pension Coordinating Council* [PENDAT]. Chicago, IL: Government Finance Officers Association.