An Independent Review of the PPMAIRC Recommendation Report

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Included in this document is an independent assessment of the findings and recommendations found in the PPMAIRC Recommendation Report ("PPMAIRC Report" or "Report"), as directed by Act 5 of 2017, based upon the author's experience spanning four decades with state pension systems. (See author's biography in Appendix A.)

The review is organized as follows. Section 1 provides a summary. Section 2 provides background information on the past and current condition of US state pensions, including PSERS and SERS. Section 3 examines stress testing and the recommendations presented by the Society of Actuaries Blue Ribbon Panel on public pension funding. Section 4 examines PSERS and SERS investment performance. Sections 5 and 6 take up cost savings (including index funds) and transparency, both topics directed for study by Act 5. The Review concludes with a discussion on governance which was also contained in the PPMAIRC Report.

Section 1: Summary and Recommendations

1) **PSERS and SERS suffer from low funded ratios and high required employer contribution rates** due to (1) state contributions that fell well below actuarial required contributions (ARC) over an extended and critical period of time when investment earnings were low, and (2) investment earnings that did not keep up with aggressive (high) actuarial earnings assumptions due to weaker market conditions that impacted all pension systems returns in a similar manner. PPMAIRC should recommend the full funding of ARC from a sustainable, and preferably permanent, funding mechanism to ensure employer contributions are met in all economic conditions.

2) **PSERS and SERS investment policies are only consistent with the current 7.25% actuarial interest rate assumption with existing targeted allocations to private assets**, unencumbered by outside fee and disclosure requirements that are already negotiated on a case-by-case basis by the two systems.

3) Although **PSERS and SERS both earned net investment returns comparable to the asset weighted average for state pension systems over the 17-year, 2000-2017 time period**[1], their funded ratios fell from their highs to their current lows, suggesting that the primary cause of the deterioration in funded ratios was not due to a shortfall in returns relative to other similar plans.

4) **Evidence suggests that deteriorating funding ratios and the 2008-2009 Financial Crisis negatively impacted the investment returns and cash flow of PSERS and SERS** by causing each to reduce risk and seek assets with greater liquidity to manage cash flow strains from systematic underfunding and to protect future benefit payments at a time when adhering to the prior policy targets would have produced higher returns.

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[1] June 30, 2000 to June 30, 2017

5) **PSERS and SERS should co-ordinate asset-liability studies on a three-year cycle**, integrating recommended actuarial practices for stress testing of benefits and contributions (Blue Ribbon Panel, ASOP 51) with investment risks assessed in regular asset allocation studies performed by PSERS and SERS investment consultants.

6) **PSERS and SERS fees and expenses are reasonable. Based on data provided in systems' Comprehensive Annual Financial Reports, the systems adopted active strategies that produced excess assets equal to $6.2 billion above a 100% index fund strategy, which presents a strong economic argument that the investment was justified.** PPMAIRC should recommend that PSERS and SERS continue to exercise discretion over fees, without a fee limitation or cost savings goal that might interfere with their ability to maximize risk-adjusted return, as they have successfully done in the past.

7) **PSERS and SERS have long-term asset class track records earning returns above index funds**, contrary to the experience of the "average individual investor", and therefore the use of index funds should not be mandated, but instead left to the discretion of the two systems. Index funds offer the lowest cost and highest returns in many publicly traded asset classes and should be considered the default investment solution. However, conditions of free, deep, and efficient markets do not exist for many asset classes. In such cases, active management may be desirable for potentially enhancing returns and reducing risk. Also, index funds are unavailable in some high returning, illiquid asset classes, such as private equity, private debt, and private real estate.

8) F**ees should be transparent to the extent that transparency does not interfere with PSERS and SERS ability to successfully manage assets**. Of note, transparency is a particular issue with private equity partnerships, but private equity has been the best performing asset class for both pension systems. PPMAIRC should recommend that PSERS and SERS annually disclose management fees and profit sharing (i.e., carried interest), at the asset class and total fund level, but not at the manager/fund level unless they believe doing so would not impact future investment performance relating to access to strong performing partnerships.

9) **PSERS and SERS should adopt common standards for fee calculations that closely follow industry best practices.** Total fees should include subcomponents for investment management (asset-based fees), realized incentive compensation, and fund administration. ILPA reporting standards should be encouraged to facilitate calculations and consistency.

10) **Based on my professional experience, the fees at PSERS and SERS are reported in an industry acceptable manner**. Fees for private asset managers are often protected from disclosure by mutual agreement between investors and managers as a condition of investment because they are considered trade secrets. Private asset managers can also collect service fees directly from underlying company investments, with explicit permissions contained in partnership agreements. Calculation of fees can sometimes become administratively burdensome, which is another benefit of adopting ILPA standards.

11) **The existing governance structures at PSERS and SERS have been effective, mirror the practices of most state pension systems, and have produced good long-term results**. PPMAIRC should not prioritize but consider the positive and negative impacts of any changes proposed.

Section 2: Background[2]

Public pension systems have come under increased scrutiny in recent years as rapidly increasing employer contribution rates put pressure on governmental budgets and reports of large "unfunded pension liabilities" raise concerns surrounding benefit security, balanced budgets, and at the very extreme, municipal bankruptcy. It is in the interest of all stakeholders to take account of the current state of pensions, reflect on "lessons learned" from the past, and take positive steps forward by assessing what actions could be taken to protect and optimize the "promise" public pension systems offer to those who devote their working lives to governmental service.

Assets

PSERS and SERS are two large state pension systems with $55 billion and $29 billion in assets, respectively, at June 30, 2017, and $84 billion in combined assets. There are 77 state-wide pension systems in the US, with combined assets equal to $3.2 trillion. The average state has $63 billion in state-wide pension assets and the average state pension system has $41 billion in assets.[3]   States vary between having one consolidated state-wide system or separate employee and teacher systems. Currently there are 21 states having separate state employee and teacher systems and 29 states having one single state-wide system.[4]

While individually and collectively large in asset size, state pension systems are part of a much broader sphere of institutional investors that compete for investment opportunities. Other long-term institutional assets active in the same markets as state pensions include $0.5 trillion in local public pension defined benefit assets, $3 trillion in private defined benefit assets, $0.5 trillion in endowment assets, and $8 trillion in sovereign wealth fund (SWF) assets. Excluded from this list, but also representing large investors in the same markets, are US insurance companies, US and foreign private wealth management (high net worth), US foundations, and foreign pension and superannuation funds in Europe and Asia.[5] PSERS and SERS represent a tiny fraction of the potential long-term assets competing for attractive investment opportunities. Importantly the higher asset growth rates in non-pension SWF and HNW assets, and their growing interest and sophistication, has gradually weakened the competitive advantage in pricing and terms that large US public pensions once held.

Pension Funding

The growth in unfunded liabilities for PSERS and SERS since 2000 has been primarily due to (1) the failure of the state to make actuarial required contributions ("ARC") and (2) historically low returns across all state pension systems, including PSERS and SERS.

The poor funded conditions for PSERS and SERS were primarily aggravated by the failure to make employer contributions at recommended levels. Employer contributions to PSERS and SERS averaged

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[2] Data on state pension systems contained in this Review come from a database maintained by Cliffwater LLC, based upon information contained in annual state pension CAFRs.

[3] "*An Examination of State Pension Performance, 2000 to 2017*" by Stephen L. Nesbitt, September 2018, submitted to PPMAIRC.

[4] The state of New Jersey recently announced plans to de-consolidate their state-wide pension system, permitting safety workers separate stature.

[5] Federal Reserve Z-1 tables, Sovereign Wealth Fund Institute

just 62% and 77% of recommended contributions over the 2000 to 2017 period and were lowest during the 2008-09 Financial Crisis, stunting asset growth.

Long term performance has been historically low for all state pension systems since the year 2000 due to low returns for stocks and bonds during that period. The asset-weighted annualized return for state pension assets equaled just 5.69% for the 17-year period ending June 30, 2017 while the actuarial assumed rate for state pension systems averaged 7.79% for the same time period. The deficit in actual versus actuarial assumed performance has been a reason for a systemic decline in state pension funded ratios, collectively falling from 100% in 2000 to 71% in 2017.

PSERS and SERS fit this general industry narrative. PSERS and SERS assets earned 5.56% and 5.44%, respectively, over this same time period, compared to actuarial discount rates averaging 8.00% and 7.98%, respectively. Over the same 2000-2017 time period PSERS and SERS funded ratios[6] dropped from 124% and 132%, respectively, to 56% and 59%. The long-term decay in funded ratios for the two Pennsylvania pension systems was caused by a combination of (1) the failure to make actuarial required contributions to PSERS and SERS, and (2) high industry wide actuarial discount rates, which caused insufficient ARC levels. In particular, the failure to make actuarial required contributions explains why current PSERS and SERS funded ratios of 56% and 59%, respectively, fall well below the 71% asset-weighted industry average.

Investment Policy or Actuarial Assumptions

This narrative is consistent with the one described in the PPMAIRC Report, whereby employer underfunding and investment performance, respectively, are the first and second leading causes of unfunded liabilities. While the Report appropriately identifies the importance of making regular employer contributions at ARC levels, its analysis of investment performance requires further development. The Report repeatedly references the "underperformance of investments" when describing the second leading cause of underfunding and proceeds with a detailed and largely unflattering evaluation of PSERS and SERS investment practices and performance.

Unfortunately, the Report does not acknowledge the role of actuarial interest rate assumptions in each system's underfunding, set at levels as high as 8% for most of the 2000-2017 period, while unfunded liabilities continue to grow. Contributions and investment earnings are the two sources of funds to pay benefits. Actuaries set contributions (ARC) by subtracting expected investment earnings from benefit payments and system expenses, with the expectation that pension contributions will fill this gap. If investment earnings – known as the actuarial assumed rate – are projected to be too high relative to what is then experienced in the capital markets, the ARC will have been set at too low a level and contributions will not be enough to fill the gap. Said differently, the two major causes of underfunding at PSERS and SERS have been (1) the failure to make employer contributions at ARC levels, and (2) ARC levels that have been too low due to lofty investment earnings assumptions.

The setting of high 8% investment earnings assumptions by actuaries has been a source of great industry anxiety over the past 20 years, as pension boards try to reconcile their fiduciary responsibility to take only prudent levels of investment risk, and unstated pressures to achieve an actuarial earnings rate that requires acceptance of significant portfolio risk-taking and illiquidity. From an investment policy and management perspective, the PPMAIRC Report is partially flawed because its mission to reduce fees and

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[6] Funded ratio is defined as actuarial value of assets divided by actuarial accrued liabilities per GASB 25.

increase transparency will likely undermine efforts to achieve the actuarial assumptions underlying current ARC levels by limiting access to strategies offering higher risk-adjusted returns.

Section 3: Stress Testing

The PPMAIRC Report evaluation of stress testing at PSERS and SERS is misguided and incomplete.

The governance of state pension systems generally involves three largely separate functions. <u>Benefits</u> are set by state legislators, <u>contributions</u> are recommended by actuaries, and <u>investments</u> are set by appointed and/or elected pension boards. Rearranging these three functions gives a simple formula that underlies most state pension systems:

Pension Contributions + Investment Earnings = Benefit Payments

A stress test is an examination of what happens if any input varies from its expected value. As applied to pensions, a robust stress test would examine how uncertainty in any one of the three variables in the pension equation above would impact the other two variables. For example, unexpectedly low investment earnings might require offsetting higher pension contributions or lower benefit payments. Or lower contributions might require adopting a riskier strategy to achieve higher investment earnings or lower benefit payments. A stress test helps policy makers overseeing each of the three separate functions better understand the impact of their decision-making on the other components. The hope is that transparency across the three functions improves collective decision-making and the common good of the overall pension system. In an ideal governance world, legislators, actuaries, and investment professionals (boards) work together toward this end.

Stress tests, or tests of uncertainty, can be applied to each of the three pension functions. Benefit formulas, once set by legislators, are largely fixed by contract, but benefit levels can change by way of long-term departures from expectations for salary growth and inflation. Pension contributions are set by actuarial professionals. Potential departures in expectations for workforce composition, workforce turnover, and retiree mortality are sources of uncertainty for "normal" contributions. The largest source of uncertainty comes from investment earnings because pension boards accept some prudent level of asset risk to achieve higher long-term returns. But asset risk-taking means that asset levels can change by large amounts in any one fiscal year, such as the 25%+ drop experienced in the 2008-2009 fiscal year. Consequently, asset risk is by far the greatest source of uncertainty in managing pensions; understanding it thoroughly has proven very useful for not only managing assets but also understanding potential uncertainty in supplemental contributions due to growing unfunded liabilities.

Act 5 specifically asks PPMAIRC to look at "implementing the recommendations of the Society of Actuaries Blue Ribbon Panel on stress testing, to test the ability of the plan to withstand a period of investment returns above or below the level of assumed return." The Blue Ribbon Panel recommendations are a useful and long overdue self-assessment of the deficiencies by which actuaries have set investment earnings rate assumptions in the past and an acknowledgement that overestimating earnings can contribute to serious and chronic underfunding.

Two Panel recommendations stand out. The first is a recommendation to use <u>expected</u> returns in setting investment earnings assumptions rather than the historical returns that actuaries had previously relied upon. This recommendation effectively directs a lowering of interest earnings assumptions from the 8%

levels of the past to the 6% to 7% range. (The Panel recommends a standardized 6.4% assumption.) Such a recommendation, if made in 2000, would have resulted in significantly higher actuarial recommended contributions, and reduced underfunding. Asset consultants for PSERS and SERS annually develop expected returns which system actuaries can draw upon, or not, to assist in setting earnings rate assumptions. As of last PSERS and SERS asset-liability reports, expected asset returns were close to the 7.25% earnings rate assumption now used by both systems.

The second Panel recommendation is to stress test contribution rates by (a) assuming actual investment earnings are 3% below and 3% above the standardized 6.4% earnings assumption over a 20-year period, and (b) assuming actual contributions are only 80% of actuarial recommended contributions for 20 years. These two stress test recommendations by the Panel are useful in helping stakeholders understand the consequences (risks) of actuarial forecast errors and failures to make scheduled contributions.

Importantly, the Blue Ribbon Panel stress test recommendations are directed at actuaries to assist them in communicating to their pension clients the process and risks in setting contributions. Panel recommendations helped lead to the adaptation of ASOP 51 (Actuarial Standard of Practice), which formally charges actuaries with integrating the Panel recommendations into their practice. The Blue Ribbon Panel recommendations are intended for actuaries and not for the purpose of being directed at asset consultants and do not suggest changes to the asset simulation and stress tests they have regularly and appropriately performed over many decades. The PPMAIRC Report goes into great depth to measure the most recent PSERS and SERS asset-liability studies against the Blue Ribbon Panel recommendations, apparently not considering that the recommendations are directed at future actuarial reports, not asset consultant reports and analysis.

Most state pensions have been well ahead of the new ASOP 51 actuarial standards for stress testing, where Monte Carlo simulation of investment returns has long been integrated into asset-liability studies. ASOP 51 largely represents a catch-up of actuarial transparency, and a commitment to participate in stress testing that has been a hallmark of periodic asset-liability studies conducted by state pension plans over many years.

PSERS and SERS are examples of pension systems that historically integrate uncertainties surrounding asset returns, liabilities, and contributions into their asset allocation policies. This is most recently exemplified in their respective 2018 and 2015 asset-liability studies.

In fact, the Blue Ribbon Panel stress test recommendations are deficient for asset-liability analysis. Twenty and 30-year deterministic scenarios recommended by the Panel are unworkable when pension boards are concerned about the consequences of short-term asset declines due to unfavorable markets and their impact on asset allocation, liquidity, and funding. For example, one element of stress testing that is not explicitly identified in ASOP 51 is liquidity risk, which has grown in importance as public pensions have become more underfunded with higher net cash outflows (i.e., benefits exceeding contributions) and with the increased use of higher returning, and less liquid, alternative investments. Most alternative investments are not only illiquid for some time period (i.e., 2 to 10 years), but can unexpectedly draw on the limited liquidity of a pension plan during a crisis through contractual "capital calls" that are not offset by "distributions."

Liquidity risk has two dimensions. The first is the more common concern that liquid assets (cash) will not be sufficient to meet benefit payments or other obligations. The second might be referred to as "rebalancing risk", or the risk that the pension system cannot maintain its target asset allocation and risk level, as when severe market downturns force pensions to use liquid stock and bond assets to meet

benefits and other claims and find themselves restricted from rebalancing out of illiquid assets and back into liquid assets to replace sold assets. In severe circumstances, pensions might find themselves forced to sell illiquid assets in the secondary market at steep price discounts. This unwanted scenario affected some large endowments with very high alternative allocations during the 2008-2009 Financial Crisis and was an important lesson that underlies current asset stress testing. In its most recent asset-liability study, PSERS includes a comprehensive analysis of the liquidity and rebalancing risk that well informs decision-makers on the system-wide benefits and risks from illiquid alternative investments.

Contrary to the finding of the PPMAIRC Report, the recent asset-liability studies conducted by PSERS and SERS continue to meet industry best practices for assessing investment risk.

Summary

Stress testing has been a mainstay of PSERS and SERS asset allocation (asset-liability) studies for over 30 years. The Blue Ribbon Panel has taken a major step forward to more accurately set pension contributions (ARC) and appropriately value liabilities by recommending that actuaries also introduce limited but useful stress testing to better inform policy and investment decision-makers. Unfortunately, the PPMAIRC Report misconstrues the Panel's recommendations as being applicable to asset consultant reports rather than actuarial functions.
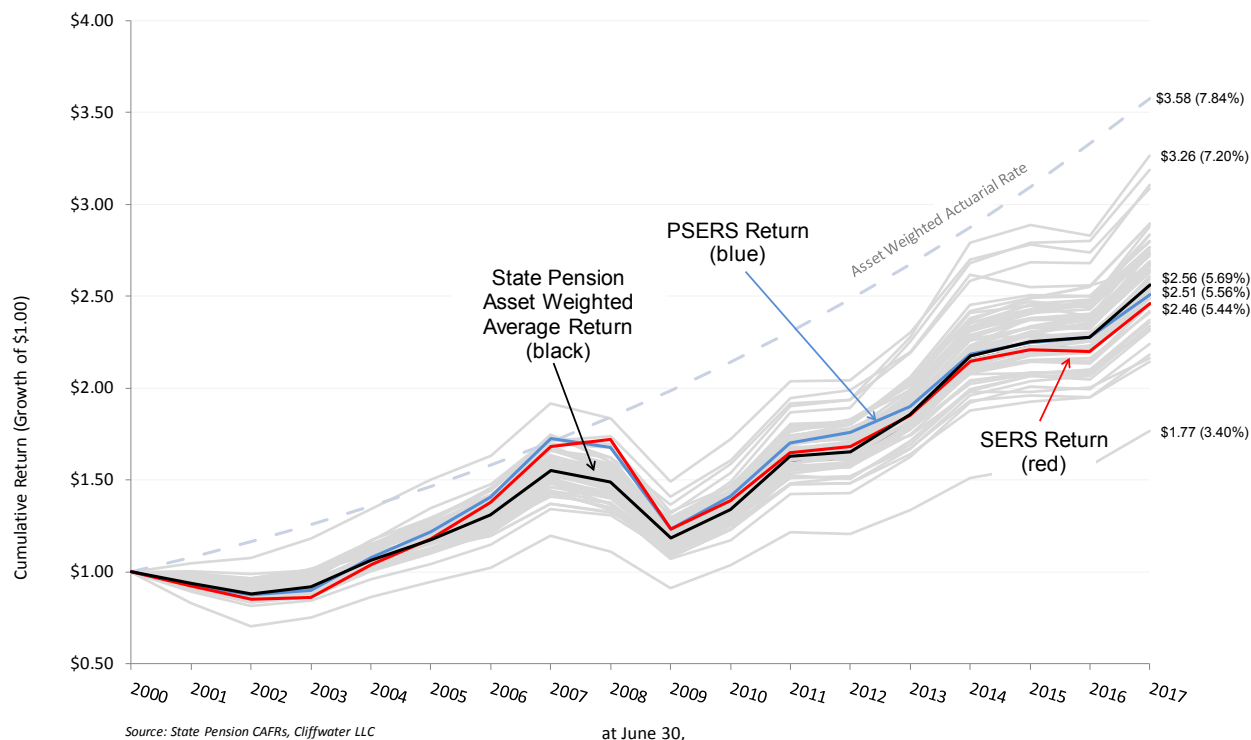

Section 4: Performance and Asset Allocation

The PPMAIRC Report offers a lengthy analysis on asset allocation trends and performance of PSERS and SERS compared to a sample of nine other state pension funds plus one California county pension fund, covering a 10-year period. Unfortunately, the Report relies upon a very small sample set and a time frame limited to just 10 years, which is typically too short to draw statistically conclusive findings. Rather than a detailed critique of the Report, a simpler and more accurate narrative is provided below based upon 66 state-wide pension systems, not just nine, covering the 17-year period from 2000 to 2017. This time period includes two bull markets, two bear markets and, most importantly, is the period over which pension funding deteriorated for PSERS, SERS, and the overall state pension industry.[7]

Exhibit 4.1 plots the long-term performance of PSERS (blue line), SERS (red line), the state pension industry asset-weighted composite return (black line), and in the background the individual returns of 65 other state pensions (gray lines) with total assets equal to $3 trillion.

Exhibit 4.1: Cumulative State Fund Performance, June 30, 2000 to June 30, 2017

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[7] Performance data covers 66 state pensions that use June 30 as their fiscal year end and report investment and other financial data as of that calendar date. In those cases where multiple in-state pensions are managed under one investment board with a single investment strategy, performance for those multiple in-state pensions is counted once and not duplicated. There are 11 state pensions excluded that use December 31 as their fiscal year end and another five state pensions that have fiscal year ends other than June 30 or December 31. While this report details findings only for the 66 fiscal June 30 state pensions, Cliffwater has conducted similar analyses on the other 16 state pensions with findings that are consistent with the study group. PSERS return is included in the state fund study group because it has a fiscal June 30 data, but SERS is not because it has a December 31 fiscal date. However, SERS provided June 30 performance data which is presented in Exhibit 4.1 along with the 66 other state pensions.

Source: State Pension CAFRs, Cliffwater LLC   at June 30,

Several observations stand out:

1. State pension systems collectively and individually underperformed the dashed line representing the 7.84% annualized composite actuarial earnings rate assumption, giving urgency to the Blue Ribbon Panel's recommendation to change (i.e., lower) earnings assumptions to expected returns and incorporate stress tests to measure the potential cost of aggressive actuarial assumptions and the budgetary impact of having earnings assumptions set too high.

2. Over the 17-year 2000-2017 period of ballooning PSERS and SERS pension underfunding, PSERS and SERS earned investment returns very close to the 5.69% asset weighted state pension average.

3. PSERS and SERS earned annualized investment returns over the 17-year period equal to 5.56% and 5.44%, respectively, which placed them roughly in the middle (ranking of 46th and 51st out of 66 total state pensions for PSERS and SERS, respectively) compared to other individual state system returns, which ranged from a low of 3.40% to a high of 7.20%. Also noteworthy is that both PSERS and SERS outperformed the 5.31% return for Calpers, considered the industry bellwether for transparency.

4. PSERS and SERS return patterns have been similar with strong returns relative to other state pensions through June 30, 2008, suffering above average losses during the 2008-2009 Financial Crisis, and largely tracking the average state return over the most recent eight years.

Expanding upon the first observation, no state pension system met its actuarial assumed rate over the 17-year period, and the average annual difference was -2.11%. This is both a remarkable and worrisome observation. This underperformance does not reflect negatively on state pension performance, individually or collectively, but on the unrealistic investment assumptions set by state pension actuaries.

While the direct impact is an underfunding of pensions[8], there has been a second order but equally important effect, which is that pension boards believe these rates represent an asset return objective, which in many cases ratchet up investment risk-taking.

PSERS and SERS both suffered losses larger than the industry average during the 2009 fiscal year, which covered the worst of the 2008-2009 Financial Crisis, with returns equal to -26.54% and -28.40%, respectively, compared to the -20.42% asset weighted average state pension return.

Many pensions, endowments and other institutions that carried higher (public and private) equity allocations and suffered unusually high losses reassessed their asset allocations after the 2008-2009 Financial Crisis, particularly pensions and endowments that were highly dependent upon existing assets to support benefits and spending and who had uncertain cash inflows, including pension contributions. PSERS and SERS certainly fell into this camp, which explains their modest performance shortfall relative to the industry averages after 2009.

At June 30, 2008, prior to the 2008-2009 Financial Crisis, PSERS had 73% of its assets targeted and 74% allocated to equity-oriented investments.[9] By June 30, 2010, PSERS reduced its assets targeted and allocated to equity-oriented investments to 57% and 58%, respectively. Subsequently, PSERS further lowered its targeted and allocated assets to equity-oriented investments to 51% and 53%, respectively, at June 30, 2017.

At December 31, 2007, prior to the 2008-2009 Financial Crisis, SERS had 69% of its assets targeted and allocated to equity-oriented investments. By December 31, 2010, SERS reduced its assets targeted and allocated to equity-oriented investments to 55% and 58%, respectively. Subsequently, SERS has gradually increased its assets targeted and allocated to equity-oriented investments to 71% and 74%, respectively, at December 31, 2017.

Both PSERS and SERS cited concerns with poor funding ratios and negative cash flows as primary reasons for lowering asset allocation targets for risky assets in the immediate aftermath of the Financial Crisis. And both pension systems have gradually increased risk over the succeeding years as markets bounced back and pension contributions were slowly restored, but in different ways. PSERS embraced a risk-centric investment strategy known as "risk parity"[10] to enhance return, while SERS gradually returned to its pre-Financial Crisis asset allocation, with a few modifications, including a 10% allocation to a "multi-asset" category, which is a flexible strategy opportunistically seeking investments with high expected returns.

Summary

A detailed performance assessment of any state investment program will undoubtedly uncover components and time periods of stronger and weaker performance. The PPMAIRC Report goes down this path with findings that are neither surprising or concerning. The bigger picture is that both PSERS and SERS achieved returns consistent with state pension average returns over the critical 2000-2017 time period, when PSERS, and SERS underwent a sharp decline in funded ratios, far higher than the

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[8] High and unachievable actuarial earnings assumptions produce scheduled regular "normal costs", or contributions made for current employees, that are less than needed to provide for their future benefits.
[9] Equity-oriented assets include public equity, private equity, real estate, and master limited partnerships.
[10] See Appendix B for a description of risk parity.

industry average, from the state's failure to make contributions at ARC levels and aggressive actuarial earnings assumptions.

It is also reasonable to conclude that the state's failure to make pension contributions (ARC) during a critical time before and during the 2008-2009 Financial Crisis led PSERS and SERS to alter their asset allocations after the Crisis to preserve liquidity to meet benefits, and that such changes to asset allocation hurt subsequent performance relative to other state pensions in the years immediately after the Financial Crisis. It is recommended that the state secure a sustainable, and preferably a permanent, funding mechanism to ensure employer contributions in all economic conditions.

Section 5: Cost Savings

Act 5 directs PPMAIRC to identify $1.5 billion in cost savings within each of the PSERS and SERS pension systems that presumably would have otherwise been spent over the next 30 years in executing current PSERS and SERS investment plans.[11] PSERS and SERS can achieve this objective by each saving $15 million per year, equal to 0.03% (3 basis points) of PSERS assets and 0.05% (5 basis points) of SERS assets.

The spotlight on investment fees is a logical byproduct of lower market returns overall and the budgetary pressures from growing unfunded liabilities. Industry-wide, pension stakeholders are examining the potential benefits of index funds as low-cost solutions for obtaining market exposure.

100% Index Funds?

A popular exercise is to compare actual past performance with a simple blend of stock and bond index funds. If the index fund strategy provides better performance, why not change and realize the fee savings? Exhibit 4.1 reported annualized returns of 5.56% and 5.44% for the PSERS and SERS investment portfolios over the 2000-2017 time period. A hypothetical 100% index fund strategy with 60% in global stocks and 40% in US bonds would have produced a lower 5.10% net return.[12]

While the "60/40" stock/bond index fund mix is ubiquitously cited as a performance benchmark and passive strategy, it does not adjust for differences in risk preferences among investors. This can be cured by finding a stock/bond mix of index funds that better fits investor risk preference. One way to estimate risk preference is by measuring an investor's historical asset mix. Using this methodology, the average split between public equities and fixed income equals 62% stocks, 38% fixed income for PSERS

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[11] Regarding PSERS, Public School Employees' Retirement Code, 24 Pa. C.S. 8535(b)(5). Regarding SERS, State Employees' Retirement Code, 71 Pa. C.S. 5958(b)(5). Section 8538(b)(5) states: "Recommend the lowest amount of investment fees to be paid by the board for the board to achieve the board's anticipated annual rate of return and to develop recommendations to reduce expenditures to generate actuarial savings of $1,500,000,000 over 30 years from the effective date of this section."

[12] The MSCI ACWI (All Country World Index) is used as a proxy for a global stock index fund return, gross of fee, and the Bloomberg Barclays US Aggregate Bond Index is used as a proxy for US bonds, gross of fee. Both indices are common benchmarks for US pension plans. Five basis points (0.05%) is deducted from gross of fee index returns to estimate an equivalent after-fee index fund return.

and 67% stocks, 33% fixed income for SERS, covering the same period 2000-2017 time period.[13] Following this risk-adjusted methodology, the estimated annualized return for a 100% index fund strategy would have been 5.07% and 5.01%, respectively, for PSERS and SERS. By subtraction, PSERS' 5.56% return outperforms its equivalent index-only strategy by 0.49% per year and SERS' 5.44% return outperforms its equivalent index-only strategy by 0.43% per year. Said differently, PSERS produced $4.2 billion in additional assets over the 17-year period compared to what it would have had at June 30, 2017 if it followed an index-only strategy.[14] Similarly, SERS produced an additional $2.0 billion in assets by June 30, 2017 by not following an index-only strategy. Combined, the fees paid by PSERS and SERS for investment services produced an additional $6.2 billion in combined value, net of fees, that would not have been available at June 30, 2017 if PSERS and SERS had followed an index-only strategy. This was over the 17-year period covering two full market cycles and a period during which pension funding dramatically declined and insufficient contributions were made by the state.

PPMAIRC Report Cost Analysis and Findings

The PPMAIRC Report suggests four "paths" to reduce fees. The "Investment Innovation" recommendation is to seed new managers with lower fees rather than established, proven managers with higher fees. The Report's recommendation to invest more with new managers reflects the authors' too simplistic approach in this specific professional field. New managers often do charge less but their businesses are riskier and performance, net-of-fees, has not proven to be better overall than established firms. Furthermore, seeding new managers cannot be done with sufficient assets (scale) to make a material difference to large funds like PSERS and SERS. A better strategy, and one that is followed by PSERS and SERS, is to look at new opportunistic funds offered by established firms, rather than the de novo firms that the Report recommends. Opportunistic funds launched by established firms have often proven to be good investments at lower fees and without the business risk.

The Report's "Strategy Simplification" path is basically a recommendation to use index funds where possible. Best practices among state pension systems, and followed by PSERS and SERS, is to seek a level of investment fees that maximizes expected net-of-fee value (return) for the pension system. Expectations for value creation are sometimes very low or non-existent, in which case pension systems invest in low cost index funds. The Commission heard testimony from both industry representatives and state pension systems about their use of index funds and the immediate cost savings that can accrue from their use. This idea is not new to pension systems, who have long been skeptical of consistent value creation by active managers in US equities, particularly for the multi-billion-dollar portfolios inherent with large state pensions and have put most of their US equity allocations into index funds. PSERS and SERS began investing in index funds in the 1980s, and at June 30, 2018 have 100% and 85%, respectively, of their US equity assets invested in lower cost index funds or index-like strategies.

The PPMAIRC Report makes a case for the <u>average</u> individual investor to use index funds, supported by data supplied by the index vendor Standard & Poor's, who gets paid by the index funds. In important respects, PSERS and SERS do not fit the average individual investor profile. Exhibit 4.2 shows PSERS and SERS net performance over the 17-year period across the three asset classes that could be fully indexed as the PPMAIRC Report seemingly recommends. Also shown in Exhibit 4.2 are average returns for state pensions and index returns (gross) for the same asset classes and time periods

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[13] The calculation excludes allocations to alternative investments, including private equity, private debt, real estate and hedge funds, in each fiscal year, finds the proportional allocation to stocks and fixed income of remaining public assets, and averages the weightings over the 17-year period.
[14] Dollar savings are calculated by averaging PSERS assets over each of the 17 fiscal years in the measurement period and multiplying by the difference between the actual return and the index-only return, all net of fees.

Exhibit 4.2: PSERS, SERS Performance versus Index Funds, June 30, 2000 to June 30, 2017

	US Equity	Non-US Equity	Fixed Income
PSERS	6.30%	6.07%	7.41%
SERS	5.31%	4.02%	6.02%
State Pension Average	5.51%	4.28%	5.90%
Index (Fund)*	5.48%	3.84%	5.11%

* Russell 3000, MSCI ACWI ex US, and Bloomberg Barclays Aggregate Bond Indices

PSERS performed better than indices and the state pension average return for US equity, non-US equity, and fixed income over the past 17 years. SERS results are more mixed. SERS outperformed the non-US and fixed income indices but underperformed the US equity index. Consequently, the higher use of index funds in US equity has been the right decision by SERS. PSERS, by contrast, could make a strong case for its continued use of active management across the three public asset classes.

The same conviction that index funds provide the best value within US equity is not shared for non-US equity and fixed income. Most state pensions allocate less to index funds for their non-US equity allocations, for two reasons. First, historical evidence generally points to state pensions earning higher returns using a combination of active management and index funds rather than index funds alone. State pensions have been able to earn additional return compared to indexing alone over the last 17 years through a combination of active management and index funds.[15] This is reflected in Exhibit 4.2. The average state pension produced a 5.90% annualized return compared to 5.11% for non-US equity. The same is true for fixed income. State pensions have performed better than the fixed income index, earning a 4.28% return compared to 3.84% for the fixed income index. Second, state pensions are often reluctant to rely totally upon formula-based investing when it comes to non-US markets, concerned about geo-political risks that perhaps deserve human oversight. PSERS and SERS reflect the ambiguity in approach to non-US equity, with PSERS successfully investing most of its non-US assets with active managers and earning more than 2% annually over its benchmark over the last 17 years and SERS investing mostly in index funds and earning a return much closer to the index benchmark.

Whichever path is selected, active management, index funds, or both, pension boards and staff regularly reassess their decisions through quarterly monitoring of performance and periodic issuance of RFPs to determine best pricing for services rendered. In addition, most management contracts involving public asset classes can be immediately terminated, without penalty, should the board lose confidence with the manager. As a general matter, the state pension boards, due to their asset size, have significant pricing power when engaging active managers in traditional asset classes but, in certain cases, fees may not be negotiable for high performing active managers with limited capacity.

"Cost Arbitrage", the third savings path recommended in the Report, is a suggestion to manage more assets internally, something already done at PSERS. Unfortunately, the Report offers no specific recommendations and mentions none of the resource challenges, operational requirements, governance requirements, and heightened liability associated with internal management, nor does it mention risks

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[15] See Exhibit 7 in "*An Examination of State Pension Performance, 2000 to 2017*" by Stephen L. Nesbitt, September 2018, submitted to PPMAIRC.

associated with internally managing assets. Most internal management programs achieve long term success and fee savings by having the compensation authority to attract/retain highly skilled asset managers through base salary and long-term performance programs that align interests.

The Report identifies quantifiable, rather than speculative, cost savings in "Monitoring and Renegotiation", which basically translates to negotiation of certain fees and, if savings can't be found, replacing the manager with a cheaper alternative.

Going through PSERS and SERS manager contracts and past performance the Report identifies $4.91 million and $4.87 million, respectively, in annual potential savings by renegotiating existing contracts or finding similar public equity managers at lower fees. Setting aside the lack of specificity related to the Report's authors success negotiating or renegotiating fees; and setting aside the assurances from both PSERS and SERS that fees are continually monitored and negotiated either through RFPs or ongoing internal comparisons; and setting aside the ability, willingness, and track record of PSERS and SERS boards to terminate manager contracts upon notice when performance is not consistent with fees paid, there is a total of $9.78 million in annual potential savings if the targeted managers agree to lower fees and if equivalent managers can be found that also agree to the lower fee terms (which itself is by no means guaranteed). While the Report advertises a combined savings of $1.14 billion in 30 years ($0.56 billion plus $0.58 billion) by implementing their fee reductions, the current value of these savings equals $118 million.[16]

While it can be said that no savings is too small and fiduciaries have a duty to protect all fund assets against unnecessary costs, the public equity cost savings identified in the Report, assuming they are appropriate and can be achieved, would cut only 0.18% (18 basis points) from the current combined $64 billion unfunded liability of the two pension systems.

The Report also identifies a total of $27.66 million in annual potential savings in private equity. These fee savings are speculative, coming from authors that may not have the requisite experience negotiating private equity partnership terms and fees.

Fees for private asset classes are higher than for other publicly traded asset classes, but those fees have historically been used to produce the highest after-fee returns within state pension systems. PSERS private equity, for example, earned an 8.34% annualized net return for the 17 years ending June 30, 2017, compared to 5.56% annualized return for its total fund. SERS private equity earned an 6.57% annualized net return for the same time period, compared to a 5.69% return for its total fund. Private equity proved to be highly accretive to both pension systems over the 17-year period and for PSERS, private equity had the highest return of all its asset classes. The lower private equity returns for SERS is largely attributable to higher allocations to venture capital during the measurement period, a sub-sector of private equity that experienced the lowest returns.

The high returns produced by private equity is not unique to the last 17-year period. The PSERS private equity portfolio has produced a 10.1% annualized return since its 1992 inception and the SERS private equity portfolio has produced a 10.9% annualized return since its 1986 inception.

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[16] The PPMAIRC fee savings, if they exist, should be expressed in current dollars as are assets, liabilities, and unfunded liabilities. The PPMAIRC Report inflates fee savings, if they exist, by calculating their future value in 30 years rather than discounting fee savings, if they exist, to current dollars, comparable to all other values shown.

Fees for investing in private assets are much higher than for publicly traded asset classes, largely due to the higher cost of acquiring, operating, and selling businesses, as compared to trading public securities. The fees can also be complex, involving not only asset-based fees but also incentive fees (profit-sharing), fee offsets, and advisor fees from portfolio company holdings. Collectively, these fees can range between 3% to 4% of assets, far higher than fees to manage stocks and bonds. However, investors such as PSERS and SERS have protections against paying high fees should performance not meet expectations. Carried interest, often the largest component of fees, is generally not paid unless all invested capital is first returned and profit sharing is paid out only after a performance "hurdle" is reached, generally set at an 8% annual return to investors.

Efforts to reduce investment fees that directly or indirectly lower allocations to private equity, and private assets more generally, will likely be detrimental to future pension system returns, and increase employer contributions.

Both PSERS and SERS are proactive in negotiating fees, either through an RFP process for public assets and/or through direct negotiation with public market asset managers or private market asset managers, in conjunction with other leading public pension systems. Gauging the appropriateness of fees is an ongoing process and best done in the context of individual private fund opportunities and relative to the value created by the private fund manager. PSERS and SERS, together with input from their consultants, are well equipped to make these fees-versus-value decisions.

A "fee-first" approach or any pre-set fee goal potentially undermines the quality of investment decision-making and is inconsistent with fiduciary responsibility to earn the highest risk-adjusted net return, which may require the use of strategies with higher or lower fees.

State pensions are also proactive in reducing fees through co-investments and strategic relationships with managers. These activities should be encouraged and the necessary staff and advisory resources to take advantage of these opportunities should be budgeted.

Finally, the PPMAIRC Report identifies $42.50 million in annual cost savings in High Yield. Basically, these savings are achieved by no longer investing in private opportunistic and performing debt, which come at higher fees, and redirecting those assets to liquid high yield bonds. This recommendation is the equivalent of moving assets from private equity to public equity, but here it is private debt to public debt. This recommendation is identified as a cost savings but, since private debt investments have many significant differences relative to public debt, would represent a change in asset allocation, for which the Report's authors don't provide support.

Fees and Private Equity

Private assets, particularly private equity, are central to the ability of PSERS and SERS to achieve the current 7.25% actuarial earnings assumption. These investments come with the highest fees and there is a real concern that private equity allocations, or other higher return, illiquid investment allocations will be reduced in order to achieve a fee reduction goal.

Both PSERS and SERS asset allocation targets place greater target weight on private assets relative to the industry average. PSERS and SERS target roughly 33%[17] of their assets to privates compared to the 26% industry average. For both PSERS and SERS, the higher allocation to private assets supports long

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[17] Assumes one-half of "Multi-Strategy" category is invested in private funds.

term expected returns of 7.36% and 7.31%, respectively, which exceeds the 7.25% actuarial interest assumption for both systems. PSERS, with their risk mitigation strategy, creates a lower risk portfolio as well, with an expected standard deviation of return equal to 11.54%, compared to 13.81% for SERS, without risk mitigation.

The allocations to private assets by both PSERS and SERS, particularly private equity, are critical to achieving a level of investment earnings consistent with current actuarial assumptions. Private equity allocations across state pension systems have historically been the highest performing asset class at a risk level that matches total portfolio risk. Both these desirable characteristics are expected to continue going forward. Without private assets, expected returns fall far below the actuarial assumption. For example, Aon (PSERS investment consultant) forecasts a lower 5.97% long term expected return if private assets are eliminated from the PSERS portfolio and instead invested only in liquid stocks and bonds. A 1.39% lower long-term return without private assets increases employer contributions significantly. The lower long-term return implies that combined PSERS and SERS employer contributions would need to increase by an amount that exceeds $1 billion per year.

PSERS and SERS asset allocation policies, while different, are prudently configured to achieve current actuarial interest rate assumptions and at the same time help mitigate potential losses through diversification in a severe market downturn, as occurred during the 2008-2009 Financial Crisis. For both systems, high allocations to private assets are essential to meeting long term actuarial assumptions, and their absence would produce significantly higher contribution rates.

Summary

The PPMAIRC Report offers minimal, achievable fee savings, other than the possibility of renegotiating a few public equity manager contracts for which the identified savings is speculative. Its other fee savings involve reducing fees by changing asset allocation (e.g., private to public debt), which would lower expected return, and finding cheaper private equity alternatives by investing in under-experienced new managers without track records or unproven "do it yourself" approaches. Instead, PSERS and SERS, with the assistance of outside consultants, should continue to have authority to assess fees in the context of the overall quality of the manager, subject to the oversight of their respective Boards. This governance structure has proven to produce the best asset class returns over many decades.

Section 6: Transparency

As concerns about underfunded pension plans have grown since the 2008-2009 Financial Crisis, public constituencies have requested more transparency (disclosure) on pension operations and investments. State pensions have moved to greater transparency by expanding their annual CAFR reports, providing web-based access to regular investment and actuarial reports, and responding to an increasing number of FOIA requests.

All pension systems, including PSERS and SERS, provide on their websites and CAFRs basic information on their total portfolio and each category of investments (asset class), including asset allocation targets, actual percentage and dollar allocations, historical returns, benchmark returns, and management fees. A narrative is also provided regarding historical performance and current investment strategy. This level of disclosure should meet the need of any stakeholder that wants to track the progress of pension assets.

Some outside groups have pressed for additional disclosures. In particular, fee disclosures that include carried interest (profit sharing) are desired. The fee disclosure issue goes further by requests for management fees and carried interest payments by individual manager. Appendix C provides a pension system checklist for these requested extended disclosures sought by some groups. It shows first that all state pension systems report aggregate management fees but only a minority, including PSERS, report carried interest. This Review recommends that SERS also report aggregate carried interest, consistent with a growing industry trend.

The disclosure of individual manager information beyond name and assets is sparse and inconsistent. The likely reason is that in managing the investments for a public pension system, some forms of manager level transparency are not desirable because they likely undermine long-term performance.

There are two levels of transparency. The first is transparency that managers provide to pension boards and staff regarding the management of their assets. This level of transparency, which includes portfolio holdings, activity, and fees should be and is non-negotiable. Both PSERS and SERS have complete transparency with respect to their investments and the fees paid.[18]

The second level of transparency is between the pension systems and the general public, where complete transparency is not desirable except in rare circumstances. For example, there is general agreement that portfolio holdings, whether for public or private managers, should not be disclosed to the public because such information could potentially harm asset values. However, public pension systems generally do provide some portfolio information, but it is generally limited to the largest traded stock and bond holdings, aggregated across all managers.

Most of the attention surrounding transparency involves manager performance and fees, known to the pension systems but often blocked from the public. Confidentiality of performance and fees can be driven by the pension system or the manager, but more likely the latter. Some public pensions take the view that disclosing manager names and performance can put them at a competitive disadvantage because other investors can use that information to seek access to their good investments, thereby potentially hurting their own standing. This is more important for private assets where top managers raise a limited amount of capital and public pensions benefit from less competition for access.

Managers of private funds generally view their performance and fees as intellectual property, where disclosure may put them at a competitive disadvantage, and where potential investors must sign confidentiality agreements to gain access to that information, even after an investment is made. While it is arguable whether performance and fees are a trade secret, the practical matter is that many of the top managers in private assets require confidentiality. These managers may boycott, and in many cases have boycotted, state pensions that have disclosure policies from accessing their funds.

PSERS and SERS should have public disclosure of fees and performance as a general objective but only to the extent that it does not interfere with their ability to seek out and gain access to desirable investment opportunities. This should not prevent reporting of overall fees and performance for categories of investment, such as private equity, but may curtail manager/fund level transparency to the public.

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[18] PSERS and SERS support the work of ILPA, who the Commission heard from, in their effort to standardize the reporting of fees. However, ILPA has nothing to do with transparency, just the consistency and efficiency of fee calculations.

PSERS and SERS should have authority to make their own disclosure decisions and weigh these against their impact on the investment program.

The PPMAIRC Report argues for 100% transparency for all investment information, seeming to believe that PSERS and SERS should be a completely open system with countless advisors and analysts helping them along. This is a risky vision, particularly for two very underfunded pension systems that can't afford to put their key investment relationships at risk.

Summary

Both PSERS and SERS currently provide good transparency on its investment activities that is consistent with industry norms. SERS should work to disclose aggregate carried interest data, as PSERS currently does. Efforts to extend disclosures to manager level information risk undermining the desirability of the two systems as investors/partners in top performing funds/managers. The potential negative consequences on long term performance are material, while the benefits largely accrue to the curious and those whose interests may not be aligned with PSERS and SERS.

Section 7: Governance

Most state pension boards, including PSERS and SERS, have similar governance structures, involving four entities, each with a different role, and which collectively provide checks and balances that have worked well over several decades. The four governing entities are (1) the pension board, (2) the pension staff, (3) outside independent consultants, and (4) the master trustee/custodian.

The pension board is the ultimate decision-making body, subject to its given authorities, and brings all impacted constituencies to the management process. This includes the taxpayer, through elected officials; beneficiaries, through elected or appointed retirees; active members, through elected or appointed employees; and independent board members that may bring business, investment, or other relevant experience. The board's management responsibilities are broad, but regarding investments they set long term asset allocation policy and objectives, and regularly monitor whether the objectives are being met and policies followed. Successful boards are those that exhibit longevity, mutual trust, and diversity.

The pension staff provide internal investment expertise, bringing a range of investment recommendations to the board, including asset allocation and manager/fund selection. Pension staffs are particularly impactful because board members are generally not trained investment professionals. It is therefore important that the composition of internal staff in terms of size and relevant expertise is aligned with the complexity of the investment strategy selected by the board. Successful staffs display investment expertise, strong communication skills, and team stability.

Consultants generally work for the board to provide an independent perspective, and/or with staff to provide a complementary skillset in areas where the staff does not have the expertise or resources to cover. Consultants can also provide institutional knowledge in cases where a pension system experiences significant board and/or staff turnover. In reporting to the board, and not staff, consultants also provide an independent check on staff recommendations. This check also works the other way as well. Staff's independence means they provide a check on consultants' investment recommendations.

Successful consultants have deep resources, broad investment capabilities, industry knowledge, and strong communication skills.

The master trustee/custodian, aside from its many administrative functions, provides an independent calculation of investment return that is critical to managing assets and rewarding staff and consultants. Successful master trustees are those that produce accurate reports in a timely manner.

Both PSERS and SERS use a current governance structure that has worked well for public pensions generally over many years.

The Commission has heard arguments that more investment expertise is needed at the most senior level, either by including investment professionals directly on boards, or instituting an investment advisory committee ("IAC") comprised of independent investment experts who would make recommendations on investment matters to the board, independent of staff and consultants.

The idea of a separate IAC has been around for a long time but is used by very few pension systems, for several reasons. First, the role itself is redundant to the functions of staff and outside consultants, whose duties and experience include those for which an IAC would be intended. Many systems that do use an IAC are those with a sole trustee, typically the state treasurer or comptroller, whereby a board of trustees does not exist. Most state pension boards hire a "general" consultant to help with general investment policy matters and selecting strategies and managers for specific asset classes. In addition, boards hire "asset class consultants" to help with specific asset class expertise, particularly with alternative investments, to bring expertise on these assets and managers. Aside from sole-trustee systems, the IAC is duplicative to these functions, unless the board wants a third opinion to the views of staff and consultants.

Most boards hire the consultants, and consultants are typically directed to work with staff but for the boards. This is important because the board and consultant then understands that the consultant's advice is not (or should not) be influenced by staff and is truly independent, just as an IAC might be constructed to be independent. This industry-wide protocol is what makes the consultant(s) and IAC duplicative from perspectives of both investment experience and governance.

Second, it is often challenging to recruit and keep IAC members. Practical, not academic, experience would be most useful in an IAC and generally these professionals are very busy, are not comfortable with financial disclosure requirements, and may have conflict-of-interest limitations, as often the best candidates do not wish to preclude their organizations from doing business with pension systems.

Third, it is difficult to make an IAC an accountable body, when its membership is voluntary. Consultants, on the other hand, are accountable for their recommendations and replaced if expectations are not met.

Of course, another choice is to have more investment professionals as board members. However, lay pension boards play a critical counter-balance to investment professionals by being the eyes and ears of outside stakeholders and providing a common-sense test to the sometimes overly complex financial strategies and instruments. In times of financial distress, the ability of the board to communicate effectively with stakeholders and the public becomes critically important. Also the systems would face the same challenges recruiting industry experts as noted above for the IAC.

The most important characteristics for a board and/or investment committee member to possess are:

1. Integrity
2. A commitment to the purpose of the fund which they serve as a fiduciary
3. A willingness to collaborate effectively with their fellow board or committee members
4. Common sense
5. A commitment to learning

Technical investment knowledge can be added to a board's decision process from many sources including a professional investment staff and outside advisors, but the core characteristics noted above are rooted deeply in the individual board member's character. No amount of technical investment knowledge can ever make a board member who lacks any of these five characteristics effective in the execution of their fiduciary duties. This explains why so many "lay" board members – meaning those without specific investment industry experience – are nonetheless outstanding board or committee members and exemplary fiduciaries.

Second, a board whose members collectively pursue education and are fully engaged in the fund's investment strategy on a sustained basis, can acquire remarkable core knowledge of the key institutional investment principles. Conversely, a board or committee member who cannot collaborate effectively with their fellow board members and with the professional investment staff and others, or who lacks basic common sense, will always be an obstacle to effective board performance – no matter what their level of technical knowledge.

Summary

The current governance structure at PSERS and SERS has worked successfully over time, conforming with industry governance practices, providing industry level investment returns, implementing best management practices, and working cooperatively through challenging periods. There is no objective evidence presented in the PPMAIRC Report that it needs to change.

Appendix A – About the Author

Stephen L. Nesbitt is a recognized leader in investment consulting to large public and private pension funds, endowments, and foundations, dating back to 1978. Mr. Nesbitt started his career at Wells Fargo Investment Advisors, an early pioneer in index funds, where he developed and managed index funds. In 1980, Mr. Nesbitt joined Wilshire Associates, where he co-founded and, until 2004, led its investment consulting division to become one of the largest in the industry. During that time, he worked with such state and federal government pensions as CalPERS, CalSTRS, Federal Retirement Thrift Investment Board, Iowa PERS, Massachusetts PRIM, Nebraska DB, New Mexico PERA, Ohio Police & Fire, Oregon PERS, The Pension Benefit Guaranty Corporation, Pennsylvania SERS, Pennsylvania PSERS, and Virginia RS.

In 2004 Mr. Nesbitt co-founded Cliffwater LLC, where he is CEO, to provide investment consulting services to large pensions, sovereign wealth funds, endowments, and foundations. While providing broad-based investment service, including asset allocation and manager selection across asset classes, Cliffwater is known for its research and capabilities in alternative investments. Current Cliffwater state pension clients include Connecticut RS, Maine PERS, STRS Ohio, New Jersey SIC, Rhode Island ERS, and Texas CDRS.

Mr. Nesbitt is among a small number of industry leaders that combines both practical and academic experience relevant to the Commission's goals. First, Mr. Nesbitt has worked directly with many state

pension systems over four decades, and in doing so has accumulated knowledge of their investment practices and governance. Mr. Nesbitt has demonstrated industry leadership on several fronts important to public pensions. He was an early advocate for the use of index funds by public pensions at a time in the 1980s when virtually all assets were actively managed. His leadership in investment fee savings and alignment of interest also manifested at the same time in a seminal 1987 Financial Analysts Journal paper titled "Performance Fees for Investment Management" that helped transform industry fee structures from those based solely on assets to structures where fees could only be earned by managers if they exceeded performance benchmarks.

Two other accomplishments are noteworthy for their impact on state pensions. Mr. Nesbitt was one of the first to bring attention to the general funding of public pensions by initiating in 1991 an Annual Study of the funding condition of individual state pension systems and an aggregate measure of state pension funding. That annual study continues and has been widely copied.   Mr. Nesbitt was also an early leader in developing corporate governance strategies for state pension systems. His consulting to Calpers led to another seminal 1994 paper published in The Journal of Applied Corporate Finance, titled "Long-Term Rewards from Shareholder Activism: A Study of the "Calpers Effect", where he quantified the benefits to public pension systems from their corporate governance activities.

Mr. Nesbitt is also known for his leadership in asset allocation and stress testing. He was one of the first consultants to develop asset allocation studies in the 1980s, including the use of expected returns and Monte Carlo simulation to understand the implications of unexpected adverse investment events. This included the introduction of asset-liability matching, which is just beginning to find application within public pensions, but which Mr. Nesbitt has used extensively for his corporate pension clients.

Mr. Nesbitt is also well known for contributions to a range of investment topics. His 1995 and 1997 papers, "Buy High, Sell Low: Timing Errors in Mutual Fund Allocations" and "Benchmarks for Private Market Investments", respectively, in The Journal of Portfolio Management, and his 1991 Financial Analysts Journal paper titled "Currency Hedging Rules for Plan Sponsors" all helped shape industry thinking on the topics of asset allocation, performance benchmarking, and international diversification.

More recently, Mr. Nesbitt has been assisting public pension systems better understand the role of alternative investments within diversified portfolios. As example, private debt and its inclusion in public fund asset allocation targets has been advanced by Mr. Nesbitt's research, published in the 2017 Journal of Alternative Investments paper, "The Investment Opportunity in US Middle Market Direct Lending" and in the forthcoming book, Private Debt: Opportunities in Corporate Direct Lending, *John Wiley Publishers*.

Mr. Nesbitt continues to actively serve the public pension community as a researcher, frequent speaker at industry events, and in an active consultant role to individual state pension systems.

Mr. Nesbitt graduated summa cum laude, with a BA in Mathematics and Economics, from Eisenhower College (Rochester Institute of Technology), and an MBA, with Distinction, from The Wharton School at The University of Pennsylvania.
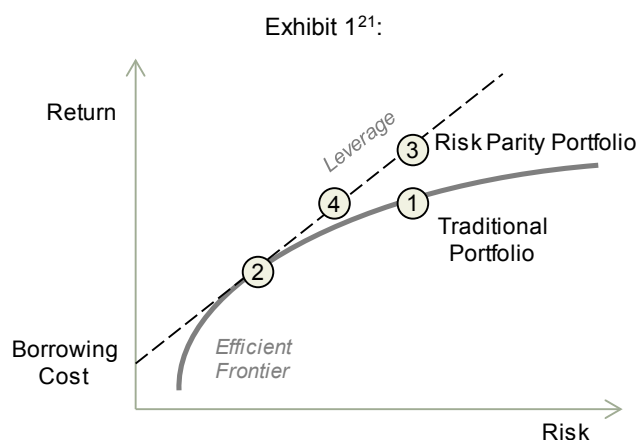

Appendix B – Risk Parity

"Risk Parity" is best described as an asset allocation solution. Its roots lie in the early work[19] of Nobel Laureate William F. Sharpe; was first popularized by Ray Dalio of Bridgewater over a decade ago in his "All Weather" strategy; and more recently has been broadly commercialized by other asset management firms.

Risk Parity and traditional asset allocation portfolios differ in two important ways. First, Risk Parity portfolios use leverage, a feature absent from traditional asset allocation policies of institutional investors.[20] Secondly, Risk Parity assumes equal Sharpe Ratios across asset classes.

Portfolio Leverage

Exhibit 1 below depicts the rationale behind the use of leverage in Risk Parity.

Exhibit 1[21]:

Portfolio 1 identifies a traditional institutional portfolio constructed to reside on the "efficient frontier" where leverage is not permitted. Its assets might include stocks, bonds, and alternative investments.

In his groundbreaking early work, Sharpe proposed a better solution to *Portfolio 1*. All investors should invest in the portfolio that has the highest Sharpe Ratio[22] – *Portfolio 2* – and leverage that portfolio up or down to the desired level of risk. He pointed out that an investor in *Portfolio 1* could do better by leveraging *Portfolio 2* to create a higher return *Portfolio 3* at the same level of risk as *Portfolio 1*.[23] Alternatively, the investor could apply less leverage to *Portfolio 2* to reach *Portfolio 4*, which provides the same return as the traditional *Portfolio 1* but at a lower level of risk.

In practice, *Portfolio 2* contains higher allocations to fixed income, notably Treasury bonds, and smaller allocations to equity. Consequently, *Portfolio 2* by itself fails to provide a return and risk that meets investor preferences, such as that found in *Portfolio 1*. Risk Parity portfolios solve this return and risk deficit through leverage to achieve *Portfolio 3*.[24]

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[19] See William F. Sharpe, "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk," *The Journal of Finance*, September 1964.

[20] To our knowledge, fiduciaries to institutional investors have long been reluctant to embrace leverage as part of asset allocation policies either because of the appearance of outsized risk-taking or the potential impact of taxable income through UBTI. Consequently, most asset allocation studies constrain asset weights to avoid leverage.

[21] The chart shown above is provided for illustrative purposes only. The chart is intended to represent the trade-off between risk and return investors make in constructing an optimal portfolio.

[22] Also referred to as the portfolio with the highest risk-adjusted return.

[23] Sharpe also pointed out that in a perfect world, all investors would hold the same Portfolio 2 which would represent the market portfolio, the concept underlying index funds and efficient markets.

[24] Leverage can be achieved in several ways, but a common approach is the use of futures contracts.

Sharpe Ratio Equivalence

Unique to Risk Parity is the presumption that all asset classes have equal Sharpe Ratios. This is a very convenient assumption for two reasons. First, it eliminates the hard work of developing expected return inputs for asset allocation studies.[25] And second, in combination with leverage, it creates a greatly simplified world where only asset class correlations matter in asset allocation.[26]

Risk Parity Optimization Example

Exhibit 2 illustrates a Risk Parity solution for three asset classes: stocks, Treasuries, and credit.

Exhibit 2: Risk Parity Example with Three Asset Classes

		Stocks	Credit	Treasuries	Risk Parity Portfolio
A.	Inputs[27]:				
1	Risk *(standard deviation)*	15.0%	11.0%	7.0%	
2	Sharpe Ratio	0.3	0.3	0.3	
3	Excess return *(1 x 2)*	4.5%	3.3%	2.1%	
4	Correlations:				
	Stocks	1.00	0.60	-0.40	
	Credit		1.00	-0.40	
	Treasuries			1.00	
B.	Optimization:				
5	Asset level leverage	0%	35%	105%	58%[28]
6	Levered excess return	4.5%	4.5%	4.5%	4.5%
7	Optimal mix *(on net assets)*	42%	42%	73%	158%
8	Optimal mix *(on gross assets)*	27%	27%	46%	100%
9	Risk *(standard deviation)*	15.0%	15.0%	15.0%	8.9%
10	Risk contribution *(% of total)*	33.3%	33.3%	33.3%	100%

Risk Parity

Section A contains asset class inputs. Risk and correlation inputs in rows 1 and 4, respectively, are illustrative, yet approximate historical levels. Risk Parity supposes equal Sharpe Ratios and we select 0.3 in row 2 as reflective of long term outcomes. Excess return, in row 3, is the product of risk and Sharpe Ratio. Since Sharpe Ratios measure excess return divided by risk, row 3 measures return above the risk-free rate. The Risk Parity portfolio is an unconstrained optimization based upon these inputs, but it is perhaps easier to grasp through a three-step process described in Section B.

The first step is to adjust the risk of the three asset classes to equal levels. This is done by leveraging (or de-leveraging) the asset classes to equal risk values. In our example, we apply leverage in row 5 to credit and Treasuries to achieve the same 15% risk level as equity.[29] In so doing the return for all three asset

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[25] Return is no longer an independent variable (input) but a linear function of the risk.
[26] Risk is the same because each individual asset class can be levered up or down to the same risk level.
[27] All return, risk and correlation assumptions are meant to represent investor expectations.
[28] Portfolio leverage equals asset leverage multiplied by asset weight, 58% = (0% x 0.27) + (35% x 0.27) + (105% x 0.46).
[29] The choice of the target risk level for all three asset classes is arbitrary and does not impact the optimal mix on gross assets. Rather, it only impacts the amount of leverage used.

classes equals 4.5% in row 6, due to their equal Sharpe Ratios. Excess return for the total portfolio will also equal 4.5%, regardless of individual asset weights.

The second step is to solve for the minimum risk portfolio for three asset classes, each having the same 4.5% return, the same 15% risk, but very different correlations. The optimal asset class weights are found in rows 7 and 8, expressed as a percent of net assets and gross assets, respectively.[30] Row 7 presents the optimized Risk Parity portfolio weights as a percent of net assets. The weights sum to 158% because leverage accounts for an additional 58% of asset exposure, mostly assigned to Treasuries. Row 8 presents the same weights as a percent of gross assets (or gross asset exposure). Almost one-half (46%) of the portfolio is allocated to Treasuries solely due to its negative correlation with the other two asset classes. The equal but lower allocations to equities and credit are explained by their higher correlation with each other and identical correlations with Treasuries.

Row 10 reports the fraction of total portfolio risk contributed by each asset class. In the Risk Parity world of equal asset class Sharpe Ratios, optimization always produces asset weights (rows 7 and 8) that result in each asset class providing the same contribution to overall portfolio risk, as we find in row 10. That is why it is called Risk Parity.

Finally, the third step would be to adjust the Risk Parity leverage to match investor risk preferences. The Risk Parity portfolio in Exhibit 2 has an 8.9% risk level (row 9), roughly comparable to the risk found in actual Risk Parity portfolios over the last several years. However, a Risk Parity portfolio's risk (and return) can be increased (decreased) by altering overall portfolio leverage. The new higher (or lower) risk portfolio would also satisfy Risk Parity conditions of highest Sharpe Ratio and equal portfolio risk contribution by asset classes, but with a potentially better match to investor risk preferences.

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[30] Weights based upon net assets equal total long asset class exposure divided by assets net of borrowing. Weights based upon gross assets equal total long asset class exposure divided by assets, including borrowing.

Appendix C: Fee Disclosure Survey

Plan Name	Total		Per Manager						Where Disclosed	
	Management Fees	Performance Fee/Carried Interest	Name	Assets	Returns	Mgmt Fee	Perf Fee	Expenses	CAFR	Separate Report
Alabama RSA	X								X	
Alaska PERS & TRS	X		X	X		X			X	
Arizona (ASRS)	X	X	X (some)	X (some)	X (some)				X	X
Arizona (PSPRS)	X		X	X					X	
Arkansas PERS	X	X	X	X		X			X	
Arkansas TRS	X		X	X	X				X	
California PERS	X	X	X	X		X	X		X	
California STRS	X		X	X	X	X			X	X
Colorado FPPA	X		X	X	X	X			X	
Colorado PERA	X	X	X	X	X				X	X
Connecticut PERS & TRS	X		X	X		X			X	
DCRB	X								X	
Delaware PERS	X		X						X	
Florida Ret System/SBA	X		X	X	X				X	X
Georgia ERS	X								X	
Georgia TRS	X								X	
Hawaii ERS	X		X	X	X				X	X
Idaho PERS	X		X	X	X	X			X	
Illinois Municipal (IMRF)	X		X	X	X				X	X
Illinois SERS/ISBI	X								X	
Illinois TRS	X		X	X		X			X	
Indiana PRS	X		X						X	
Iowa Police & Fire	X		X						X	
Iowa PERS	X		X			X			X	
Kansas PERS	X		X	X		X			X	
Kentucky RS	X	X	X	X	X	X	X		X	X
Kentucky TRS	X		X	X	X	X			X	X
Louisiana SERS	X		X	X					X	X
Louisiana TRS	X		X	X					X	
MainePERS	X		X	X	X				X	X
Maryland SRA	X	X	X	X		X			X	
Massachusetts PRIT/PRIM	X		X	X					X	
Michigan MERS	X								X	
Michigan SERS	X								X	
Minnesota PERA	X		X			X			X	
Minnesota SRS	X		X			X			X	
Minnesota TRS	X		X			X			X	
Mississippi PERS	X		X	X		X			X	
Missouri LAGERS	X		X						X	
Missouri DOT & Patrol	X		X						X	
Missouri SERS	X	X	X	X		X	X	X	X	
Missouri PSRS/PEERS	X		X	X		X			X	
Montana PERS	X		X	X					X	
Montana TRS	X		X	X					X	
Nebraska Inv Council/PERS	X		X	X		X				X
Nevada PERS	X		X	X		X			X	
New Hampshire RS	X		X	X					X	
New Jersey DOI	X	X	X	X						X
New Mexico ERB	X	X	X	X	X				X	X
New Mexico PERA	X		X	X	X (some)				X	X
New York SLRS (Common)	X	X	X	X	X (some)	X	X	X	X	
New York State TRS	X		X	X	X	X			X	
North Carolina Treasury	X	X	X	X	X	X	X		X	X
North Dakota PERS/TRS	X		X	X	X				X	X
Ohio PERS	X	X	X						X	
Ohio Police & Fire	X		X						X	
Ohio SERS	X		X						X	
Ohio STRS	X		X						X	
Oklahoma PERS	X		X	X		X			X	
Oklahoma TRS	X		X	X		X			X	
Oregon PERS	X		X	X	X	X			X	X
Pennsylvania PSERS	X	X	X	X	X				X	X
Pennsylvania SERS	X		X	X					X	
Rhode Island (ERSRI)	X	X	X	X		X	X	X	X	X
South Carolina RS	X	X	X	X		X	X	X	X	
South Dakota RS	X		X	X		X			X	
Tennessee CRS	X		X						X	
Texas CDRS	X	X	X	X					X	X
Texas ERS	X		X						X	
Texas TMRS	X	X	X	X					X	X
Texas TRS	X		X	X					X	
Utah RS	X								X	
Vermont SERS/STRS	X		X	X	X				X	X
Virginia RS	X		X						X	
Washington RS	X		X	X (some)					X	X
West Virigina IMB	X		X	X					X	
Wisconsin (SWIB)	X		X	X	X					X
Wyoming RS	X		X	X					X	

Red means the information is on the plan's website but isn't in the CAFR (such as a separate performance report or fee report).