COMMONWEALTH OF PENNSYLVANIA June 17, 2015

PUBLIC EMPLOYEE RETIREMENT COMMISSION

ACTUARIAL NOTE TRANSMITTAL

Bill ID: House Bill Number 727, Printer's Number 1555

System: Public School Employees' Retirement System and
State Employees' Retirement System

Subject: Defined Contribution Retirement Plan

SYNOPSIS

House Bill Number 727, Printer's Number 1555, would amend the Public School Employees' Retirement Code of the Public School Employees' Retirement System (PSERS) and the State Employees' Retirement Code of the State Employees' Retirement System (SERS) to:

1) Effective July 1, 2016, establish a defined contribution retirement benefit plan under a new chapter of the PSERS Code, Chapter 84, called the School Employees' Defined Contribution (DC) Plan. All new school employees would become participants in the new plan. Membership in the PSERS' defined benefit retirement plan would be closed to all new employees. School employees participating in the DC plan would contribute 6.5% of compensation with an employer contribution of 4% of compensation; and

2) Effective January 1, 2016, establish a defined contribution retirement benefit plan under a new chapter of the SERS Code, Chapter 54, called the State Employees' Defined Contribution (DC) Plan. Most new State employees would become participants in the new plan, except for future Pennsylvania State Police Officers, who would continue to be eligible for membership in the SERS defined benefit plan after 2016, and school employees who elect the alternate retirement plan under Section 5301(a)(12). Most State employees participating in the DC plan would contribute 6.5% of compensation with an employer contribution of 4% of compensation. For hazardous duty employees (including Capitol Police and park rangers), the employer contribution rate would be 5.5% of compensation.

DISCUSSION

The Retirement Codes and Systems

Currently, most full-time public school and State employees are members of either the Public School Employees' Retirement System (PSERS) or the State Employees' Retirement System (SERS). Both PSERS and SERS are governmental, cost-sharing, multiple-employer defined benefit (DB) pension plans. The designated purpose of the Public School Employees' Retirement System and the State Employees' Retirement System is to provide retirement allowances and other benefits, including disability and death benefits to public school and State employees. As of June 30, 2014, there were approximately 789 participating employers, generally school districts, area vocational-technical schools, and intermediate units in PSERS, and as of December 31, 2014, approximately 104 Commonwealth and other employers participating in SERS.

Membership in PSERS and SERS is mandatory for most school and State employees. Certain other employees are not required but are given the option to participate. As of June 30, 2014, there were 263,312 active members and 213,900 annuitant members of PSERS, and as of December 31, 2014, there were 104,431 active members and 122,249 annuitant members of SERS.

For most members of both Systems, the basic benefit formula used to determine the normal retirement benefit is equivalent to the product of 2.5% multiplied by the member's years of accumulated service credit ("eligibility points") multiplied by the member's final average (highest three years) salary. Since the passage of Act 9 of 2001 (which increased the accrual rate for most members from 2.0% to 2.5%), most members of PSERS are Class T-D members and contribute 7.5% of compensation to PSERS, while most members of SERS are Class AA members and contribute 6.25% of compensation to SERS. Within both Systems, there are a number of additional membership classes with corresponding benefit accrual and employee contribution rates that differ from the majority of school and State employees.

Act 120 of 2010 implemented major pension reforms, including the establishment of new benefit tiers applicable to most new members. Effective January 1, 2011, most new members (including members of the General Assembly), are required to become members of one of two membership classes, known as "Class A-3" and "Class A-4." Most new members of SERS, other than State Police Officers or members employed in a position for which a class of service other than Class A or Class AA is credited or could be elected, become members of Class A-3 beginning January 1, 2011 (or if a member of the General Assembly, beginning December 1, 2010). Class A-3 members are eligible for an annuity based upon an annual benefit accrual rate of 2% and have a corresponding employee contribution requirement of

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6.25% of compensation. As an alternative to Class A-3, an employee who becomes a member of SERS on or after January 1, 2011, may elect Class A-4 membership within 45 days of becoming a member of SERS. A Class A-4 member is eligible for an annuity based upon an annual benefit accrual rate of 2.5% with a corresponding employee contribution requirement equal to 9.3% of compensation.

Effective July 1, 2011, new members of PSERS are required to become members of one of two membership classes, known as "Class T-E" and "Class T-F." Most new members of PSERS are required to become members of Class T-E beginning July 1, 2011. Class T-E members are eligible for an annuity based upon an annual benefit accrual rate of 2% and have a corresponding employee contribution of 7.5% of compensation. As an alternative to Class T-E, an employee who becomes a member of PSERS on or after July 1, 2011, may elect Class T-F membership within 45 days of becoming a member of PSERS. A Class T-F member is eligible for an annuity based upon an annual benefit accrual rate of 2.5% with a corresponding employee contribution requirement equal to 10.3% of compensation.

Under the Codes of both Systems, superannuation or normal retirement age is that date on which a member may terminate service with the public employer and receive a full retirement benefit without reduction. Under the Public School Employees' Retirement Code, superannuation or normal retirement age for most members is age 62 with at least one full year of service, age 60 with 30 or more years of service, or any age with 35 years of service. Under the State Employees' Retirement Code, superannuation or normal retirement age for most members is age 60 with three years of service or any age with 35 years of service, while age 50 is the normal retirement age for members of the General Assembly and certain public safety employees. For most members of the Systems who first became members after the effective dates of Act 120, the superannuation requirement is age 65 with a minimum of three years of service credit, or any combination of age and service that totals 92 with at least 35 years of credited service, and age 55 for members of the General Assembly and certain public safety employees.

Defined Benefit and Defined Contribution Retirement Systems

There are two predominate approaches to pension plan design employed in the public and private sectors to provide employee retirement benefits. In a "defined benefit" (DB) plan, such as PSERS, the pension benefit to be provided at retirement is defined, while the contributions to be made over the period of employment are variable based on the experience of the pension fund. Upon retirement, a DB plan participant is entitled to receive a definitely determinable benefit that is calculated using a formulation that considers factors such as age, duration of service with the employer and compensation. Because the benefit is de-

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fined and calculated using a formula and is not dependent on an individual's account balance, members of DB plans are largely insulated from both negative and positive fluctuations of the investment markets.

By contrast, in a "defined contribution" (DC) pension plan, such as the plan proposed in the bill for new or returning school employees, the contributions to be made over the period of employment are defined, while the pension benefit to be provided at retirement is variable based on the experience of the pension fund. Upon retirement or separation from the employer, a DC plan participant is generally entitled only to the balance standing to the credit of the individual's retirement account. Market performance directly impacts the value of an individual's retirement account.

The distinction between the DB and DC approaches is most significant in the placement of the risk associated with investment earnings over the period of employment. The fixed benefit in a DB pension plan means that the investment experience impacts the contribution requirements, increasing them when investment earnings are lower than anticipated and decreasing them when earnings are greater than anticipated. The fixed contributions in a DC pension plan mean that the investment experience impacts on the benefit amount, increasing it when earnings are higher and reducing it when earnings are lower. Therefore, the employer bears the investment risk in a DB plan, and the employee bears the investment risk in a DC pension plan.

For most employees, defined contribution plans are generally regarded as more valuable for those in the early stages of their careers or for those who are employed in careers that entail greater mobility. Defined contribution accounts are portable and can readily move with the employee as that employee moves from one employer to the next. In contrast, defined benefit plans are relatively more valuable for those employees who tend to remain with one employer and to long-service employees in the later stages of their careers, because the value and cost of the defined benefits earned each year increase as employees approach retirement age.

Defined Contribution Plan for School and State Employees

The bill would establish new mandatory governmental retirement plans, known as the School Employees' Defined Contribution Plan and the State Employees' Defined Contribution Plan ("Plans"), for most new school and State employees on or after the year 2016. The defined benefit plan provided by PSERS and SERS would be closed to most new entrants effective July 1, 2016, and January 1, 2016, respectively. Under the bill, a part-time school

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employee compensated on an hourly or per diem basis would become a mandatory participant in the Plan.

The membership provision known colloquially as the "footprint rule" would be preserved for school and State employees returning to service following a break in service. Generally, under the bill, members who already participated (i.e., had a footprint) in the retirement systems prior to the effective date of the defined contribution plans would be eligible to maintain the benefit provisions that originally applied to them.

Optional members of SERS listed under Section 5301(a) would retain membership in the System unless they choose to become a "participant" in the new DC plan. The State employees that can elect to participate in the DC plan include the following: the Governor, the Lieutenant Governor, members of the General Assembly, heads of administrative departments, the Budget secretary, and legislative employees. Once the eligible employees elect participation in the Plan, they would cease accruing service credit in SERS and would continue as participants in the DC plan until termination of State service.

Membership benefits already accumulated prior to election in the DC plan would be frozen in the System, but available to the employee upon retirement. Election to participate in the plan can be made at any time, and would be an irrevocable election. An employee who is both a member of the System and a participant in the Plan would be known as a "combined service employee." After electing to participate in the Plan, the employee would be prohibited from purchasing any previous school or creditable nonschool service. Under Section 5307 of the bill, for an active member who elects to become a participant in the Plan, vesting requirements under the System (five-year vesting for Class AA and ten-year vesting for Classes A-3 & A-4) shall be considered to have been satisfied if the employee participates in the Plan for three or more years. A combined service employee would also be eligible for a superannuation annuity only after attaining superannuation age and three years of credited service (or three years of participation in the DC plan).

For the purposes of the Commission's discussion, the major issues of the new pension plan have been divided into the following four categories: 1) establishment, organization and operation; 2) coverage, benefits and contributions; 3) investments; and 4) ancillary issues.

Establishment, Organization and Operation

The bill mandates the creation of the Plans, establishes the PSERS and SERS Boards as administrators of the respective Plans, and sets forth the Boards' powers and duties. Most

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of the details governing the actual operation of the new Plan are delegated to the Boards which will be responsible for establishing the rules and regulations governing the Plans. These rules and regulations will presumably address the many specific details involved in the operation of a public pension plan. It also appears that most of the new Plans' investment and administrative functions may be handled by third-party administrators contracted by the Boards to provide the necessary services.

Coverage, Benefits and Contributions

School and State employees who participate in the new DC plans would be required to contribute a mandatory 6.5% of compensation with an employer contribution of 4% of compensation. For hazardous duty employees (including Capitol Police and park rangers), the employer contribution rate would be 5.5% of compensation. Future Pennsylvania State Police Officers would be exempt from joining the new DC plan, with new employees of this group continuing to be eligible for membership in Class A-3 of SERS after 2016. A participant may make additional contributions to the pension plan up to the limits imposed by federal law. Contributions on behalf of the participant and the employer would be credited to an "individual investment account" for each participant of the new Plans, along with all interest and investment gains or losses. For investment purposes, the Boards may pool the assets of the participants in the Plans.

Participants in the Plans would be 100% vested immediately in all employee contributions, as well as any interest and earnings attributed to those contributions. Employer contributions would become vested over a three-year period: 33% after the first year of service, 66% after the second year of service, and 100% vested after the third year of service.

The Plans include the requirement that any disbursement of an individual investment account made after the participant reaches age 55 must include at least a partial payout as a life annuity. Since no specific annuity options are mentioned, it will be up to the board to determine the minimum annuity amount and what types of lifetime annuity options will be provided.

Investments

While the bill does not specifically mention the type of investments that will be offered to the participants, governmental defined contribution plans typically offer a variety of investment options, including lifestyle funds that are based upon age and projected retirement date. The Plans will most likely also make available investment options that repre-

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sent a broad cross-section of asset classes and risk profiles. The bill states that the PSERS and SERS Boards will not be held responsible for any investment losses incurred by participants in the Plans or for the failure of any investment to earn a specific or expected return. All fees, costs and expenses of administering the Plans will be assessed against the accounts created on behalf of participants.

Ancillary Issues

Death and Disability Benefits. Beyond payment of the participant's account balance to the designated beneficiary upon the death of an active participant, there are no special death or disability benefit provisions to provide for the surviving spouse or children of a Plan participant. This includes a lack of disability benefits for work-related disabilities incurred by public safety employees.

Premium Assistance. Under the PSERS Code, premium assistance eligibility is determined based upon years of service credited in the System. Because DC plan participants will no longer accrue service credit in the System, PSERS' DC plan participants would be ineligible for post-retirement health insurance premium assistance now provided to eligible retired members.

Retired Employee Health Program. The Retired Employee Health program (REHP) is administered jointly by the Governor's Office of Administration and SERS. The REHP provides for Commonwealth-subsidized post-retirement healthcare benefits to employees of most Commonwealth agencies. Eligibility for these benefits is tied to an employee's years of credited service in SERS and an employee's age at retirement. Because a participant in the Plan would not accrue credited service in the System, SERS' DC plan participants appear to be ineligible for REHP participation now provided to eligible retired members.

Pension Forfeiture Act. Under Act 140 of 1978, known as the Public Employee Pension Forfeiture Act (43 P.S. §§ 1311-1315), a public official or public employee who is convicted or pleads guilty or no defense to a crime related to public office or public employment is disqualified to receive a retirement or other benefit or payment of any kind except a return without interest of the contributions paid into a retirement system. Under the bill, the accumulated contributions of a participant shall not be forfeited but will be made available for payment of any fines or restitution.

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Membership Exemption for Pennsylvania State Police Officers

Special retirement coverage for various public safety employees often is provided in public employee retirement systems. The enhanced benefits are premised on the hazardous nature of public safety employment and the physical and psychological demands of public safety work. Under the State Employees' Retirement Code, the special retirement benefit for most Commonwealth public safety employees, including correction and enforcement officers, is the eligibility to retire at age 50 with full retirement benefits. For public safety employees who first became members of SERS after the effective date of Act 120, retirement age is age 55.

The benefits of State Police Officers are affected by the DiLauro arbitration award. The award provided that officers with 20 years of service are eligible to receive a retirement benefit of 50% of the officer's highest full year's salary, and those with 25 years of service shall receive 75% of the highest full year's salary. Years of service between 20 and 25 or after 25 do not produce incremental benefit increases. The award applies to officers who retire on or after July 1, 1989. (Class A members with less than 20 years of service are not affected by the award and are eligible for the statutory Class A benefit at a 2.0% benefit accrual rate. No State Police Officer is entitled to the Act 9 benefit accrual rate of 2.5% because members of the State Police were specifically excluded from coverage by that statute). By the act of August 5, 1991 [P. L. 183, No. 23], 71 Pa. C. S. § 5955 was amended to provide that SERS retirement benefits are exclusively statutory and cannot be changed by collective bargaining agreements or arbitration awards under such agreements. That section grandfathered pre-existing awards, including DiLauro, but the amendment does not foreclose the legislature from prospectively altering benefits for new State Police Officers by statute.

The bill would exempt a sworn officer of the Pennsylvania State Police from membership in the new DC plan. All prospective employees of this group would continue to be eligible for membership in Class A-3 in SERS until they become eligible for the enhanced State Trooper retirement benefits upon attaining 20 years of credited service.

Special Membership Classes

Within SERS, there are a number of special membership classes entitled to enhanced retirement benefits, reduced superannuation requirements or both. These include all members of the judiciary, members of the General Assembly, certain enforcement officers and Pennsylvania State Police Officers. Additionally, certain highly compensated employees

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would be entitled to enhanced retirement benefits by virtue of their higher than normal final average salary calculations. Under the bill, except for Pennsylvania State Police Officers, there would be no special benefit provisions for these groups of employees in the new State Employees' DC plan.

In 1974, an attempt was made to reform and make uniform the benefit provisions of the SERS Code. This attempt at reform prompted a series of lawsuits brought by members of the judiciary challenging the benefit changes as applied to members of the judicial branch. These court cases ultimately resulted in the preservation of the judiciary's entitlement to special membership status and enhanced benefits. The most salient of these cases were the "Goodheart" Supreme Court decisions (See *Goodheart v. Casey*, 521 Pa. 316 (1989); 523 Pa. 188 (1989), and *Klein v. State Employees' Retirement System*, 521 Pa. 330, 555 A.2d 1216, 1221 (1989)). Essentially, the Supreme Court of Pennsylvania ruled that the 1974 amendments to the Code, which eliminated the option to elect special class membership, were unconstitutional as applied to members of the judiciary. The Supreme Court ruled that, in order to preserve an independent judiciary, judges must be adequately compensated, pension benefits are part of compensation, and all members of a single-level court performing similar functions and exercising similar authority must be compensated at the same rate. As a result, all individuals who became members of the judiciary following the 1974 amendments to the SERS Code must be permitted to elect special class (Class E-1 or E-2) membership, make the required higher member contributions, and receive the higher pension benefit attributable to their membership class.

Based upon the independent status of the judiciary in Pennsylvania and the case law regarding the special status of its members, if enacted, the bill is likely to be challenged in the courts.

Treatment of Educational Employees

Under current law, "school employees" (employees and officers of the Pennsylvania State System of Higher Education [PASSHE] institutions and the Department of Education, most employees of the Pennsylvania State University, and community college employees) are eligible to choose coverage in an employer-approved, defined contribution "alternative retirement program" as an alternative option to membership in either the State Employees' Retirement System (SERS) or the Public School Employees' Retirement System (PSERS). Of the school employees who are eligible to choose membership in an alternative retirement program, approximately 50% elect membership in SERS, 45% elect membership in an alternative retirement program and 5% elect membership in PSERS. Section 5301(a)(12) of

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the SERS Code directs employers to contribute up to 9.29% of pay into the independent retirement program, and all affected employers currently contribute at that rate.

Under the bill, these school employees would no longer be eligible to elect membership in either of the Systems or to become a participant in the Plan. Instead, all future eligible employees would be limited to choosing coverage in an alternative retirement program.

Implications of Closing PSERS to New Members and Retention of a Vestigial DB Plan for SERS

As noted previously, membership in PSERS would be closed to school employees hired or returning after a break in service on or after July 1, 2016. In the case of SERS, only members of the Pennsylvania State Police would remain eligible for membership in the System on or after January 1, 2016. Although SERS will be closed to most new members, SERS will maintain a vestigial DB plan containing State Police Officers. However, both PSERS and SERS will retain their current active and annuitant populations and funding for the retirement benefits of those members will continue for many decades. In actuarial terms, the funding dynamics of such "closed groups" differ significantly from an open group in which there is a continuous influx of new active members. Closed groups present funding challenges that will need to be addressed in the future through modification of the Systems' respective statutory funding provisions.

When the population of a retirement system is an open group, with a continuous influx of new active members, payroll generally increases and the level-dollar amortization represents a decreasing percentage of payroll. However, in a closed group, the payroll will begin shrinking in the future and the level-dollar payments will represent an increasingly larger percentage of payroll. Each System currently has a large unfunded actuarial accrued liability that will need to be covered by future contributions. The liabilities of PSERS and SERS are not unlike a home mortgage or other long-term debt. The debt must be paid (amortized), with interest, over a certain span of time. In the event PSERS and SERS are closed to new members, the period over which these liabilities will need to be amortized will be no more than 30 years on a level-dollar basis. The fixed-dollar cost of paying down these liabilities will result in increased amortization payments as a percentage of payrolls and may become excessively burdensome for the remaining active member employers.

Currently, changes in the unfunded accrued liability, except those due to legislative action, are amortized on a level-percentage of compensation over 24 years for PSERS and on a lev-

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el-dollar basis over a 30-year period for SERS. Changes due to legislative action are to be amortized over a ten-year period.

Under the bill, for PSERS, any increase or decrease in the unfunded accrued liability will continue to be amortized on a level-percentage of compensation of all active members and participants over a period of 24 years. Changes in the accrued liability of PSERS as a result of legislation will be amortized on a level-percentage of compensation over a ten-year period, with the result of the 10-year asset averaging method being constrained to within 30% of the market values of assets. In the case of SERS, for the fiscal year beginning July 1, 2015, any change in the unfunded accrued liability will be amortized on a level-dollar basis as a percentage of compensation of all active members and participants over a period of 30 years. Beginning July 1, 2015, changes in the accrued liability of SERS due to benefit changes under the bill will be amortized on a level-dollar basis over a period of 20 years.

As the active membership declines within each System, it may not be reasonable to assume that future changes in the unfunded accrued liability should be amortized over 24 or 30 years. A ten-year period may also be unreasonable for future legislative changes. Consideration should also be given to the appropriate period over which future plan experience should be amortized.

Once active membership in PSERS and SERS has significantly declined and retired members are the majority of each System's total membership, the Systems may also need to consider revising their investment policies. Due to the need to ensure sufficient liquidity to provide for the payment of benefits, both PSERS and SERS may be inclined to invest assets in a more conservative manner resulting in a lower discount rate. This revision would result in a lower valuation interest rate, which would result in higher actuarial accrued liabilities, requiring larger employer contributions as a percentage of payroll.

Based on discussion provided by the Systems' investment consultants, the Systems' actuaries recommend that the investment return assumption be reduced over time if the bill is enacted. The Commission's consulting actuary, Milliman, cautions the reader to determine whether this is a cost of the bill or a change in assumptions. The Systems' Boards (Boards) can change asset allocation strategy at any time, which could have an impact on the investment return assumption. A more conservative or diversified portfolio could result in a reduction in the expected investment return, but the variability of returns may be reduced. On the other hand, a more aggressive portfolio could result in an increase in the expectation, but the variability of returns may be increased. A larger variation of returns would result in more volatility in the annual contribution requirement. Milliman asks, if a change in benefit design is made, would that ***require*** the Boards to modify the assumption? Mil-

DISCUSSION (CONT'D)

liman believes that there is much uncertainty regarding the possible actions of the Boards in future years under the current design or if the bill is enacted. In the Systems' actuaries' analyses, they note the following reasons for the change.

Future Expected Benefit Commitments of the Systems

In determining if the Systems' asset allocation should be modified due to the enactment of the bill, Milliman reviewed the plans' liquidity ratio to determine the percentage of assets to be used to cover a year of benefit payments. If this percentage increases over time, Milliman would then expect a shift in the plan's asset allocation to more liquid assets. As of June 30, 2014, expected benefit payments for the upcoming year represent approximately 12% of market value for PSERS and 11% for SERS. If the bill is enacted, the expected benefit payments represent approximately 8.0% of market value as of June 30, 2047, for PSERS, and 6% of market value as of December 31, 2049, for SERS. Therefore, the liquidity ratio, based on this metric, is expected to decrease from its current levels assuming all current actuarial assumptions are met and all employers, including the Commonwealth, make the annual actuarial contribution.

*Consideration of the Illiquidity of Certain Investment Classe*s

As of June 30, 2047, for PSERS, and December 31, 2049, for SERS, the projected market value is $140 billion for PSERS and at least $60 billion for SERS. The projected benefit payments are $11 billion for PSERS and $4 billion for SERS. Based on this ratio, Milliman does not believe that current illiquid investments would need to be reduced by the end of the projection period.

Expected Reduction of Risk and Surplus Volatility Over the Period Examined to Minimize Employer Contribution Requirements While Securing Assets for Benefit Commitments

Assuming a Commonwealth budget growth assumption of 3.9%, the ratio of the total projected plan liability to the Commonwealth budget is expected to be reduced by over 60% during the projection period if the bill is enacted. Milliman agrees that the plans will mature over time, but the Commonwealth is not expected to mature assuming the tax base and population will continue at current levels. Therefore as the size of the plans is reduced, the DB plans become less of a risk to the Commonwealth. As a result, the Commonwealth might be able to take on more risk regarding the investments of the plan and continue to manage the plan at its current investment risk levels.

DISCUSSION (CONT'D)

The Median of the Future Expected Asset Returns

Based on the PSERS investment consultant's analysis, the median return is approximately 7%, which is 50 basis points less than the current investment return assumption (as referenced in the attached report from Aon Hewitt, the investment consultant for PSERS, entitled *Asset/Liability Plan Change Study*, dated May 2015). Milliman agrees that the investment return assumption should be set at the median return regardless of plan design. Milliman is uncertain if the reduction contained in the analyses represents a change in the current assumption or if they are solely a result of the bill.

Miscellaneous Provisions

Contractual Benefit Rights of DC Plan Participants. Section 401 of Article 4 in the bill explicitly states that a participant in either the School Employees' Defined Contribution Plan or the State Employees' Defined Contribution Plan shall not have "an express or implied contractual right" in relation to requirements for any of the following provisions: 1) qualification of the Plans as a qualified plan(s) under the Internal Revenue Code; 2) contributions to, participation in, or benefits from the Plans; and 3) domestic relations orders regarding alternate payees of participants in the Plans.

SUMMARY OF ACTUARIAL COST IMPACT

The specific elements of the current issue involve significant differences in the actuarial analyses provided by our consultant, Milliman, and the actuaries for the retirement systems. Regarding the amortization of the existing unfunded liability, all of the actuaries agree that some reduction of the current amortization period would be advisable. The Systems' actuaries applied that amortization reduction to their analysis. Milliman, noting that the amortization period is established by existing statute and the House Bill Number 727 does not alter that amortization period, did not. Further, the Systems' actuaries opined that the closure of the existing defined benefit pension would require a future shift in investment policy to a more conservative one, while Milliman disagreed that such a change would be "required" (emphasis in the Milliman letter at pages 14 and 16). The fundamental problem with this is that investment policy is set by the Systems' Boards. House Bill Number 727 does not restrict the Boards' discretion in this area, but expands upon it. While the bill does not compel a change in investment policy, it does not prevent it, either. Given that the Boards' investment advisor and actuary are both recommending the change, it may be unrealistic to discount the work of the Systems' actuaries.

SUMMARY OF ACTUARIAL COST IMPACT (CONT'D)

The Commission's consulting actuary has reviewed the bill and has stated:

> If this Bill is enacted, the following chart shows the expected accumulated nominal dollar cash flow costs/(savings) on the employer contributions for the fiscal years 2015-2016 through 2047-2048 for both Systems, without and with the System actuary's recommended changes in amortization methodology and reduction in investment return assumption. The chart also shows the present value of the expected cash flow costs/(savings) as of June 30, 2015, assuming end of year payment, at 3.9% (a proxy for budget growth) and 7.5% (the current investment return for the System). The 3.9% proxy for budget growth is based on the annual growth in estimated general fund revenue from 2017-2018 to 2019-2020 shown on page C1-12 in the Governor's Executive Budget for 2015-2016. *As a reminder, it is up to the reader to determine what portion, if any, of the increase in cost due to the System actuaries' recommendations should be included as a cost of the Bill*.

Impact on Employer Contributions if House Bill 727, PN 1555 is enacted
For Fiscal Years 2015-2016 through 2047-2048
(amounts in millions and based on System actuary's projections)

	Cash Flow Costs/(Savings)	**Present Value of Cash Flow Costs/(Savings) at 3.9%**	**Present Value of Cash Flow Costs/(Savings) at 7.5%**
Without the System actuary's recommended changes in amortization methodology and reductions in investment return assumption			
PSERS	$5,208.9	$2,303.8	$1,217.1
SERS	(3,030.6)	(1,279.9)	(641.5)
Total	2,178.3	1,023.9	575.6
With the System actuary's recommended changes in amortization methodology and reductions in investment return assumption			
PSERS	$28,264.1	$10,649.5	$4,903.7
SERS	2,964.1	1,105.0	462.2
Total	31,228.2	11,754.5	5,365.9

> Prior to reflecting the System actuary's recommended changes for amortization methodology and reduction in investment returns, there is a cost for PSERS and a savings for SERS if the Bill is enacted. This difference is due to the relationship between the current employer normal cost rate for recent hires and the 4% DC plan

SUMMARY OF ACTUARIAL COST IMPACT (CONT'D)

contribution rate – such normal cost rate is below 4% for PSERS and vice versa for SERS.

Each of the system's assets is assumed to earn 7.5% or alternative assumption, as applicable, each year of the projection. To the extent adverse (favorable) investment returns are experienced, the contribution rates would be higher (lower).

Tables 1 and 2 detail the actuarial impact of the bill ***without*** the recommended changes of the Systems' actuaries. Tables 3 and 4 detail the actuarial impact of the bill ***with*** the recommended changes of the Systems' actuaries. To see the work and commentary of the Systems' actuaries in their entirety, please see the attached actuarial cost estimates provided by Buck Consultants and Hay Group.

SUMMARY OF ACTUARIAL COST IMPACT (CONT'D)

TABLE 1
Public School Employees' Retirement System
Projection of Contribution Rates and Funded Ratios as of June 30, 2014
Current PSERS vs. House Bill No. 727, Printer's No. 1555
Without Reflecting Potential Funding Reforms Associated with Financing of a Closed Benefit Plan

	Total Employer Contribution Rate		Total Employer Contribution (thousands)				Funded Ratio		Unfunded Accrued Liability (millions)	
					Cost /(Savings)					
Fiscal Year Ending June	Current PSERS	HB 727 DB + DC	Current PSERS	HB 727 DB + DC	Cash Flow Basis	Present Value as of June 30, 2015	Current PSERS	HB 727 DB	Current PSERS	HB 727 DB
2013	12.36 %	12.36 %					63.8 %	63.8 %	$32,598.6	$32,598.6
2014	16.93	16.93					62.0	62.0	35,121.2	35,121.2
2015	21.40	21.40	$ 2,885,148	$ 2,885,148	$ 0	$ 0	60.6	60.6	37,413.9	37,413.9
2016	25.84	25.84	3,456,100	3,456,100	0	0	59.6	59.6	39,412.8	39,412.8
2017	29.69	29.85	4,079,195	4,100,953	21,757	18,827	58.7	58.7	41,424.4	41,424.4
2018	30.62	30.93	4,316,593	4,359,776	43,183	34,760	58.4	58.4	42,871.0	42,871.0
2019	31.56	31.88	4,569,239	4,616,291	47,051	35,232	60.0	60.0	42,296.8	42,296.8
2020	32.23	32.58	4,794,454	4,846,262	51,808	36,088	61.7	61.6	41,603.7	41,603.7
2021	32.02	32.40	4,892,886	4,950,628	57,742	37,414	63.0	62.9	41,228.1	41,228.1
2022	31.90	32.29	5,005,091	5,066,369	61,278	36,936	64.7	64.5	40,395.1	40,395.1
2023	31.96	32.39	5,149,606	5,218,695	69,088	38,738	66.5	66.3	39,344.6	39,344.6
2024	31.90	32.36	5,276,635	5,353,474	76,839	40,078	68.1	67.8	38,382.2	38,382.2
2025	31.83	32.30	5,404,815	5,484,779	79,964	38,798	69.9	69.5	37,192.9	37,192.9
2026	31.90	32.42	5,555,781	5,646,066	90,285	40,750	71.8	71.3	35,741.5	35,741.5
2027	31.99	32.53	5,709,259	5,805,198	95,939	40,280	73.8	73.3	34,014.0	34,014.0
2028	32.10	32.68	5,865,715	5,971,382	105,668	41,270	75.9	75.3	31,999.5	31,999.5
2029	32.20	32.81	6,020,442	6,134,617	114,175	41,481	78.2	77.5	29,682.5	29,682.5
2030	32.31	32.97	6,178,835	6,304,186	125,352	42,365	80.6	79.9	27,032.1	27,032.1
2031	32.43	33.12	6,340,635	6,476,080	135,445	42,582	83.1	82.4	24,014.7	24,014.7
2032	32.58	33.31	6,509,681	6,656,031	146,350	42,800	85.8	85.1	20,597.9	20,597.9
2033	32.72	33.50	6,679,209	6,839,343	160,134	43,564	88.7	88.1	16,743.8	16,743.8
2034	32.88	33.70	6,856,314	7,026,865	170,551	43,161	91.8	91.3	12,411.6	12,411.6
2035	33.03	33.89	7,036,790	7,220,565	183,774	43,263	95.1	94.7	7,559.2	7,559.2
2036	18.12	19.03	3,943,950	4,141,623	197,673	43,288	96.6	96.2	5,418.8	5,418.8
2037	14.27	15.21	3,173,457	3,383,434	209,977	42,775	97.6	97.3	3,871.2	3,871.2
2038	12.46	13.45	2,831,765	3,056,868	225,103	42,657	98.4	98.3	2,529.3	2,529.3
2039	10.43	11.46	2,422,607	2,661,073	238,467	42,036	99.1	99.0	1,474.9	1,474.9
2040	8.80	9.88	2,090,021	2,346,674	256,653	42,086	99.6	99.6	654.8	654.8
2041	7.28	8.40	1,769,320	2,041,689	272,369	41,547	100.0	100.0	72.5	72.5
2042	5.93	7.09	1,476,104	1,763,645	287,542	40,801	100.2	100.2	(280.8)	(280.8)
2043	4.55	5.73	1,161,604	1,463,364	301,760	39,831	100.2	100.3	(362.3)	(362.3)
2044	4.14	4.72	1,085,716	1,237,753	152,037	18,668	100.2	100.2	(395.4)	(221.3)
2045	4.00	4.89	1,079,491	1,318,784	239,293	27,332	100.2	100.1	(428.1)	(142.9)
2046	3.88	4.98	1,079,385	1,385,584	306,198	32,534	100.2	100.1	(463.0)	(111.3)
2047	3.75	4.83	1,075,379	1,384,055	308,676	30,509	100.3	100.0	(500.9)	(56.5)
2048	3.62	4.89	1,070,100	1,446,842	376,741	34,639	100.3	100.0	(541.1)	(30.0)
			Total Cost/(Savings)		$ 5,208,873	$ 1,217,092				

SUMMARY OF ACTUARIAL COST IMPACT (CONT'D)

TABLE 2
State Employees' Retirement System (SERS)
Projection of Contribution Rates and Funded Ratios
Current SERS vs. House Bill No. 727
Without Reflecting Potential Funding Reforms Associated with Financing of a Closed Benefit Plan

	Total Employer Contribution Rate		Total Employer Contribution* (Millions)			Funded Ratio		Unfunded Accrued Liability (Billions)	
Fiscal Year	Current SERS	HB 727 DB + DC	Current SERS	HB 727 DB + DC	(Savings)/ Cost	Current SERS	HB 727 DB + DC	Current SERS	HB 727 DB + DC
2012/2013	11.50	11.50	677.4	677.4	-	65.3	65.3	14.69	14.69
2013/2014	16.00	16.00	933.8	933.8	-	58.8	58.7	17.78	17.78
2014/2015	20.50	20.50	1,209.0	1,209.0	-	59.2	59.2	17.90	17.90
2015/2016	25.00	24.98	1,505.4	1,504.4	(1.0)	59.4	59.4	18.17	18.17
2016/2017	29.50	29.45	1,830.6	1,827.6	(4.1)	59.7	59.7	18.42	18.42
2017/2018	30.41	30.29	1,944.5	1,937.1	(11.5)	61.4	61.5	18.01	17.98
2018/2019	29.40	29.22	1,937.1	1,925.3	(23.2)	63.2	63.2	17.53	17.48
2019/2020	28.82	28.58	1,957.0	1,940.6	(39.6)	64.2	64.3	17.35	17.27
2020/2021	28.15	27.85	1,970.0	1,948.9	(60.7)	65.4	65.5	17.07	16.95
2021/2022	27.52	27.16	1,984.4	1,958.5	(86.6)	66.6	66.7	16.77	16.63
2022/2023	26.92	26.50	2,000.2	1,969.3	(117.5)	67.8	67.9	16.45	16.28
2023/2024	26.34	25.87	2,016.9	1,980.8	(153.6)	68.9	69.0	16.12	15.92
2024/2025	25.78	25.25	2,034.0	1,992.6	(195.0)	70.0	70.1	15.76	15.52
2025/2026	25.23	24.65	2,051.7	2,004.9	(241.9)	71.2	71.3	15.37	15.10
2026/2027	24.70	24.08	2,070.0	2,017.5	(294.3)	72.3	72.4	14.94	14.64
2027/2028	24.19	23.52	2,089.0	2,030.7	(352.6)	73.5	73.6	14.48	14.15
2028/2029	23.69	22.97	2,108.5	2,044.3	(416.8)	74.8	74.8	13.98	13.61
2029/2030	23.21	22.44	2,128.6	2,058.3	(487.1)	76.0	76.1	13.44	13.04
2030/2031	22.74	21.93	2,149.3	2,072.7	(563.7)	77.3	77.4	12.85	12.42
2031/2032	22.29	21.44	2,170.7	2,087.5	(646.9)	78.7	78.8	12.22	11.75
2032/2033	21.85	20.96	2,192.8	2,103.0	(736.7)	80.1	80.2	11.54	11.02
2033/2034	21.42	20.49	2,215.6	2,118.9	(833.4)	81.6	81.7	10.79	10.25
2034/2035	21.01	20.04	2,239.0	2,135.2	(937.2)	83.1	83.3	9.99	9.41
2035/2036	20.61	19.60	2,263.2	2,152.2	(1,048.2)	84.7	85.0	9.13	8.50
2036/2037	20.22	19.17	2,288.2	2,169.6	(1,166.8)	86.4	86.8	8.19	7.53
2037/2038	19.84	18.76	2,314.0	2,187.7	(1,293.1)	88.2	88.7	7.18	6.48
2038/2039	19.48	18.36	2,340.5	2,206.3	(1,427.3)	90.1	90.7	6.09	5.35
2039/2040	19.12	17.97	2,367.9	2,225.4	(1,569.8)	92.1	92.9	4.91	4.13
2040/2041	15.06	13.88	1,921.8	1,770.9	(1,720.7)	94.2	95.2	3.63	2.81
2041/2042	12.13	10.92	1,595.7	1,436.0	(1,880.4)	95.7	96.8	2.73	1.87
2042/2043	8.86	7.62	1,200.8	1,032.3	(2,048.8)	96.7	98.0	2.11	1.21
2043/2044	6.85	5.58	957.1	779.4	(2,226.5)	97.2	98.5	1.87	0.93
2044/2045	6.67	5.37	959.9	772.9	(2,413.5)	97.2	98.5	1.87	0.89
2045/2046	6.42	5.09	952.1	755.5	(2,610.1)	97.2	98.6	1.89	0.88
2046/2047	6.18	4.83	944.6	738.2	(2,816.5)	97.1	98.5	1.95	0.90
2047/2048	6.30	4.94	992.4	778.3	(3,030.6)	97.0	98.5	2.06	0.96
2048/2049	6.44	5.07	1,045.5	823.6	(3,252.5)	96.9	98.4	2.14	1.01
2049/2050	6.42	5.04	1,072.9	843.1	(3,482.3)	96.8	98.4	2.21	1.04
2050/2051	6.43	5.05	1,108.6	870.3	(3,720.6)	96.8	98.4	2.29	1.08
2051/2052	6.44	5.05	1,144.4	897.2	(3,967.8)	96.7	98.4	2.37	1.11

*Savings shown are cumulative.

SUMMARY OF ACTUARIAL COST IMPACT (CONT'D)

TABLE 3
Public School Employees' Retirement System
Projection of Contribution Rates and Funded Ratios as of June 30, 2014
Current PSERS vs. House Bill No. 727, Printer's No. 1555
Reflecting Potential Funding Reforms Associated with Financing of a Closed Benefit Plan

	Total Employer Contribution Rate		Total Employer Contribution (thousands)				Funded Ratio		Unfunded Accrued Liability (millions)	
					Cost /(Savings)					
Fiscal Year Ending June	Current PSERS	HB 727 DB + DC	Current PSERS	HB 727 DB + DC	Cash Flow Basis	Present Value as of June 30, 2015	Current PSERS	HB 727 DB	Current PSERS	HB 727 DB
2013	12.36 %	12.36 %					63.8 %	63.8 %	$ 32,598.6	$ 32,598.6
2014	16.93	16.93					62.0	62.0	35,121.2	35,121.2
2015	21.40	21.40	$ 2,885,148	$ 2,885,148	$ 0	$ 0	60.6	60.6	37,413.9	37,413.9
2016	25.84	25.84	3,456,100	3,456,100	0	0	59.6	59.6	39,412.8	39,412.8
2017	29.69	29.85	4,079,195	4,100,953	21,757	18,827	58.7	58.7	41,424.4	41,424.4
2018	30.62	34.73	4,316,593	4,895,473	578,880	465,976	58.4	58.9	42,871.0	42,335.8
2019	31.56	35.21	4,569,239	5,098,406	529,167	396,240	60.0	61.0	42,296.8	41,241.3
2020	32.23	35.32	4,794,454	5,253,858	459,404	320,002	61.7	63.1	41,603.7	40,063.6
2021	32.02	34.14	4,892,886	5,216,512	323,626	209,697	63.0	64.7	41,228.1	39,305.5
2022	31.90	33.10	5,005,091	5,193,458	188,367	113,539	64.7	65.0	40,395.1	40,868.3
2023	31.96	32.40	5,149,606	5,220,306	70,700	39,641	66.5	66.6	39,344.6	39,843.3
2024	31.90	33.50	5,276,635	5,542,043	265,408	138,433	68.1	68.3	38,382.2	38,736.3
2025	31.83	32.54	5,404,815	5,525,532	120,717	58,571	69.9	69.9	37,192.9	37,542.3
2026	31.90	31.82	5,555,781	5,541,569	(14,212)	(6,415)	71.8	71.6	35,741.5	36,229.7
2027	31.99	31.13	5,709,259	5,555,339	(153,919)	(64,624)	73.8	73.3	34,014.0	34,801.9
2028	32.10	30.45	5,865,715	5,563,889	(301,826)	(117,882)	75.9	73.3	31,999.5	36,197.2
2029	32.20	29.77	6,020,442	5,566,228	(454,214)	(165,022)	78.2	74.8	29,682.5	34,758.5
2030	32.31	31.47	6,178,835	6,017,332	(161,502)	(54,582)	80.6	76.6	27,032.1	32,807.3
2031	32.43	30.75	6,340,635	6,012,703	(327,932)	(103,098)	83.1	78.4	24,014.7	30,722.6
2032	32.58	30.08	6,509,681	6,010,657	(499,024)	(145,941)	85.8	80.2	20,597.9	28,495.6
2033	32.72	29.40	6,679,209	6,002,401	(676,808)	(184,125)	88.7	82.1	16,743.8	26,114.8
2034	32.88	28.74	6,856,314	5,992,579	(863,735)	(218,585)	91.8	84.0	12,411.6	23,567.5
2035	33.03	28.09	7,036,790	5,984,919	(1,051,871)	(247,624)	95.1	85.9	7,559.2	20,842.3
2036	18.12	25.11	3,943,950	5,464,979	1,521,029	333,089	96.6	86.0	5,418.8	21,277.3
2037	14.27	22.50	3,173,457	5,004,632	1,831,176	373,030	97.6	87.3	3,871.2	19,331.0
2038	12.46	24.96	2,831,765	5,672,727	2,840,963	538,358	98.4	89.1	2,529.3	16,610.7
2039	10.43	21.88	2,422,607	5,081,357	2,658,751	468,678	99.1	90.6	1,474.9	14,273.2
2040	8.80	19.24	2,090,021	4,569,696	2,479,675	406,615	99.6	90.3	654.8	14,992.2
2041	7.28	17.00	1,769,320	4,131,819	2,362,499	360,372	100.0	91.3	72.5	13,434.9
2042	5.93	17.63	1,476,104	4,387,277	2,911,173	413,085	100.2	92.4	(280.8)	11,532.6
2043	4.55	17.07	1,161,604	4,358,437	3,196,834	421,971	100.2	93.7	(362.3)	9,506.9
2044	4.14	14.67	1,085,716	3,847,143	2,761,427	339,069	100.2	94.8	(395.4)	7,836.9
2045	4.00	12.72	1,079,491	3,431,888	2,352,397	268,693	100.2	95.6	(428.1)	6,460.4
2046	3.88	11.12	1,079,385	3,093,683	2,014,298	214,023	100.2	96.4	(463.0)	5,325.6
2047	3.75	9.84	1,075,379	2,820,761	1,745,382	172,512	100.3	97.0	(500.9)	4,390.2
2048	3.62	8.81	1,070,100	2,605,625	1,535,524	141,181	100.3	97.5	(541.1)	3,619.0
				Total Cost/(Savings)	$ 28,264,109	$ 4,903,707				

SUMMARY OF ACTUARIAL COST IMPACT (CONT'D)

TABLE 4
State Employees' Retirement System (SERS)
Projection of Contribution Rates and Funded Ratios
Current SERS vs. House Bill No. 727
Reflecting Potential Funding Reforms Associated with Financing of a Closed Benefit Plan

	Total Employer Contribution Rate		Total Employer Contribution* (Millions)			Funded Ratio		Unfunded Accrued Liability (Billions)	
Fiscal Year	Current SERS	HB 727 DB + DC	Current SERS	HB 727 DB + DC	(Savings)/ Cost	Current SERS	HB 727 DB + DC	Current SERS	HB 727 DB + DC
2012/2013	11.50	11.50	677.4	677.4	-	65.3	65.3	14.69	14.69
2013/2014	16.00	16.00	933.8	933.8	-	58.8	58.7	17.78	17.78
2014/2015	20.50	20.50	1,209.0	1,209.0	-	59.2	59.2	17.90	17.90
2015/2016	25.00	24.98	1,505.4	1,504.4	(1.0)	59.4	59.4	18.17	18.17
2016/2017	29.50	29.45	1,830.6	1,827.6	(4.1)	59.7	59.7	18.42	18.42
2017/2018	30.41	30.29	1,944.5	1,937.1	(11.5)	61.4	61.5	18.01	17.98
2018/2019	29.40	29.22	1,937.1	1,925.3	(23.2)	63.2	63.2	17.53	17.48
2019/2020	28.82	28.58	1,957.0	1,940.6	(39.6)	64.2	64.3	17.35	17.27
2020/2021	28.15	27.85	1,970.0	1,948.9	(60.7)	65.4	65.5	17.07	16.95
2021/2022	27.52	27.16	1,984.4	1,958.5	(86.6)	66.6	66.7	16.77	16.63
2022/2023	26.92	26.50	2,000.2	1,969.3	(117.5)	67.8	67.9	16.45	16.28
2023/2024	26.34	25.87	2,016.9	1,980.8	(153.6)	68.9	69.0	16.12	15.92
2024/2025	25.78	25.25	2,034.0	1,992.6	(195.0)	70.0	70.1	15.76	15.52
2025/2026	25.23	24.65	2,051.7	2,004.9	(241.9)	71.2	71.3	15.37	15.10
2026/2027	24.70	26.08	2,070.0	2,185.8	(126.0)	72.3	69.9	14.94	16.53
2027/2028	24.19	25.45	2,089.0	2,197.9	(17.1)	73.5	71.0	14.48	15.99
2028/2029	23.69	24.84	2,108.5	2,210.4	84.8	74.8	72.3	13.98	15.41
2029/2030	23.21	24.25	2,128.6	2,223.4	179.6	76.0	73.6	13.44	14.79
2030/2031	22.74	23.67	2,149.3	2,236.6	266.9	77.3	75.0	12.85	14.11
2031/2032	22.29	23.11	2,170.7	2,250.2	346.4	78.7	76.4	12.22	13.39
2032/2033	21.85	22.56	2,192.8	2,264.5	418.1	80.1	77.9	11.54	12.62
2033/2034	21.42	22.04	2,215.6	2,279.1	481.6	81.6	79.4	10.79	11.78
2034/2035	21.01	21.53	2,239.0	2,294.3	536.9	83.1	81.0	9.99	10.89
2035/2036	20.61	21.03	2,263.2	2,309.9	583.6	84.7	82.8	9.13	9.93
2036/2037	20.22	22.02	2,288.2	2,491.5	786.9	86.4	82.2	8.19	10.55
2037/2038	19.84	21.50	2,314.0	2,507.0	979.9	88.2	84.2	7.18	9.39
2038/2039	19.48	20.99	2,340.5	2,523.1	1,162.5	90.1	86.3	6.09	8.15
2039/2040	19.12	20.51	2,367.9	2,539.7	1,334.3	92.1	88.5	4.91	6.82
2040/2041	15.06	16.44	1,921.8	2,098.1	1,510.6	94.2	90.9	3.63	5.40
2041/2042	12.13	13.48	1,595.7	1,773.4	1,688.3	95.7	92.7	2.73	4.34
2042/2043	8.86	10.21	1,200.8	1,383.5	1,871.1	96.7	94.1	2.11	3.55
2043/2044	6.85	8.16	957.1	1,139.7	2,053.7	97.2	94.8	1.87	3.11
2044/2045	6.67	7.87	959.9	1,132.4	2,226.2	97.2	95.2	1.87	2.90
2045/2046	6.42	7.52	952.1	1,115.0	2,389.1	97.2	95.6	1.89	2.71
2046/2047	6.18	8.09	944.6	1,237.1	2,681.6	97.1	94.1	1.95	3.67
2047/2048	6.30	8.10	992.4	1,274.9	2,964.1	97.0	94.4	2.06	3.47
2048/2049	6.44	8.12	1,045.5	1,318.1	3,236.7	96.9	94.8	2.14	3.23
2049/2050	6.42	8.00	1,072.9	1,337.4	3,501.2	96.8	95.3	2.21	2.96
2050/2051	6.43	7.91	1,108.6	1,363.5	3,756.1	96.8	95.8	2.29	2.67
2051/2052	6.44	6.91	1,144.4	1,228.0	3,839.7	96.7	96.3	2.37	2.35

*Savings shown are cumulative.

POLICY CONSIDERATIONS

In reviewing the bill, the Commission staff identified the following policy considerations:

Differing Actuarial Opinions. The specific elements of the current issue involve significant differences in the actuarial analyses provided by our consultant, Milliman, and the actuaries for the retirement systems. Regarding the amortization of the existing unfunded liability, all of the actuaries agree that some reduction of the current amortization period would be advisable. The Systems' actuaries applied that amortization reduction to their analysis. Milliman, noting that the amortization period is established by existing statute and that House Bill Number 727 does not alter that amortization period, did not. Further, the Systems' actuaries opined that the closure of the existing defined benefit pension would require a future shift in investment policy to a more conservative one, while Milliman disagreed that such a change would be "required" (emphasis in the Milliman letter at pages 14 and 16). The fundamental problem with this is that investment policy is set by the Systems' Boards. House Bill Number 727 does not restrict the Boards' discretion in this area, but expands upon it. While the bill does not compel a change in investment policy, it does not prevent it, either. Given that the Boards' investment advisor and actuary are both recommending the change, it may be unrealistic to discount the work of the Systems' actuaries.

Benefit Value and Security. While a detailed benefit comparison was beyond the scope of this actuarial note, the DC plans proposed in the bill would provide new public school and State employees with a retirement income that is likely to be less valuable, predictable and secure than that provided by the traditional DB pension plans. Retirement planning based on projected DC account balances is likely to be less predictable and involve greater individual attention to risk management than participation in a traditional DB plan. Policymakers must determine the appropriateness of such a change in the Commonwealth's public pension policy.

Delegation of Legislative Authority. The bill empowers the Boards of both Systems to develop the details of major DC plan design elements and administrative details by rule or regulation. Policymakers must determine if the broad powers afforded the Boards constitute an appropriate delegation of legislative authority.

Special Membership Classes. Under the SERS Code, there are a number of special categories of public employees entitled to enhanced benefits, reduced superannuation requirements, or both. These include members of the General Assembly, the judiciary, Pennsylvania State Police Officers and certain other hazardous duty per-

POLICY CONSIDERATIONS (CONT'D)

sonnel. Under the bill, except for Pennsylvania State Police Officers, there are no special benefit provisions for these groups of employees. The uniform benefit level under the bill would result in a major reduction in the value of employer-provided benefits for these groups of employees in the future and would result in significant benefit disparities between similarly situated employees.

Adequacy of Disability and Death Benefits for Hazardous Duty Personnel. Historically, it has been the practice of the Commonwealth to provide special disability and death benefits to public safety employees due to the hazardous nature of such employment. The bill represents a major departure from past practice by providing no such special benefits for hazardous duty personnel. Due to the hazardous nature of their duties, it may be desirable to retain some type of enhanced benefit for hazardous duty personnel in the form of special disability or retirement provisions.

Judicial Benefits. The Supreme Court of the Commonwealth has ruled that, in order to preserve an independent judiciary, judges must be adequately compensated, pension benefits are part of compensation, and all members of a single-level court performing similar functions and exercising similar authority must be compensated at the same rate. As drafted, the bill ignores the special status of judicial benefits. Based upon the independent status of the judiciary in Pennsylvania and the case law regarding the special status of its members, if enacted, the bill is likely to be challenged in the courts.

State Police Officers Benefits. The benefits of State Police Officers are affected by the DiLauro arbitration award. The award provided that officers with 20 years of service are eligible to receive a retirement benefit of 50% of the officer's highest full year's salary, and those with 25 years of service shall receive 75% of the highest full year's salary. Years of service between 20 and 25 or after 25 do not produce incremental benefit increases. The award applies to officers who retire on or after July 1, 1989. (Class A members with less than 20 years of service are not affected by the award and are eligible for the statutory Class A benefit at a 2.0% benefit accrual rate. No State Police Officer is entitled to the Act 9 benefit accrual rate of 2.5% because members of the State Police were specifically excluded from coverage by that statute). By the act of August 5, 1991 [P. L. 183, No. 23], 71 Pa. C. S. § 5955 was amended to provide that SERS retirement benefits are exclusively statutory and cannot be changed by collective bargaining agreements or arbitration awards under such agreements. That section grandfathered pre-existing awards, including DiLauro, but the amendment does not foreclose the legislature from prospectively altering

POLICY CONSIDERATIONS (CONT'D)

benefits for new State Police Officers by statute. It is unclear why State Police are given special treatment in the bill while other traditional, special membership classes are not exempt from the new DC plan.

Treatment of Educational Employees. Under current law, "school employees" (employees of PASSHE institutions and the Department of Education, most employees of the Pennsylvania State University, and community college employees) are eligible to choose coverage in an employer-approved, defined contribution "alternative retirement program" as an alternative option to default membership in SERS or optional membership in PSERS. Under the bill if enacted, new employees of these educational institutions would have no other option besides selecting membership in an alternative retirement program such as the Teachers' Insurance Annuity Association – College Retirement Equity Fund (TIAA-CREF). The rationale for special treatment of this subgroup of educational employees while imposing reduced benefit plans upon most future school and State employees is unclear.

Renewal of Pension Contract. In *Shiomos v. State Employes' Retirement Board,* 533 Pa. 588, 626 A.2d 158 (1993), the Supreme Court held that a public official, at every new term of office, renews his pension contract subject to the law in effect when the new term of office commences. While this case, and the subsequent decisions that follow its holding, specifically relates to Section 3 of the Public Employee Pension forfeiture Act, 1978, July 8, P. L. 752, No. 140, 43 P.S. § 1313(c), the core of the court's analysis is that a statutory provision can alter otherwise protected benefits contingent upon a change in the nature of the employment. That analysis may apply equally to the statutory amendment proffered by this legislation.

Technical Operational Issues. In reviewing the bill, the Commission staff noted the following technical operational issues.

> *Closed Group Funding Dynamics.* The bill would close both PSERS and SERS to new entrants effective 2016 (except for Pennsylvania State Police Officers, in the case of SERS), substituting membership in the Systems with participation in DC plans for new employees. In their respective work products, the Commission's consulting actuary (Milliman) and the consulting actuaries for both PSERS and SERS describe the major issues associated with the funding dynamics of a defined benefit retirement system that has been closed to new entrants. The use of level percentage of payroll amortization periods, amortization periods that exceed the average remaining service of

POLICY CONSIDERATIONS (CONT'D)

active members, and the manner in which investment return assumptions are set by the respective retirement system boards may all require review and adjustment if the bill becomes law. It should be noted, however, that the Commission's consulting actuary maintains that there is no need to alter either Systems' liquidity ratios over the course of the projection period, but does agree with the Systems' actuaries that the amortization periods should be shortened to more closely reflect the remaining service of the active members in the legacy defined benefit plans. Ultimately, the decisions as to investment policy and amortization periods will be made by the Boards of the respective Systems.

Nondiscrimination Provision. As the existing defined benefit plan gradually loses active members other than members of the State Police (and probably judges), the risk of violating the nondiscrimination provisions and participation requirements of the Internal Revenue Code, Sections 401(a)(4) and (26), and 414, is likely to develop. These issues should be reviewed by qualified tax counsel.

Premium Assistance. Under the PSERS Code, premium assistance eligibility is determined based upon years of service credited in the System. Because DC plan participants will no longer accrue service credit in the System, PSERS' DC plan participants would be ineligible for post-retirement health insurance premium assistance now provided to eligible retired members.

*Retired Employee Health Program***.** The Retired Employee Health program (REHP) is administered jointly by the Governor's Office of Administration and SERS. The REHP provides for Commonwealth-subsidized post-retirement healthcare benefits to employees of most Commonwealth agencies. Eligibility for these benefits is tied to an employee's years of credited service in SERS and an employee's age at retirement. Because a participant in the Plan would not accrue credited service in the System, SERS' DC plan participants appear to be ineligible for REHP participation now provided to eligible retired members.

Risk Sharing. Under the defined benefit structure of PSERS and SERS, all of the longevity risk (the risk of members outliving their retirement income) and most of the investment risk is borne by the retirement systems. Under current law, only those members subject to Act 120 of 2010 (Classes A-3, A-4,

POLICY CONSIDERATIONS (CONT'D)

T-E and T-F) share in the investment risk of the Systems through the shared-risk contribution requirement imposed by Act 120. All pre-Act 120 members of both Systems are exempt from the shared-risk contribution requirement. Under the bill, all new employees would be enrolled in a DC plan and would be required to bear all of the investment risk and longevity risk associated with managing their retirement accounts. This situation creates significant risk-sharing disparities among various cohorts of employees.

Drafting Ambiguities. Section 5955(b) of the bill appears to be attempting to prohibit new State Police Officers hired on or after the effective date of the bill from being eligible for the DiLauro arbitration award after 20 years of service. However, the additional language necessary to effectuate this prohibition for future State Police Officers is absent from the provision. Policymakers may wish to review the intention of this provision in the bill. Furthermore, Section 5955(b)(2)(ii) makes reference to a "Class A-5" in SERS in relation to current or former sworn police officers. Under the SERS Code, there is currently no Class A-5 membership class and there is no other mention of Class A-5 made in the text of the bill. The reference to Class A-5 in the bill appears to be a drafting error.

COMMISSION RECOMMENDATION

The Commission voted to attach the actuarial note to the bill, recommending that the General Assembly and the Governor consider the policy issues identified above.

ATTACHMENTS

Actuarial note provided by Katherine A. Warren and Timothy J. Nugent of Milliman, Inc., consulting actuary for the Public Employee Retirement Commission.

Actuarial cost estimates provided by Buck Consultants, consulting actuary for the Public School Employees' Retirement System.

Actuarial cost estimates provided by the Hay Group, consulting actuary for the State Employees' Retirement System.

House Bill Number 727, Printer's Number 1555.

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June 15, 2015

Mr. James L. McAneny
Executive Director
Public Employee Retirement Commission
P.O. Box 1429
Harrisburg, PA 17105-1429

Re: House Bill 727, Printer’s Number 1555

Dear Mr. McAneny:

As you requested, we have prepared an actuarial note on House Bill 727, Printer’s Number 1555.

Summary of the Bill

House Bill 727, Printer’s Number 1555, would amend both the Public School Employees’ Retirement Code and the State Employees’ Retirement Code to enact significant reforms applicable to future members of the Public School Employees’ Retirement System (PSERS) and the State Employees’ Retirement System (SERS).

PSERS

Benefits

The Bill would establish a defined contribution retirement benefit plan under a new chapter of the PSERS Code, Chapter 84, called the School Employees’ Defined Contribution Plan effective July 1, 2016. School employees hired on or after July 1, 2016 would become participants in the defined contribution (DC) plan. Membership in the current defined benefit (DB) system would be closed.

Also, beginning July 1, 2016, school employees who are employed on a per diem or hourly basis and are not PSERS members would become participants in the DC plan. Currently, per diem or hourly school employees must be employed for at least 80 full-day sessions or 500 hours in a fiscal year to join PSERS.

School employees participating in the DC plan would contribute 6.5% of compensation

This analysis was prepared solely for the Pennsylvania Public Employee Retirement Commission and may not be appropriate for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work.

and receive an employer contribution of 4% of compensation. Accumulated employer contributions to the DC plan would be 33% vested after the first year of service, 66% vested after the second year of service, and 100% vested after the third year of service. Participant contributions would vest immediately.

Voluntary DC plan contributions are permitted, but only through eligible rollovers or direct trustee-to-trustee transfers.

Each DC plan participant would have an individual investment account where all member and employer contributions would be accumulated and investment experience, fees, and costs are credited or charged.

DC plan participants would be required to receive a partial payout as a life annuity if retiring after age 55 or electing a distribution of the vested accumulated employer DC plan contributions. The participant would be required to purchase a life annuity from an annuity provider contracted by the Board.

DC plan participants would not be eligible for the health care premium assistance.

Employees of the Department of Education, a State-owned educational institution, a community college, or The Pennsylvania State University who become employees on or after January 1, 2016 would not be eligible for membership in PSERS or participation in the new DC plan.

Funding

The Bill, if enacted, would change the following items with regard to the employer contribution rate determination for PSERS.

- The normal contribution rate in §8328(b) would be revised effective with the fiscal year beginning July 1, 2015 to be determined “as a level percentage of the compensation of all active members, which percentage, if contributed on the basis of the member’s prospective compensation through the entire period of active school service, would be sufficient to fund the liability for any prospective benefit payable to him, in excess of that portion funded by his prospective member contributions, excluding the shared-risk contributions.” Previously the normal contribution rate was to be based on the “average new member”.
- The Actuarial Value of Assets cannot be less than 70% of the Market Value of Assets nor more than 130% of the Market Value of Assets.
- Future changes (not just increases) in the accrued liability caused by legislation would be amortized over 10 years as a level percentage of compensation.

- Effective with the fiscal year beginning July 1, 2016, employers would be required to pay the accrued liability contribution rate on compensation for both active members of the DB plan and active participants in the DC plan.
- Effective with the fiscal year beginning July 1, 2016, the minimum floor on the employer contribution rate would be removed. Previously the employer contribution rate could not be less than the normal contribution rate.
- Effective with the fiscal year beginning July 1, 2016, The Pennsylvania State University, the State System of Higher Education, each State-owned education institution and each community college would be required to make an additional actuarial accrued liability contribution.

SERS

Benefits

The Bill would establish a defined contribution retirement benefit plan under a new chapter of the SERS Code, Chapter 54, called the State Employees' Defined Contribution Plan effective January 1, 2016. Except for State Police, State employees hired on or after January 1, 2016 would become participants in the defined contribution (DC) plan. State police hired on or after January 1, 2016 would continue to participant in the current defined benefit (DB) system and be eligible for the DiLauro Award benefits. Membership in the current DB system would be closed for other State employees.

State employees participating in the DC plan would contribute 6.5% of compensation and most would receive an employer contribution of 4% of compensation. For hazardous duty State employees (enforcement officers, correction officers, psychiatric security aides, Delaware River Port Authority policemen, park rangers and Capitol police officers), the employer contribution would be 5.5% of compensation. Accumulated employer contributions to the DC plan would be 33% vested after the first year of service, 66% vested after the second year of service, and 100% vested after the third year of service. Participant contributions would vest immediately.

Voluntary DC plan contributions are permitted, but only through eligible rollovers or direct trustee-to-trustee transfers.

Each DC plan participant would have an individual investment account where all member and employer contributions would be accumulated and investment experience, fees, and costs are credited or charged.

DC plan participants would be required to receive a partial payout as a life annuity if retiring after age 55 or electing a distribution of the vested accumulated employer DC plan contributions. The participant would be required to purchase a life annuity from an annuity provider contracted by the Board.

Employees of The Pennsylvania State University, the State System of Higher Education, a State-owned educational institution, or a community college who become employees on or after January 1, 2016 would not be eligible for participation in the new DC plan.

Funding

The Bill, if enacted, would change the following items with regard to the employer contribution rate determination for SERS.

- The employer normal contribution rate effective for fiscal years beginning on or after July 1, 2016 would be the employer normal contribution rate that would have been applicable if such rate was determined as part of the December 31, 2015 actuarial valuation. As the normal contribution rate is based on the “average new member” and the DB plan is closed except for State Police, future normal contribution rates would be determined using the last “average new member” into the DB plan.
- Effective with the fiscal year beginning July 1, 2016, employers would be required to pay the accrued liability contribution rate on compensation for both active members of the DB plan and active participants in the DC plan.
- Effective with the fiscal year beginning July 1, 2016, The Pennsylvania State University, the State System of Higher Education, each State-owned education institution and each community college would be required to make an additional actuarial accrued liability contribution.
- Any changes in the accrued liability due to benefit changes under this Bill would be amortized in equal dollar installments over a 20 year period beginning July 1, 2015.
- Any changes in the accrued liability due to this Bill would not be considered costs added by legislation for purposes of the collared contribution rate.

Discussion of the Bill

Defined Contribution Plans – General Information

Defined Contribution Plans have been replacing traditional final average pay retirement plans in the private sector for many years. Many employers have been replacing their existing final average pay retirement plan with a defined contribution plan in an attempt to control plan costs, reduce volatility, and shift the inherent risk associated with maintaining a defined benefit plan from the employer to the employee. The shift to defined contribution plans is also a response to the changing relationship between employers and employees.

Defined contribution plans shift inflation, investment, and longevity risks from the employer to the employee as the account balance is a function of earnings over the working lifetime of the employee and the investment yield of the funds selected by the employee. As employees typically withdraw account balances upon retirement, they bear the risk of outliving their retirement assets. The Bill attempts to offset a portion of the longevity risk by requiring participants receive part of their distribution as a life annuity through an annuity provider contracted by the Board.

With a defined contribution plan, the employer contributions are typically a percentage of member compensation, and can be budgeted each year without the added risk of additional contributions due to investment and demographic losses. Forfeitures of non-vested employer contributions with interest from members who terminate employment prior to full vesting would serve to slightly lower future employer contributions.

Many employers also have shifted away from final average pay plans to defined contribution plans as a response to the changing relationship between employers and employees. A final average pay plan rewards employees who stay with one employer for their entire career since benefits earned increase significantly as retirement approaches since all past service is a function of current salaries. A defined contribution plan is attractive for a younger, more mobile workforce since it is easier to understand and typically provides portability of benefits.

Partial Annuity Requirement in DC Plan

There are two sections regarding the partial annuity requirement in Chapter 84 for school employees and in Chapter 54 for State employees. §8407(f) and §5407(f) would require a participant electing a distribution of the vested accumulated employer defined contributions to receive part of that distribution as an annuity. §8412 and §5411.1 would require a participant electing a distribution after age 55 to receive part of the distribution as a life annuity.

New Benefit Tiers

The benefit accrual rate applicable to new members in PSERS and for most new members in SERS is currently 2.0% with a member contribution rate of 7.50% in PSERS and 6.25% in SERS. This benefit structure is similar to benefits provided to other members of PSERS and SERS and provides retirement benefits in a traditional defined benefit formula reflecting a member's final average salary and years of service.

The Bill would establish separate defined contribution plans for new school employees and most new State employees. New participants would be required to contribute 6.5% of compensation. Employer contributions would be 5.5% of compensation for certain hazardous duty State employees and 4% of compensation for school employees and all other State employees. Members would be vested in the employer contributions and earnings thereon after 3 years of service, with the vesting percentage increasing by 33% for each year of service. Members who elect to withdraw the vested accumulated employer defined contribution account or who elect a withdrawal at age 55 or later would be required to receive a partial payout as a life annuity.

The higher employer contribution rates for certain hazardous duty SERS members are likely due to the shorter expected working career for these members as compared to other members.

Having differing benefit accrual rates (and resulting pension amounts) for different groups of employees results in additional administrative costs as well as the necessity for clear and consistent communication about the benefits provided. There is also a potential equity issue when two employees, one hired before the change and one after, have the exact same job but have different pension benefits. This situation already exists in PSERS and SERS.

Under the Bill, members who wish to withdraw the vested accumulated employer defined contribution account or who wish to withdraw at age 55 or later must purchase an annuity with some of the monies. Typically, the cost for an individual to purchase an annuity in the marketplace is higher than the cost for that individual if they are part of a group annuity purchase due to the pooling of longevity risk among many individuals and removal of anti-selection concerns. As such, consideration could be given to having the respective Systems serve as the annuity providers. Retiring members would have their defined contribution plan monies transferred to a pooled annuitant reserve fund that the Systems could manage on a conservative basis. This pooling would help maximize the benefits provided to the member, especially as the Systems are better able to manage longevity risk among many members than any one individual member. Also, the Systems could elect to use more stable interest rates for the annuity purchases over time, as opposed to market providers who use continually varying rates. Of course, these moves would transfer investment and longevity risk back to the Systems and result in potential additional costs thus the Systems would need to carefully select the annuitization basis.

Under the Bill, voluntary member contributions to the DC plan would not include additional payroll based contributions. Consideration could be given to allowing members to make additional voluntary payroll-based member contributions to facilitate additional retirement savings.

New Member Benefit Adequacy

Depending on the level of employer contributions, projected retirement benefits expected to be received by members are typically lower under a defined contribution plan than a traditional final average pay retirement plan. Most notably, the expected reduction in retirement benefits typically impacts members who enter the system at older ages since the time available to accumulate substantial account balances is limited. In a traditional final average pay plan, the value of the retirement benefit increases significantly as members approach retirement and past years of service are based on current higher earnings. In a defined contribution plan, benefits are earned equitably over the working lifetime of a participant. Therefore, there is generally a decrease in the projected retirement benefits, depending on the relationship between past salary increases and the investment income earned on the accounts.

Except for the higher employer contribution rates to the defined contribution plan for hazardous duty in SERS, there are no other enhanced benefits for the current special membership classes for hazardous duty members, judges, or legislators. These special membership classes currently receive higher benefits under SERS via higher accruals or earlier superannuation age. Therefore, these members would receive a larger reduction in employer-provided benefits than the general employee class. Consideration may need to be given to providing enhanced benefits (e.g. upon in-service death or disability or upon retirement) to certain special membership classes, such as hazardous duty members.

It was beyond the scope of our assignment to provide a comparison of the two benefit designs and the value to members. We note that the PSERS' system actuary provided some benefit comparisons in the cost estimate referenced below. Readers should keep in mind the reduction in the employee contribution rate from 7.5% for Class T-E members to 6.5% for the DC Plan. A member would have the choice to increase personal savings and this choice should be considered in the benefit comparison as part of the three-legged stool of retirement savings. Serious consideration should be given to having a more formal analysis prepared prior to any revision in benefits. Such analysis should reflect the impact of varying investment returns and annuity conversion rates. In addition, if the pension benefits are reduced, there may be pressure to increase other forms of compensation to provide for the same total compensation value as before.

Determination of Employer Cost for SERS and PSERS under the Bill

Funding of the two Systems is currently based on the determination of the employer normal cost and an amortization charge attributable to unfunded liabilities subject to contribution collars. The employer contribution is expressed as a percentage of active member payroll (i.e. appropriation payroll) and charged to the various employers.

Under the Bill, effective with the fiscal year beginning July 1, 2016, employers would be required to pay the accrued liability contribution rate on compensation for both active members of the DB plan and active participants in the DC plan. This would provide for a future funding source of the Systems' unfunded accrued liabilities as the active members and related payroll in both Systems decline as most new employees would be covered by the DC plan. As a reminder, an unfunded liability is paid down with dollars, and not percentages of payroll. By expanding the payroll to which the dollars are to come from, the percentage of payroll declines but the dollar amount does not change.

Additionally, under current law governing PSERS and SERS, the normal cost of the system is to reflect the cost of benefits provided to the average new member of the retirement system. However, the systems have interpreted the statute differently regarding the method used to determine the normal cost.

Under the PSERS interpretation of the statute, the normal cost rate reflects the actual Class of membership of each active member. This is the traditional approach to calculating the normal cost under the entry age cost method. We understand that PSERS' actuary develops a normal cost rate based on current active members and the benefits to which each individual member is entitled. Thus, the PSERS normal cost rate is based on an average of each member reflecting the 2.0% and 2.5% benefit accrual rates and the various member contribution rates, depending on each member's date of hire and class of service. As active membership would be closed, the PSERS normal cost rate would gradually decline as the remaining current members would be Classes T-E and T-F. The Bill codifies this interpretation of the PSERS normal contribution rate determination effective for the fiscal year beginning on July 1, 2015.

PSERS' position is that the current methodology for determining the employer normal cost is reasonable and can continue in the event of a closed System. Under a closed

System, we believe the traditional method of determining the normal cost rate under the entry age normal cost method will continue to be a reasonable approach.

SERS' actuary bases the normal cost rate calculation on new members entering Class A-3(65) only. Under a System open to new members, we believe that this approach is a reasonable interpretation of the SERS Code, although we do not necessarily believe it is the preferable method for determining costs under a tiered benefit system.

Under the Bill, the future normal cost rate would be based on a virtual new member population. This virtual new member population would have the same characteristics of the last new member population entering Class A-3(65) only before SERS closed to new entrants. Under this method, the future normal cost rate would remain unchanged as long as there were no changes in assumptions or provisions. In the event of a change in assumptions or provisions, the changes would also be carried through to the virtual new entrant population and the normal cost rate would be modified accordingly. The Hay Group indicates that this method has been used by the Civil Service Retirement System for many years under a closed program. Please note that the Bill does not propose to close the system for all employees as State Police would continue to become members of SERS. Yet these new members are not part of the new entrant cohort used by the Hay Group. Towards the end of the projection period, the only members accruing benefits under SERS would be State Police but the new entrant cohort would continue to reflect a virtual new member population of only former Class A-3(65) members resulting in pre-determined actuarial losses to the System. If this new entrant approach continues, we suggest that the new entrant cohort contain the members accruing benefits under SERS.

As indicated in prior actuarial notes, we believe that the normal cost determined for both PSERS and SERS should reflect the prospective benefits to be earned by the members in the System as of the valuation date, which is more consistent with PSERS' method or using a replacement life version of Entry Age Normal. If this approach is to be used by SERS, we suggest changing the SERS Code to reflect this approach in determining the normal cost rate. Because the methodology used by SERS will result in ongoing actuarial losses due to new entrants that are not in Class A-3(65), we strongly encourage consideration of a modification in the method used by SERS.

Under the Bill, the requirement that the actual employer contribution rate be no less than the employer normal cost rate was removed for PSERS, but not SERS. As long as there are active members accruing future DB benefits, we recommend keeping this requirement and suggest consideration be given to restoring this requirement for PSERS.

If this Bill is enacted, the Systems' actuaries would need to be cognizant when developing future proposed actuarial assumptions as the entry age normal cost reflects the costs during the member's entire working career. For example, 10 years from the effective date of the Bill, there would be no experience on the withdrawal rates for members within the first 10 years of employment and 20 years from the effective date of the Bill, all members retiring would have at least 20 years of service. The assumptions applicable in the earlier years of employment should remain in place to properly determine an entry age normal cost rate.

The Bill does not amend the determination of the healthcare premium assistance contribution rate for PSERS. We are uncertain if this rate should be determined as a percentage of total compensation for both active members of the DB plan and active participants in the DC plan – or only on DB plan payroll. We recommend that this issue be clarified prior to the Bill's enactment. The cost estimate by the System's actuary reflected total DB and DC payroll in determining this rate.

Estimated Actuarial Cost

You provided us with a copy of the June 5, 2015 estimate by Buck Consultants for PSERS and the June 4, 2015 estimate by Hay Group for SERS with the projected impact of this Bill. In addition, Buck Consultants and Hay Group have provided us with additional details regarding their projections. We appreciate their cooperation in providing this information.

Both estimates included multi-year projections of the employer contribution rate under the current law and if this Bill was enacted. These estimates show the projected appropriation payroll, the employer contribution rate, and the employer contribution amount for both the DB members and the DC participants. These projections are based on the latest actuarial valuations (June 30, 2014 for PSERS and December 31, 2014 for SERS), and assume that future experience will exactly match the actuarial assumptions used to prepare the valuation.

In addition, both System actuaries recommend changes in the amortization of the unfunded liabilities and reductions in the investment return assumption if this Bill is enacted. These recommendations are discussed below.

The following represents Milliman's commentary on Buck's analysis of the Bill's impact on PSERS:

- Buck assumes that employees who became members of PSERS during the period July 1, 2011 through June 30, 2014 would be representative of members entering the system each year in the future. Act 120 (enacted November 23, 2010) reduced the requirements for membership into PSERS such that part-time hourly or per diem school employees who work at least 500 hours or 80 per diem days became members for all future service until a break in membership occurs; previously part-time hourly and per diem members had to qualify for PSERS membership each year (500 hours, 80 days for hourly and per diem employees). Therefore, there may be a higher percentage of these types of part-time members entering PSERS in the past three years (e.g. new hires and a one-time spike in existing part-time employees becoming members due to Act 120) than would necessarily be expected in future years (e.g. new hires only). These members would have lower salaries and lower DB plan costs than full-time members as these members would not be expected to accrue a full year of service each year in the future. We recommend that the System and Buck review the new entrant profile used in the projection to determine if it is representative of members entering the system in future years.

- The Bill would eliminate the participation requirement such that all employees would be eligible to participate in the DC plan. We do not believe that Buck included any provision in the projections for these potential additional members. These additional members would increase the dollar amount of employer contributions under HB 727 attributable to the DC plan. Their inclusion would also potentially reduce the unfunded accrued liability rate as compensation for all members would be reflected. We recommend that PSERS review the number of additional employees and compensation that could be added due to this provision in the Bill.
- The Bill would eliminate potential membership by school employees of the Department of Education, a State-owned educational institution, a community college, or The Pennsylvania State University who become school employees on or after January 1, 2016. This change could result in a decrease in the combined number of members in the DB and DC plan, resulting in a decrease in the amount of employer contribution dollars. Note that we believe accrued liability contributions would still be made on the compensation of these employees under the Bill. We recommend that PSERS review the number of members who have elected PSERS membership from these employers to inform legislators about the potential impact of this provision.
- It is our understanding that if the Bill is enacted, employers would be charged a normal cost rate that is applied to compensation of members in PSERS and an accrued liability rate that is applied to compensation of members in PSERS *plus* members of the DC plan. In Buck's cost estimate, the normal cost rate is shown as a percentage of total DB and DC compensation and the DC contribution is shown as a percentage of total DB and DC compensation. If this Bill is enacted,

Buck should provide the actual normal cost rate that should be applied to DB member payroll. We do not believe that any change would modify the results of Buck's projections, but recommend the projections and methodology be reviewed to verify that the correct rates are charged against the proper definition of compensation if the Bill is enacted. In addition, the healthcare premium assistance rate in Buck's cost estimate is determined based on compensation of members in PSERS *plus* members of the DC plan. As indicated above, we are uncertain if this rate should be determined as a percentage of total compensation for both active members of the DB plan and active participants in the DC plan – or only on DB plan payroll. We recommend that this issue be reviewed.

In addition, Buck included commentary on certain methods and assumptions that they recommend be changed if the Bill is enacted. It is up to the reader to determine if any change in assumptions or methods should be attributable to the cost or savings of the Bill or should be reflected as a cost or savings at the actual time a change is made. Some of the suggestions are subjective and speculative and based on decisions to be made in the future by PSERS and by the legislature, which may or may not occur depending on the particular circumstances at the time. The three primary items Buck discusses are the amortization methodology, the amortization period, and the investment return assumption:

- Buck recommends the amortization method be changed from level percent of pay to level dollar.
    - The implications of using a 24-year level percent of pay amortization is that it takes 13 years before one dollar of principal is paid. In other words, for the first 13 years of the amortization, the unfunded liability is expected to increase, e.g. negative amortization occurs. Therefore, contributions are deferred to future years, e.g. back-loaded, under the current methodology.
    - Changing to a level dollar payment is a more prudent method to steadily pay down the unfunded liability.
    - If the Bill is enacted as drafted, the same level percent of pay amortization methodology would continue. Although if all assumptions are met, the unfunded liability is expected to be paid off during the projection period as compensation from DB and DC plan members are used in determining the contribution.
    - We agree that using a level dollar method is more prudent for funding the plan regardless if the status quo continues or if the Bill is enacted. We do believe that, if this Bill is enacted, the amortization method for new UAL bases should be changed to a level dollar payment as the deferred

methodology may not provide for adequate contribution levels once the system only contains inactive members.

- Buck recommends that the amortization period be reduced to the expected working lifetime of the remaining active group.
  - Although not provided by Buck, we believe the expected working lifetime of the current active membership group is approximately 12 years. Currently a 24-year amortization period is used. A reduction in the amortization period decreases the amount of interest paid on the liability, but results in an increase in the annual payment. We agree that it is ideal to use an amortization period based on the expected working lifetime and such an approach could be used even if no benefit changes are made.
  - For the projected cost of the Bill with these recommended changes, Buck phases from the current 24-year period to the expected working lifetime of the remaining active DB plan members. It is up to the reader to determine whether this change is a cost of the Bill or an enhancement on the current method to amortize gains and losses. Note that if the amortization period used for actuarial gains/losses was already determined as the expected working lifetime at the time of the Bill's enactment; then the amortization period would be reduced as the number of active members diminishes as a natural consequence and no change in methodology would occur due to the closure of the plan to new members.
  - Note that Buck's recommendations and resulting projections are based on "open" amortization periods, i.e. the bases do not get paid off over the indicated time and are constantly re-amortized over the projection period based on the expected working lifetime at each future valuation date. We suggest that layers continue to be used such that each UAL base is completely paid over the indicated time period when the base was established.
  - If the expected working lifetime of active members is adopted as the amortization period, we recommend that a minimum period (5 to 10 years) for amortizing gains and losses be used once there are no or very little active members.
- Based on an analysis provided by PSERS' investment consultant, Buck recommends that the investment return assumption be reduced over time if the Bill is enacted. Again, we caution the reader to determine whether this is a cost of the Bill or a change in assumptions. The PSERS Board can change asset allocation strategy at any time, which could have an impact on the investment return assumption. A more conservative or diversified portfolio could result in a reduction in the expected investment return, but the variability of returns may be reduced. On the other hand, a more aggressive portfolio could result in an increase in the

expectation, but the variability of returns may be increased. A larger variation of returns would result in more volatility in the annual contribution requirement. The question is, if a change in benefit design is made, would that ***require*** the PSERS Board to modify the assumption? We believe that there is much uncertainty regarding the possible actions of the PSERS Board in future years under the current design or if the Bill is enacted. In Buck's analysis, they note the following four specific reasons for the change.

- Future expected benefit commitments of the System under House Bill No. 727.
  - *Milliman Comment:* In determining if the System's asset allocation should be modified due to the enactment of the Bill, we reviewed the plan's liquidity ratio to determine the percentage of assets to be used to cover a year of benefit payments. If this percentage increases over time, we would then expect a shift in the plan's asset allocation to more liquid assets. As of June 30, 2014, expected benefit payments for the upcoming year represent approximately 12% of market value. If the Bill is enacted, the expected benefit payments represent approximately 8.0% of market value as of June 30, 2047. Therefore, the liquidity ratio, based on this metric, is expected to decrease from its current level assuming all current actuarial assumptions are met and all employers, including the Commonwealth makes the annual actuarial contribution.
- Consideration of the illiquidity of certain investment classes.
  - *Milliman Comment:* As of June 30, 2047, the projected market value is $140 billion and projected benefit payments are $11 billion. Based on this ratio, we do not believe that current illiquid investments would need to be reduced by the end of the projection period.
- Expected reduction of risk and surplus volatility over the period examined to minimize employer contribution requirements while securing assets for benefit commitments.
  - *Milliman Comment*: Assuming a Commonwealth budget growth assumption of 3.9%, the ratio of the total projected plan liability to the Commonwealth budget is expected to be reduced by over 60% during the projection period if the Bill is enacted. We agree that the plan will mature over time, but the Commonwealth is not expected to mature assuming the tax base and population will continue at current levels. Therefore as the size of the plan is reduced, the DB plan becomes less of a risk to the Commonwealth. As a result, the Commonwealth might be able to take on more risk regarding the

investments of the plan and continue to manage the plan at its current investment risk levels.

    - The median of the future expected asset returns.
        - *Milliman Comment:* Based on the investment consultant's analysis, the median return is approximately 7%, which is 50 basis points less than the current investment return assumption. We agree that the investment return assumption should be set at the median return regardless of plan design. We are uncertain if the reduction contained in the analysis represents a change in the current assumption or if they are solely a result of the Bill.

The following represents Milliman's commentary on Hay Group's analysis of the Bill's impact on SERS:

- The projected DB percent contribution shown on Hay Group's projection for the Bill is the rate that would be applied to the active DB plan member payroll. The rate to be applied to the active DC plan participant payroll is the difference between the "projected DB percent contribution" and the "floor contribution" as the floor contribution equals the employer normal contribution rate. Hay Group's projection does not show an overall DC employer contribution rate applied to payroll – which will vary between 4% and 5.5% due to the different rates for general employees versus hazardous duty. We suggest such rate be provided in any future analysis.

In addition, Hay Group included commentary on certain methods and assumptions that they recommend be changed if the Bill is enacted. It is up to the reader to determine if any change in assumptions or methods should be attributable to the cost or savings of the Bill or should be reflected as a cost or savings at the actual time a change is made. Some of the suggestions are subjective and speculative and based on decisions to be made in the future by SERS and by the legislature, which may or may not occur depending on the particular circumstances at the time. The two primary items Hay Group discusses are the amortization period and the investment return assumption:

- Hay Group recommends that the amortization period be reduced gradually to 15 years by the end of the projection period – 30 years after the DB system is closed to most new entrants.
    - Currently a 30-year amortization period is used. A reduction in the amortization period decreases the amount of interest paid on the liability, but results in an increase in the annual payment. We agree with reducing the amortization period and such an approach could be used even if no benefit changes are made.

  - For the projected cost of the Bill with these recommended changes, Hay Group gradually reduces the current 30-year amortization period by 5 year increments every ten years until reaching a 15 year amortization period for the December 31, 2045 valuation. It is up to the reader to determine whether this change is a cost of the Bill or an enhancement on the current method to amortize gains/losses.
- Based on discussions with SERS' investment consultant, Hay Group recommends that the investment return assumption be reduced over time if the Bill is enacted. Again, we caution the reader to determine whether this is a cost of the Bill or a change in assumptions. The SERS Board can change asset allocation strategy at any time, which could have an impact on the investment return assumption. A more conservative or diversified portfolio could result in a reduction in the expected investment return, but the variability of returns may be reduced. On the other hand, a more aggressive portfolio could result in an increase in the expectation, but the variability of returns may be increased. A larger variation of returns would result in more volatility in the annual contribution requirement. The question is, if a change in benefit design is made, would that ***require*** the SERS Board to modify the assumption? We believe that there is much uncertainty regarding the possible actions of the SERS Board in future years under the current design or if the Bill is enacted. In Hay Group's analysis, they note the following reason for the change.
  - Expected future liquidity requirements for this group will most likely result in gradual limitations in fund investment opportunities and a shifting to an increasingly conservative (lower risk) investment portfolio.
    - *Milliman Comment:* In determining if the System's asset allocation should be modified due to the enactment of the Bill, we reviewed the plan's liquidity ratio to determine the percentage of assets to be used to cover a year of benefit payments. If this percentage increases over time, we would then expect a shift in the plan's asset allocation to more liquid assets. As of December 31, 2014, expected benefit payments for the upcoming year represent approximately 11% of market value. If the Bill is enacted, the expected benefit payments represent approximately 6% of market value as of December 31, 2049. Therefore, the liquidity ratio, based on this metric, is expected to decrease from its current level assuming all current actuarial assumptions are met and all employers, including the Commonwealth makes the annual actuarial contribution.
    - *Milliman Comment:* As of December 31, 2049, the projected market value is at least $60 billion and projected benefit payments are $4 billion. Based on this ratio, we do not believe that current illiquid

investments would need to be reduced by the end of the projection period.

- *Milliman Comment*: The same commentary above about the DB plan size becoming smaller in relation to the Commonwealth's budget also applies to SERS.

We recommend that any change in amortization methodology be consistent between PSERS and SERS. In addition, we recommend that the smoothing period used in the Actuarial Value of Assets determination also be reviewed in conjunction with any potential amortization methodology changes.

The multi-year projections reflect a single-point scenario assuming that all assumptions are exactly realized, including actual investment return on the market value of assets of 7.5% (or alternate investment return assumption) each and every year. In reality, actual investment returns will vary from year to year, which will have an impact on the future employer costs. We recommend that stochastic modeling be performed to analyze the impact of varying investment returns on the future employer costs. We note that Buck's cost estimate for PSERS contained information on the 25th and 75th percentile results on Table 3 if the Bill was enacted; to help educate the user and provide a comparison, we recommend that comparable results for the current law projections also be provided as investments are subject to market volatility regardless of the underlying portfolio structure.

The PSERS estimate of this Bill included the year-by-year cash flow cost/(savings) and the present value of such cash flow cost/(savings) using the System's investment return assumption of 7.5% over the projection period. The present value reflects the time value of money. The interest rate used to discount any expected savings would vary based on the user's perspective. The Commonwealth may want to use an inflation rate consistent with budget growth as increases in costs above that rate decrease available dollars for other programs in future years, excluding any new revenue. The System would probably wish to use its expected return since that would be consistent with the development of its costs and liabilities.

If this Bill is enacted, the following chart shows the expected accumulated nominal dollar cash flow costs/(savings) on the employer contributions for the fiscal years 2015-2016 through 2047-2048 for both Systems, without and with the System actuary's recommended changes in amortization methodology and reduction in investment return assumption. The chart also shows the present value of the expected cash flow costs/(savings) as of June 30, 2015, assuming end of year payment, at 3.9% (a proxy for budget growth) and 7.5% (the current investment return for the System). The 3.9% proxy for budget growth is based on the annual growth in estimated general fund revenue from

2017-2018 to 2019-2020 shown on page C1-12 in the Governor's Executive Budget for 2015-2016. _As a reminder, it is up to the reader to determine what portion, if any, of the increase in cost due to the System actuaries' recommendations should be included as a cost of the Bill._

Impact on Employer Contributions if House Bill 727, PN 1555 is enacted
For Fiscal Years 2015-2016 through 2047-2048
(amounts in millions and based on System actuary's projections)

	Cash Flow Costs / (Savings)	Present Value of Cash Flow Costs / (Savings) at 3.9%	Present Value of Cash Flow Costs / (Savings) at 7.5%
Without the System actuary's recommended changes in amortization methodology and reductions in investment return assumption			
PSERS	$5,208.9	$2,303.8	$1,217.1
SERS	(3,030.6)	(1,279.9)	(641.5)
Total	2,178.3	1,023.9	575.6
With the System actuary's recommended changes in amortization methodology and reductions in investment return assumption			
PSERS	$28,264.1	$10,649.5	$4,903.7
SERS	2,964.1	1,105.0	462.2
Total	31,228.2	11,754.5	5,365.9

Prior to reflecting the System actuary's recommended changes for amortization methodology and reduction in investment returns, there is a cost for PSERS and a savings for SERS if the Bill is enacted. This difference is due to the relationship between the current employer normal cost rate for recent hires and the 4% DC plan contribution rate – such normal cost rate is below 4% for PSERS and vice versa for SERS.

Each of the system's assets is assumed to earn 7.5% or alternative assumption, as applicable, each year of the projection. To the extent adverse (favorable) investment returns are experienced, the contribution rates would be higher (lower).

Basis for Analysis

In performing this analysis, we have relied on the information provided by the Commission, PSERS, SERS, Hay Group, and Buck Consultants. We have not audited or verified this data and other information. If the data or information is inaccurate or incomplete, the results of this analysis may likewise be inaccurate or incomplete.

We performed a limited review of the projections prepared by Buck Consultants and Hay Group as provided by the Commission, PSERS, and SERS for reasonableness and consistency and have not found material defects. If there are material defects, it is possible that they would be uncovered by a detailed, systematic review and comparison to search for values that are questionable or for relationships that are materially inconsistent. Such a review was beyond the scope of our assignment.

Future actuarial measurements may differ significantly from the current measurements presented in this analysis due to actual plan experience deviating from the actuarial assumptions, the natural operation of the plan’s actuarial cost method, and changes in plan provisions, actuarial assumptions, actuarial methods, and applicable law. An assessment of the potential range and cost effect of such differences is beyond the scope of this analysis.

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The consultants who worked on this assignment are pension actuaries. We have not explored any legal issues with respect to the proposed plan changes. We are not attorneys and cannot give legal advice on such issues. We suggest that you review this proposal with counsel.

In addition, the consultants who worked on this assignment are not investment consultants and nothing in this letter is to be construed as investment advice. Our commentary regarding the investment return assumption is based on our experience as actuaries.

We are members of the American Academy of Actuaries and meet its Qualification Standards to render this actuarial opinion.

Please let us know if we can provide any additional information regarding this Bill.

Sincerely,

Timothy J. Nugent

Katherine A Warren

Katherine A. Warren

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This analysis was prepared solely for the Pennsylvania Public Employee Retirement Commission and may not be appropriate for other purposes. Milliman does not intend to benefit and assumes no duty or liability to other parties who receive this work.

David L. Driscoll, FSA
Principal, Consulting Actuary

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June 5, 2015

Mr. Glen R. Grell
Executive Director
Pennsylvania Public School Employees' Retirement System
5 North 5th Street
Harrisburg, PA 17101

Re: House Bill No. 727 (Printer's No. 1555)

Dear Mr. Grell:

As requested, we are writing with regard to House Bill No. 727, which would establish a defined contribution (DC) plan with an effective date of July 1, 2016. School employees hired on or after July 1, 2016, would no longer be allowed to become members in the Pennsylvania Public School Employees' Retirement System (PSERS or System). Instead, school employees hired on or after July 1, 2016 would be enrolled in the DC plan. In addition, school employees of the Department of Education, community colleges, state-owned educational institutions and Pennsylvania State University who become school employees on or after January 1, 2016, would not be eligible for membership in PSERS or the new DC plan.

Provisions of proposed DC plan

- School employees who begin school service on or after July 1, 2016, would be required to enroll in the DC plan. These employees would not be eligible to be enrolled in PSERS, even if they were previously school employees or members of PSERS.

- Current PSERS members would be ineligible to elect coverage under the DC plan on a prospective basis.

- DC-plan participants would be required to make contributions to the plan of 6.5% of compensation. These contributions are intended to be pre-tax "pickup" contributions.

- Employer contributions to the DC plan would be 4.0% of compensation.

- Participant contributions to the DC plan would vest immediately. Employer contributions would vest over a 3-year time period: 0% prior to 1 year of service; 33% on or after 1 year of service; 66% on or after 2 years of service; 100% on or after 3 years of service.

- Each DC participant would have an individual investment account in which all participant and employer contributions would be accumulated and investment experience, fees and costs would be credited or charged.

- If a DC participant retired after age 55, a portion of his or her distribution would have to be made in the form of an annuity.

- School employees of the Department of Education, community colleges, state-owned educational institutions and Pennsylvania State University who are hired on or after January 1, 2016, would not be eligible for membership in the DB plan or for participation in the DC plan.

- DC plan participants would be ineligible for premium assistance under the Health Care Premium Assistance Program.

Proposed funding reforms

- The result of the 10-year asset averaging method would be constrained to lie within 30% of the market value of assets. The effective date is the fiscal year beginning July 1, 2011. For the July 1, 2010 through July 1, 2014 valuations, the 30% constraint would not have applied.
- Effective for the fiscal year beginning in 2016, compensation for active members of the DB plan as well as active participants in the DC plan would be used in determining the employer contribution rate for the amortization of the unfunded accrued liability of the DB plan.
- Changes in accrued liability due to legislation would be funded as a level percentage of pay over a period of ten years.
- For fiscal years beginning July 1, 2017 after the collars are no longer in effect, the normal contribution rate is no longer set as the minimum contribution rate.

The results reported in this cost note are based on the assumption that the DC plan would cover only employees hired on or after July 1, 2016, and do not take into consideration the coverage of any former PSERS members returning to active service. In addition, the projected 4.0% employer contributions under the DC plan do not reflect any offset for projected forfeitures by participants terminating prior to three years of service.

It should be noted that under the proposed DC plan, investment risk would be fully borne by participants. Under PSERS, only Class T-E and T-F members share responsibility for the fund’s investment risk through the Act 2010-120 “shared-risk” additional member contributions. PSERS Class T-C and T-D members are not subject to the “shared-risk” contributions.

Also, under the proposed DC plan, participants would bear “longevity risk” (i.e., the risk of running out of money in retirement) completely, in contrast to PSERS, which assumes all longevity risk for participants.

The potential financial impact of House Bill No. 727 is presented in the attached tables. These results may be used as estimates of the likely pattern of emerging costs and liabilities resulting from the proposed changes but should not be viewed as a guarantee of actual costs. Actual future funding obligations will be determined on the basis of actuarial valuations made at future valuation dates, which will likely differ from the estimates provided in these analyses.

Table 1 compares projected employer contribution obligations under the current benefit and funding provisions of PSERS with those projected to arise under House Bill No. 727.

The calculations presented here are based on the data, methods and assumptions used in the June 30, 2014 actuarial valuation of PSERS and the following assumptions for future valuations:

a. The active workforce size is assumed to remain constant over the projection period; and

b. Future new employees are assumed to be Class T-E members (before 7/1/2016) or DC participants (after 6/30/2016) and have similar characteristics (age/gender/salary) to new employees who entered the System in the period July 1, 2011 through June 30, 2014.

In this context, it should be noted that one difficulty in the estimation of liabilities arising under House Bill No. 727 is that we would expect a change in retirement patterns among the participants of the DC plan due to the benefit entitlement reduction. In general, decreasing benefits may lead to the postponement of member retirements, since members may need to remain in service longer to earn sufficient benefits to meet their financial needs in retirement. However, the nature and extent of such postponements will not be identifiable until affected members retire under the new benefit design and a formal experience study is prepared. Therefore, in preparing these cost estimates, we have assumed that there will be no immediate changes in members’ retirement patterns.

Implication of Financing the DB Plan

The following are additional funding concerns which need to be addressed if House Bill No. 727 were to move forward:

House Bill No. 727 continues computation of the accrued liability contribution as a level percentage of total compensation of all active System members and active DC participants. It would likely be difficult to continue using a level-percentage-of-pay amortization method if the System were closed to new members, as a level-percentage-of-pay amortization method assumes that the System payroll will continue to increase. However, for purposes of the projected costs presented in Table 1, the aggregate projected pay of school employees in both the System and the DC plan is used to determine the unfunded accrued liability contribution rate, as the bill calls for employers of the DC plan participants to share in contributing toward the amortization of the System's unfunded accrued liability.

House Bill No. 727 would continue the computation of the System's accrued liability contribution arising from experience and changes in assumptions using an amortization period of 24 years. It may not remain reasonable indefinitely to use a 24-year amortization period, which could greatly exceed the eventual level of the anticipated future working lifetime of the System's membership if House Bill No. 727 is enacted, for this purpose. Consideration should be given to changing the System's funding policies to reflect the changes in the active membership of the System that would result from its closure to new members, especially as the number of active members approaches zero. These changes would likely accelerate accrued liability payments and result in increased employer contributions to the System, subject to the collar provisions.

Our analysis is based on an assumed 7.50% annual rate of return on System assets. However, under House Bill No. 727, as more members were covered under the DC plan, the PSERS Board would likely change the System's asset allocation to reduce the risk of the portfolio and reflect the need to hold a growing proportion of its assets in more liquid, less volatile asset classes. In general, such changes would be expected to result in a lowering of the discount rate used in the System's valuation. This would increase the accrued liabilities and contribution requirements of the System. Therefore, the projected costs associated with the legislation would change, potentially significantly, if there were a change in the asset allocation and expected asset return.

Accordingly, the attached Table 2 presents the potential financial impact of reflecting funding provisions for financing the closed System under House Bill No. 727. Table 2 compares projected employer contribution obligations under the current benefit and funding provisions of PSERS with those projected to arise under House Bill No. 727 assuming certain provisions for financing a closed defined benefit plan are incorporated in the proposed legislation.

The comparison presented in Table 2 is based on the same assumptions as Table 1 and the following method for financing the closed System under House Bill No. 727:

a. The remaining unfunded accrued liability as of June 30, 2016 would be amortized in equal installments over a 24-year closed period but not less than the average future working lifetime of the active population as of the future valuation date.

b. Future System gains and losses would be amortized over the greater of (1) the same remaining period of the unfunded accrued liability as of June 30, 2016 or (2) the average future working lifetime of the active population as of the future valuation date. The analysis assumes no future legislation which changes the System's accrued liability.

c. In accordance with an analysis by PSERS' investment consultant, Aon Hewitt, as noted below, the House Bill No. 727 results are based on the following projection of assumed rates of return that would apply in future years' valuations.

   The schedule is in consideration of likely future actions that would be taken to limit fund volatility and anticipate future liquidity requirements for the System.

   i. 7.25% during fiscal year 2022
   ii. 7.00% during fiscal year 2028
   iii. 6.75% during fiscal year 2036
   iv. 6.50% during fiscal year 2040

The above rate of investment return schedule was provided by the System's investment advisor, Aon Hewitt, and is based on:

- Future expected benefit commitments of the System under House Bill No. 727,
- An investment horizon which covers the period from fiscal year 2015 through fiscal year 2053,
- Consideration of the illiquidity of certain investment classes, and
- Expected reduction of risk and surplus volatility over the period examined to minimize employer contribution requirements while securing assets for benefit commitments.
- The median of the future expected asset returns.

A copy of Aon Hewitt's report on their analysis is provided in the appendix.

The attached Table 3 allocates the total projected cost/(savings) among the components of House Bill No. 727 that affect System cost. The Table 3 cost allocation is dependent on the order in which the changes are implemented. If a different order is utilized, individual results will vary but the total savings will remain unchanged.

The estimated cost/(savings) are presented on two bases: a cash flow basis and a present value basis. Cost/(savings) shown on a cash flow basis are the sums of the dollar amounts of (reductions)/increases in the projected contributions the employers would have to make in future years if the proposed changes in System provisions are enacted. The calculation of cost/(savings) on this basis makes no distinction between a dollar of projected cost/(savings) in one future year and a dollar of cost/(savings) in some other year in the nearer or more distant future. The calculation of cost/(savings) on a present value basis, on the other hand, involves discounting projected reductions in contributions from the times they are expected to occur to June 30, 2015, at a rate of 7.50% (the assumed interest rate presently used in the annual actuarial valuations of the System) to reflect the time value of money. It is useful to compare cost/(savings) measured on a present value basis with those measured on a cash flow basis because a dollar of cost/(savings) in future years has a lower value in today's dollars than a dollar that must be paid today.

Also, to provide a range of potential System closing costs, Table 3 provides alternative estimates based on the 25th and 75th percentiles of the distribution of future expected asset returns.

Attached as Table 4 are six benefit comparisons between the estimated current benefits provided under PSERS for Class T-E members and proposed DC plan benefits under House Bill No. 727 for hypothetical members who are eligible for retirement under PSERS.

The resulting contributions for each fiscal year may differ from actual results that will be determined in future actuarial valuations due to demographic and financial experience different from that assumed. This will certainly be the case if the workforce and/or payroll continue to decrease over the next few years. In addition, it is outside the scope of this assignment to determine if the assumptions used in the June 30, 2014 actuarial valuation are reasonable for future valuations. Accordingly, these results should not be used for any purpose other than providing an estimate of future employer pension cost obligations under House Bill No. 727.

This analysis only provides information with regards to future funding contributions of the System. It does not provide any information with regards to the impact any changes may have on financial disclosure and expense under applicable GASB standards.

This analysis was prepared under my supervision. I am a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. I meet the Academy's qualification Standards to issue this Statement of Actuarial Opinion. This report has been prepared in accordance with all applicable Actuarial Standards of Practice and I am available to answer questions about it.

Finally, care should be exercised in using the projection model and communicating any results to third parties to ensure that the above caveats and underlying bases of the projections are clearly communicated to any possible recipients.

Please let me know if you have any questions.

Respectfully submitted,

David L. Driscoll

David L. Driscoll, FSA, MAAA, EA
Principal, Consulting Actuary

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Enc.

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pc: Brian Carl
Edward Quinn
Sal Nakar

TABLE 1
Public School Employees' Retirement System of Pennsylvania
Projection of Contribution Rates and Funded Ratios As of June 30, 2014
Current PSERS vs. House Bill 727 (Printer's No. 1555) Without Reflecting Potential Funding Reforms Associated with Financing of a Closed Defined Benefit Plan

	Appropriation Payroll (thousands)			Pension Rate Floor		Employee Contribution Rate		Employer Normal Cost Rate			Employer Unfunded Liability Rate		Preliminary Employer Pension Rate		Health Care Contribution		Total Employer Contribution Rate		Total Employer Contribution (thousands)				Funded Ratio		Unfunded Accrued Liability (millions)	
									House Bill 727												Cost/(Savings)					
Fiscal Year Ending June	DB Plan	Paricipants Enrolled in DC Plan	Fiscal Year Market Rate of Return	Current PSERS	House Bill 727 - DB	Current PSERS	House Bill 727 - DB	Current PSERS	DB	DC	Current PSERS	House Bill 727 - DB	Current PSERS	House Bill 727 - DB	Current PSERS	House Bill 727 - DB	Current PSERS	House Bill 727: DB + DC	Current PSERS	House Bill 727: DB + DC	Cash Flow Basis	Present Value as of June 30, 2015	Current PSERS	House Bill 727 - DB	Current PSERS	House Bill 727 - DB
2013	$ 14,297,000		7.96 %	4.00 %	4.00 %	7.40 %	7.40 %	8.66 %	8.66 %		12.99 %	12.99 %	21.65 %	21.65 %	0.86 %	0.86 %	12.36 %	12.36 %					63.8 %	63.8 %	$ 32,598.6	$ 32,598.6
2014	13,720,000		14.91	4.00	4.00	7.43	7.43	8.57	8.57		15.25	15.25	23.82	23.82	0.93	0.93	16.93	16.93					**62.0**	**62.0**	**35,121.2**	**35,121.2**
2015	13,482,000		7.50	4.00	4.00	7.46	7.46	8.46	8.46		17.51	17.51	25.97	25.97	0.90	0.90	21.40	21.40	$ 2,885,148	$ 2,885,148	$ 0	$ 0	60.6	60.6	37,413.9	37,413.9
2016	**13,375,000**		7.50	4.00	4.00	**7.49**	**7.49**	**8.38**	**8.38**		**19.44**	**19.44**	**27.82**	**27.82**	**0.84**	**0.84**	**25.84**	**25.84**	**3,456,100**	**3,456,100**	**0**	**0**	59.6	59.6	39,412.8	39,412.8
2017	13,739,290	$ 543,937	7.50	8.21	0.00	7.50	7.50	8.21	8.21	0.16 %	20.64	20.64	28.85	28.85	0.84	0.84	29.69	29.85	4,079,195	4,100,953	21,757	18,827	58.7	58.7	41,424.4	41,424.4
2018	14,097,299	1,079,571	7.50	8.05	0.00	7.50	7.50	8.05	8.05	0.31	21.74	21.74	29.79	29.79	0.83	0.83	30.62	30.93	4,316,593	4,359,776	43,183	34,760	58.4	58.4	42,871.0	42,871.0
2019	14,477,945	1,610,623	7.50	7.89	0.00	7.51	7.22	7.89	7.77	0.44	22.85	22.85	30.74	30.62	0.82	0.82	31.56	31.88	4,569,239	4,616,291	47,051	35,232	60.0	60.0	42,296.8	42,296.8
2020	14,875,749	2,150,567	7.50	7.74	0.00	7.51	6.95	7.74	7.51	0.58	23.69	23.69	31.43	31.20	0.80	0.80	32.23	32.58	4,794,454	4,846,262	51,808	36,088	61.7	61.6	41,603.7	41,603.7
2021	15,280,718	2,704,203	7.50	7.60	0.00	7.51	6.69	7.60	7.27	0.71	23.64	23.64	31.24	30.91	0.78	0.78	32.02	32.40	4,892,886	4,950,628	57,742	37,414	63.0	62.9	41,228.1	41,228.1
2022	15,689,939	3,257,855	7.50	7.45	0.00	7.51	6.45	7.45	7.01	0.83	23.68	23.68	31.13	30.69	0.77	0.77	31.90	32.29	5,005,091	5,066,369	61,278	36,936	64.7	64.5	40,395.1	40,395.1
2023	16,112,661	3,821,856	7.50	7.29	0.00	7.52	6.21	7.29	6.77	0.95	23.92	23.92	31.21	30.69	0.75	0.75	31.96	32.39	5,149,606	5,218,695	69,088	38,738	66.5	66.3	39,344.6	39,344.6
2024	16,541,176	4,402,170	7.50	7.14	0.00	7.52	5.98	7.14	6.54	1.06	24.02	24.02	31.16	30.56	0.74	0.74	31.90	32.36	5,276,635	5,353,474	76,839	40,078	68.1	67.8	38,382.2	38,382.2
2025	16,980,255	5,013,119	7.50	6.99	0.00	7.52	5.77	6.99	6.28	1.18	24.12	24.12	31.11	30.40	0.72	0.72	31.83	32.30	5,404,815	5,484,779	79,964	38,798	69.9	69.5	37,192.9	37,192.9
2026	17,416,242	5,653,501	7.50	6.83	0.00	7.52	5.55	6.83	6.05	1.30	24.37	24.37	31.20	30.42	0.70	0.70	31.90	32.42	5,555,781	5,646,066	90,285	40,750	71.8	71.3	35,741.5	35,741.5
2027	17,847,011	6,325,471	7.50	6.67	0.00	7.52	5.34	6.67	5.79	1.42	24.62	24.62	31.29	30.41	0.70	0.70	31.99	32.53	5,709,259	5,805,198	95,939	40,280	73.8	73.3	34,014.0	34,014.0
2028	18,273,254	7,028,622	7.50	6.51	0.00	7.52	5.11	6.51	5.55	1.54	24.89	24.89	31.40	30.44	0.70	0.70	32.10	32.68	5,865,715	5,971,382	105,668	41,270	75.9	75.3	31,999.5	31,999.5
2029	18,697,025	7,764,664	7.50	6.33	0.00	7.52	4.89	6.33	5.28	1.66	25.17	25.17	31.50	30.45	0.70	0.70	32.20	32.81	6,020,442	6,134,617	114,175	41,481	78.2	77.5	29,682.5	29,682.5
2030	19,123,598	8,539,725	7.50	6.15	0.00	7.52	4.66	6.15	5.02	1.79	25.46	25.46	31.61	30.48	0.70	0.70	32.31	32.97	6,178,835	6,304,186	125,352	42,365	80.6	79.9	27,032.1	27,032.1
2031	19,551,758	9,354,434	7.50	5.96	0.00	7.53	4.44	5.96	4.74	1.91	25.77	25.77	31.73	30.51	0.70	0.70	32.43	33.12	6,340,635	6,476,080	135,445	42,582	83.1	82.4	24,014.7	24,014.7
2032	19,980,605	10,209,244	7.50	5.78	0.00	7.53	4.20	5.78	4.47	2.04	26.10	26.10	31.88	30.57	0.70	0.70	32.58	33.31	6,509,681	6,656,031	146,350	42,800	85.8	85.1	20,597.9	20,597.9
2033	20,413,230	11,105,968	7.50	5.58	0.00	7.53	3.96	5.58	4.19	2.18	26.44	26.44	32.02	30.63	0.70	0.70	32.72	33.50	6,679,209	6,839,343	160,134	43,564	88.7	88.1	16,743.8	16,743.8
2034	20,852,537	12,042,831	7.50	5.39	0.00	7.53	3.72	5.39	3.90	2.31	26.79	26.79	32.18	30.69	0.70	0.70	32.88	33.70	6,856,314	7,026,865	170,551	43,161	91.8	91.3	12,411.6	12,411.6
2035	21,304,240	13,023,897	7.50	5.19	0.00	7.53	3.47	5.19	3.61	2.45	27.14	27.14	32.33	30.75	0.70	0.70	33.03	33.89	7,036,790	7,220,565	183,774	43,263	95.1	94.7	7,559.2	7,559.2
2036	21,765,729	14,046,609	7.50	4.99	0.00	7.53	3.22	4.99	3.32	2.58	12.43	12.43	17.42	15.75	0.70	0.70	18.12	19.03	3,943,950	4,141,623	197,673	43,288	96.6	96.2	5,418.8	5,418.8
2037	22,238,659	15,112,004	7.50	4.79	0.00	7.53	2.97	4.79	3.02	2.72	8.78	8.78	13.57	11.80	0.70	0.70	14.27	15.21	3,173,457	3,383,434	209,977	42,775	97.6	97.3	3,871.2	3,871.2
2038	22,726,844	16,225,136	7.50	4.58	0.00	7.53	2.72	4.58	2.72	2.86	7.18	7.18	11.76	9.90	0.70	0.69	12.46	13.45	2,831,765	3,056,868	225,103	42,657	98.4	98.3	2,529.3	2,529.3
2039	23,227,294	17,382,733	7.50	4.38	0.00	7.53	2.47	4.38	2.42	2.99	5.35	5.35	9.73	7.77	0.70	0.69	10.43	11.46	2,422,607	2,661,073	238,467	42,036	99.1	99.0	1,474.9	1,474.9
2040	23,750,235	18,581,109	7.50	4.18	0.00	7.53	2.21	4.18	2.14	3.13	3.92	3.92	8.10	6.06	0.70	0.69	8.80	9.88	2,090,021	2,346,674	256,653	42,086	99.6	99.6	654.8	654.8
2041	24,303,842	19,818,055	7.50	3.98	0.00	7.53	1.96	3.98	1.85	3.26	2.60	2.60	6.58	4.45	0.70	0.69	7.28	8.40	1,769,320	2,041,689	272,369	41,547	100.0	100.0	72.5	72.5
2042	24,892,137	21,089,264	7.50	3.79	0.00	7.53	1.72	3.79	1.57	3.39	1.44	1.44	5.23	3.01	0.70	0.69	5.93	7.09	1,476,104	1,763,645	287,542	40,801	100.2	100.2	(280.8)	(280.8)
2043	25,529,749	22,396,441	7.50	3.61	0.00	7.53	1.49	3.61	1.30	3.51	0.24	0.24	3.85	1.54	0.70	0.68	4.55	5.73	1,161,604	1,463,364	301,760	39,831	100.2	100.3	(362.3)	(362.3)
2044	26,225,024	23,737,733	7.50	3.44	0.00	7.53	1.27	3.44	1.06	3.62	(0.64)	(0.64)	2.80	0.42	0.70	0.68	4.14	4.72	1,085,716	1,237,753	152,037	18,668	100.2	100.2	(395.4)	(221.3)
2045	26,987,280	25,110,295	7.50	3.30	0.00	7.52	1.07	3.30	0.84	3.72	(0.35)	(0.35)	2.95	0.49	0.70	0.67	4.00	4.89	1,079,491	1,318,784	239,293	27,332	100.2	100.1	(428.1)	(142.9)
2046	27,819,206	26,500,583	7.50	3.18	0.00	7.52	0.88	3.18	0.65	3.81	(0.20)	(0.15)	2.98	0.50	0.70	0.67	3.88	4.98	1,079,385	1,385,584	306,198	32,534	100.2	100.1	(463.0)	(111.3)
2047	28,676,777	27,899,018	7.50	3.05	0.00	7.52	0.72	3.05	0.49	3.89	(0.29)	(0.22)	2.76	0.27	0.70	0.66	3.75	4.83	1,075,379	1,384,055	308,676	30,509	100.3	100.0	(500.9)	(56.5)
2048	29,560,785	29,311,397	7.50	2.92	0.00	7.52	0.58	2.92	0.37	3.97	(0.19)	(0.10)	2.73	0.27	0.70	0.66	3.62	4.89	1,070,100	1,446,842	376,741	34,639	100.3	100.0	(541.1)	(30.0)
																			Total Cost/(Savings):		$ 5,208,873	$ 1,217,092				

Based on Buck's House Bill 727 (Printer's Number 1555) cost note dated June 5, 2015. All statements of reliance included in that cost note continue to apply. Please refer to that cost note for more information.

TABLE 2
Public School Employees' Retirement System of Pennsylvania
Projection of Contribution Rates and Funded Ratios As of June 30, 2014
Current PSERS vs. House Bill 727 (Printer's No. 1555) Reflecting Potential Funding Reforms Associated with Financing of a Closed Defined Benefit Plan

Fiscal Year Ending June	Appropriation Payroll (thousands)		Fiscal Year Market Rate of Return	Pension Rate Floor		Employee Contribution Rate		Employer Normal Cost Rate			Employer Unfunded Liability Rate		Preliminary Employer Pension Rate		Health Care Contribution		Total Employer Contribution Rate		Total Employer Contribution (thousands)				Funded Ratio		Unfunded Accrued Liability (millions)	
									House Bill 727												Cost/(Savings)					
	DB Plan	Participants Enrolled in DC Plan		Current PSERS	House Bill 727 - DB	Current PSERS	House Bill 727 - DB	Current PSERS	DB	DC	Current PSERS	House Bill 727 - DB	Current PSERS	House Bill 727 - DB	Current PSERS	House Bill 727 - DB	Current PSERS	House Bill 727: DB + DC	Current PSERS	House Bill 727: DB + DC	Cash Flow Basis	Present Value as of June 30, 2015	Current PSERS	House Bill 727 - DB	Current PSERS	House Bill 727 - DB
2013	$ 14,297,000		7.96 %	4.00 %	4.00 %	7.40 %	7.40 %	8.66 %	8.66 %		12.99 %	12.99 %	21.65 %	21.65 %	0.86 %	0.86 %	12.36 %	12.36 %					63.8 %	63.8 %	$ 32,598.6	$ 32,598.6
2014	13,720,000		14.91	4.00	4.00	7.43	7.43	8.57	8.57		15.25	15.25	23.82	23.82	0.93	0.93	16.93	16.93					**62.0**	**62.0**	**35,121.2**	**35,121.2**
2015	13,482,000		7.50	4.00	4.00	7.46	7.46	8.46	8.46		17.51	17.51	25.97	25.97	0.90	0.90	21.40	21.40	$ 2,885,148	$ 2,885,148	$ 0	$ 0	60.6	60.6	37,413.9	37,413.9
2016	**13,375,000**		7.50	4.00	4.00	**7.49**	**7.49**	**8.38**	**8.38**		**19.44**	**19.44**	**27.82**	**27.82**	**0.84**	**0.84**	**25.84**	**25.84**	**3,456,100**	**3,456,100**	**0**	**0**	59.6	59.6	39,412.8	39,412.8
2017	13,739,290	$ 543,937	7.50	8.21	0.00	7.50	7.50	8.21	8.21	0.16 %	20.64	20.64	28.85	28.85	0.84	0.84	29.69	29.85	4,079,195	4,100,953	21,757	18,827	58.7	58.7	41,424.4	41,424.4
2018	14,097,299	1,079,571	7.50	8.05	0.00	7.50	7.50	8.05	8.06	0.31	21.74	25.53	29.79	33.59	0.83	0.83	30.62	34.73	4,316,593	4,895,473	578,880	465,976	58.4	58.9	42,871.0	42,335.8
2019	14,477,945	1,610,623	7.50	7.89	0.00	7.51	7.21	7.89	7.79	0.44	22.85	26.16	30.74	33.95	0.82	0.82	31.56	35.21	4,569,239	5,098,406	529,167	396,240	60.0	61.0	42,296.8	41,241.3
2020	14,875,749	2,150,567	7.50	7.74	0.00	7.51	6.94	7.74	7.52	0.58	23.69	26.42	31.43	33.94	0.80	0.80	32.23	35.32	4,794,454	5,253,858	459,404	320,002	61.7	63.1	41,603.7	40,063.6
2021	15,280,718	2,704,203	7.50	7.60	0.00	7.51	6.69	7.60	7.26	0.71	23.64	25.39	31.24	32.65	0.78	0.78	32.02	34.14	4,892,886	5,216,512	323,626	209,697	63.0	64.7	41,228.1	39,305.5
2022	15,689,939	3,257,855	7.50	7.45	0.00	7.51	6.45	7.45	7.00	0.83	23.68	24.50	31.13	31.50	0.77	0.77	31.90	33.10	5,005,091	5,193,458	188,367	113,539	64.7	65.0	40,395.1	40,868.3
2023	16,112,661	3,821,856	7.50	7.29	0.00	7.52	6.21	7.29	6.76	0.95	23.92	23.94	31.21	30.70	0.75	0.75	31.96	32.40	5,149,606	5,220,306	70,700	39,641	66.5	66.6	39,344.6	39,843.3
2024	16,541,176	4,402,170	7.50	7.14	0.00	7.52	5.98	7.14	7.18	1.06	24.02	24.52	31.16	31.70	0.74	0.74	31.90	33.50	5,276,635	5,542,043	265,408	138,433	68.1	68.3	38,382.2	38,736.3
2025	16,980,255	5,013,119	7.50	6.99	0.00	7.52	5.77	6.99	6.90	1.18	24.12	23.74	31.11	30.64	0.72	0.72	31.83	32.54	5,404,815	5,525,532	120,717	58,571	69.9	69.9	37,192.9	37,542.3
2026	17,416,242	5,653,501	7.50	6.83	0.00	7.52	5.55	6.83	6.64	1.30	24.37	23.18	31.20	29.82	0.70	0.70	31.90	31.82	5,555,781	5,541,569	(14,212)	(6,415)	71.8	71.6	35,741.5	36,229.7
2027	17,847,011	6,325,471	7.50	6.67	0.00	7.52	5.33	6.67	6.37	1.42	24.62	22.64	31.29	29.01	0.70	0.70	31.99	31.13	5,709,259	5,555,339	(153,919)	(64,624)	73.8	73.3	34,014.0	34,801.9
2028	18,273,254	7,028,622	7.50	6.51	0.00	7.52	5.11	6.51	6.10	1.54	24.89	22.11	31.40	28.21	0.70	0.70	32.10	30.45	5,865,715	5,563,889	(301,826)	(117,882)	75.9	73.3	31,999.5	36,197.2
2029	18,697,025	7,764,664	7.50	6.33	0.00	7.52	4.89	6.33	5.81	1.66	25.17	21.60	31.50	27.41	0.70	0.70	32.20	29.77	6,020,442	5,566,228	(454,214)	(165,022)	78.2	74.8	29,682.5	34,758.5
2030	19,123,598	8,539,725	7.50	6.15	0.00	7.52	4.66	6.15	6.09	1.79	25.46	22.89	31.61	28.98	0.70	0.70	32.31	31.47	6,178,835	6,017,332	(161,502)	(54,582)	80.6	76.6	27,032.1	32,807.3
2031	19,551,758	9,354,434	7.50	5.96	0.00	7.53	4.44	5.96	5.76	1.91	25.77	22.38	31.73	28.14	0.70	0.70	32.43	30.75	6,340,635	6,012,703	(327,932)	(103,098)	83.1	78.4	24,014.7	30,722.6
2032	19,980,605	10,209,244	7.50	5.78	0.00	7.53	4.20	5.78	5.44	2.04	26.10	21.90	31.88	27.34	0.70	0.70	32.58	30.08	6,509,681	6,010,657	(499,024)	(145,941)	85.8	80.2	20,597.9	28,495.6
2033	20,413,230	11,105,968	7.50	5.58	0.00	7.53	3.96	5.58	5.10	2.18	26.44	21.43	32.02	26.53	0.70	0.70	32.72	29.40	6,679,209	6,002,401	(676,808)	(184,125)	88.7	82.1	16,743.8	26,114.8
2034	20,852,537	12,042,831	7.50	5.39	0.00	7.53	3.72	5.39	4.76	2.31	26.79	20.97	32.18	25.73	0.70	0.70	32.88	28.74	6,856,314	5,992,579	(863,735)	(218,585)	91.8	84.0	12,411.6	23,567.5
2035	21,304,240	13,023,897	7.50	5.19	0.00	7.53	3.47	5.19	4.42	2.45	27.14	20.53	32.33	24.95	0.70	0.70	33.03	28.09	7,036,790	5,984,919	(1,051,871)	(247,624)	95.1	85.9	7,559.2	20,842.3
2036	21,765,729	14,046,609	7.50	4.99	0.00	7.53	3.23	4.99	4.06	2.58	12.43	17.77	17.42	21.83	0.70	0.70	18.12	25.11	3,943,950	5,464,979	1,521,029	333,089	96.6	86.0	5,418.8	21,277.3
2037	22,238,659	15,112,004	7.50	4.79	0.00	7.53	2.97	4.79	3.71	2.72	8.78	15.38	13.57	19.09	0.70	0.70	14.27	22.50	3,173,457	5,004,632	1,831,176	373,030	97.6	87.3	3,871.2	19,331.0
2038	22,726,844	16,225,136	7.50	4.58	0.00	7.53	2.72	4.58	3.70	2.86	7.18	17.71	11.76	21.41	0.70	0.69	12.46	24.96	2,831,765	5,672,727	2,840,963	538,358	98.4	89.1	2,529.3	16,610.7
2039	23,227,294	17,382,733	7.50	4.38	0.00	7.53	2.47	4.38	3.30	2.99	5.35	14.89	9.73	18.19	0.70	0.69	10.43	21.88	2,422,607	5,081,357	2,658,751	468,678	99.1	90.6	1,474.9	14,273.2
2040	23,750,235	18,581,109	7.50	4.18	0.00	7.53	2.22	4.18	2.91	3.13	3.92	12.51	8.10	15.42	0.70	0.69	8.80	19.24	2,090,021	4,569,696	2,479,675	406,615	99.6	90.3	654.8	14,992.2
2041	24,303,842	19,818,055	7.50	3.98	0.00	7.53	1.96	3.98	2.54	3.26	2.60	10.51	6.58	13.05	0.70	0.69	7.28	17.00	1,769,320	4,131,819	2,362,499	360,372	100.0	91.3	72.5	13,434.9
2042	24,892,137	21,089,264	7.50	3.79	0.00	7.53	1.72	3.79	2.40	3.39	1.44	11.15	5.23	13.55	0.70	0.69	5.93	17.63	1,476,104	4,387,277	2,911,173	413,085	100.2	92.4	(280.8)	11,532.6
2043	25,529,749	22,396,441	7.50	3.61	0.00	7.53	1.49	3.61	2.01	3.51	0.24	10.87	3.85	12.88	0.70	0.68	4.55	17.07	1,161,604	4,358,437	3,196,834	421,971	100.2	93.7	(362.3)	9,506.9
2044	26,225,024	23,737,733	7.50	3.44	0.00	7.53	1.27	3.44	1.65	3.62	(0.64)	8.72	2.80	10.37	0.70	0.68	4.14	14.67	1,085,716	3,847,143	2,761,427	339,069	100.2	94.8	(395.4)	7,836.9
2045	26,987,280	25,110,295	7.50	3.30	0.00	7.52	1.07	3.30	1.33	3.72	(0.35)	6.99	2.95	8.32	0.70	0.67	4.00	12.72	1,079,491	3,431,888	2,352,397	268,693	100.2	95.6	(428.1)	6,460.4
2046	27,819,206	26,500,583	7.50	3.18	0.00	7.52	0.88	3.18	1.05	3.81	(0.20)	5.59	2.98	6.64	0.70	0.67	3.88	11.12	1,079,385	3,093,683	2,014,298	214,023	100.2	96.4	(463.0)	5,325.6
2047	28,676,777	27,899,018	7.50	3.05	0.00	7.52	0.72	3.05	0.81	3.89	(0.29)	4.47	2.76	5.28	0.70	0.66	3.75	9.84	1,075,379	2,820,761	1,745,382	172,512	100.3	97.0	(500.9)	4,390.2
2048	29,560,785	29,311,397	7.50	2.92	0.00	7.52	0.58	2.92	0.62	3.97	(0.19)	3.57	2.73	4.19	0.70	0.66	3.62	8.81	1,070,100	2,605,625	1,535,524	141,181	100.3	97.5	(541.1)	3,619.0
																			Total Cost/(Savings):		$ 28,264,109	$ 4,903,707				

Based on Buck's House Bill 727 (Printer's Number 1555) cost note dated June 5, 2015. All statements of reliance included in that cost note continue to apply. Please refer to that cost note for more information.

TABLE 3

Public School Employees' Retirement System of Pennsylvania
Allocation of the Total Potential Projected Cost/(Savings)
Due to House Bill No. 727 (Printer's No. 1555)
(Amounts in millions)

	Cash Flow Basis	Present Value As of June 30, 2015
Benefit Reforms		
DC plan membership for employees hired after June 30, 2016	$ 5,668	$ 1,270
Employees hired after June 30, 2016 Health Care premium assistance	(62)	(8)
Sub-total Benefit Reforms	$ 5,606	$ 1,262
Funding Reforms		
Elimination of NC rate as minimum pension rate after the Act 120 collars no longer apply	$ (397)	$ (45)
Total House Bill No. 727 Cost/(Savings) - Table 1	$ 5,209	$ 1,217
Implications of financing a closed DB plan	$ 23,055	$ 3,687
Potential Total House Bill No. 727 Cost/(Savings) - Table 2	$ 28,264	$ 4,904

Notes to Table 3:

1 The total House Bill 727 Cost/(Savings) presents the cost allocation of the proposed legislation.

It would likely be difficult to continue using a level-percentage -of-pay amortization method if the System were to close to new members as a level-percentage -of-pay amortization method assumes that the System payroll will continue to increase. PSERS will need to determine changes to the funding methodologies to reflect the new status of the existing DB system, especially as the number of active members approaches zero. Such changes in the amortization method and period would result in increased employer contributions into the System, subject to the collar provisions.

In addition, the above analysis assumes a 7.50% discount rate. However, under the House Bill No. 727, as more members are covered under the DC plan, the Board may want to consider changing the asset allocation to reduce the risk of the portfolio. In general, lowering the risk of the portfolio lowers the discount rate used in the valuation. This in turn increases the accrued liabilities and contribution requirements of the System. Therefore, the results shown will change, potentially significantly, if there is a change in the asset allocation and expected asset return.

2 Estimated cost/(savings) are presented on two bases: a cash flow basis and a present value basis. Cost/(savings) shown on a cash flow basis are the sums of the dollar amounts of (reductions)/increases in the projected contributions the employers would have to make in future years if the proposed changes in System provisions are enacted. The calculation of cost/(savings) on this basis makes no distinction between a dollar of projected cost/(savings) in one future year and a dollar of cost/(savings) in some other year in the nearer or more distant future. The calculation of cost/(savings) on a present value basis, on the other hand, involves discounting projected reductions in contributions from the times they are expected to occur to June 30, 2015, at a rate of 7.50% (the assumed interest rate presently used in the annual actuarial valuations of the System) to reflect the time value of money. It is useful to compare cost/(savings) measured on a present value basis with those measured on a cash flow basis because a dollar of cost/(savings) in future years has a lower value in today’s dollars than a dollar that must be paid today.

3 "Implications of financing a closed DB plan" presents the potential financing cost associated with the closing of the DB plan under HB 727.

This analysis includes potential cost associated with financing the closed DB plan under HB 727. The calculations assume that the remaining unfunded accrued liability as of June 30, 2016 will be amortized in equal installments over a 24-year closed period. However, the amortization period will never be less than the average future working life of active members at the time of each valuation date.

In addition, the potential closing cost result of $23,055 is based on the following valuation interest rate assumption schedule. The schedule is based on an analysis to limit fund volatility and anticipate future liquidity requirements for the HB 727 DB plan and is based on the median of the distribution of future expected asset returns.

Valuation Years	Interest Rate Assumption
Through 2021	7.50%
2022 - 2027	7.25%
2028 - 2035	7.00%
2036 - 2039	6.75%
2040 and later	6.50%

To provide a range of potential closing costs, the following present the potential closing costs based on the 25th percentile of the distribution of future expected assets returns and, alternatively, based on the 75th percentile of the distribution of future expected asset returns.

	Potential Closing Cost	
	Cash Flow Basis	Present Value as of June 30, 2015
25th Percentile	$29,414	$5,785
75th Percentile	$11,280	$ 638

The alternative potential closing costs presented on a cash flow basis are based on the following valuation interest rate assumption schedule while, as stated in note 2, the corresponding present value as of June 30, 2015 were determined using a 7.50% interest rate.

25th Percentile		75th Percentile	
Valuation Years	Interest Rate Assumption	Valuation Years	Interest Rate Assumption
Through 2020	7.50%	Through 2036	7.50%
2021 - 2022	7.25%	2037 - 2039	7.25%
2023 - 2025	7.00%	2040 and later	7.00%
2026 - 2031	6.75%		
2032 - 2040	6.50%		
2041 and later	6.25%		

TABLE 4

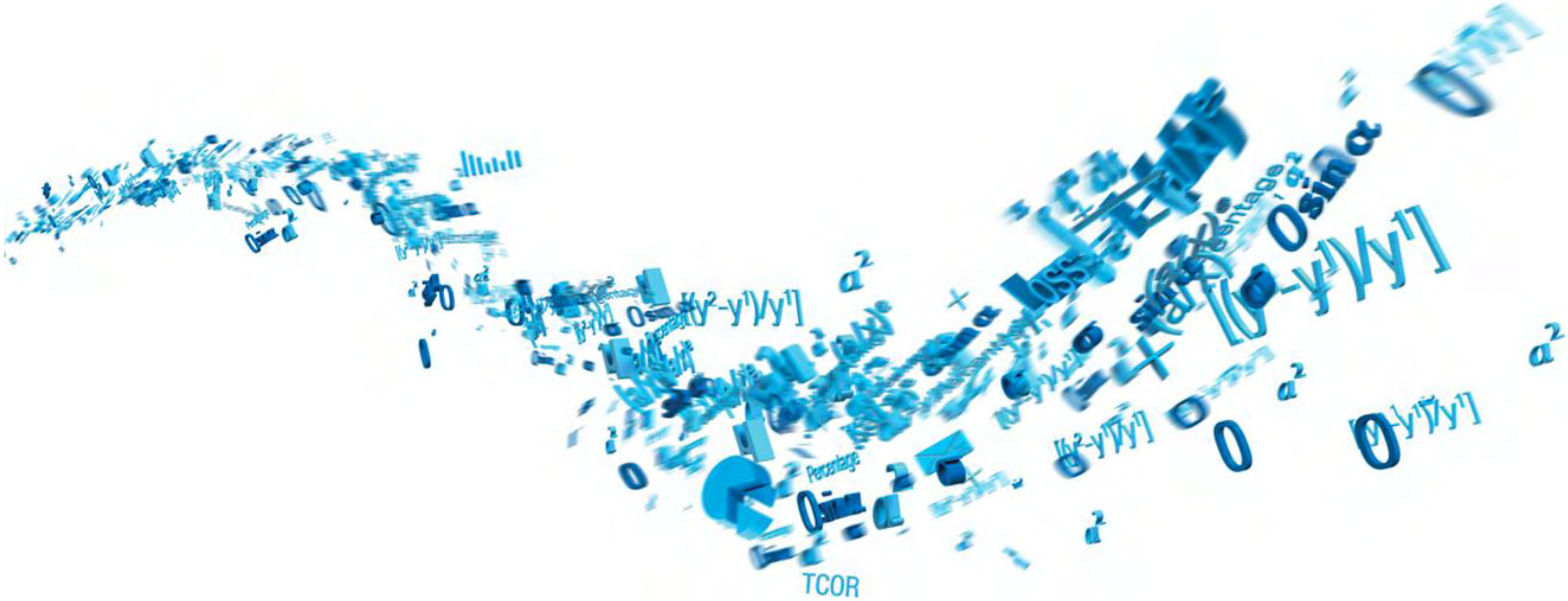
Public School Employees' Retirement System of Pennsylvania

Comparison of Benefits
PSERS Class T-E members vs. House Bill No. 727 Defined Contribution Plan

Employee	A	B	C	D	E	F
Age at Hire	30	30	30	30	40	22
Age at Termination	65	65	65	65	65	57
Retirement Age	65	65	65	65	65	57
Salary at Termination	$ 31,111	$ 51,852	$ 72,592	$ 93,333	$ 51,852	$ 57,000
PSERS Benefit	$ 21,000	$ 35,000	$ 49,000	$ 63,000	$ 25,000	$ 29,232
House Bill No. 727 DC Benefit	$ 9,049	$ 15,081	$ 21,113	$ 27,146	$ 10,570	$ 11,684
House Bill No. 727 DC Benefit / PSERS Benefit	43%	43%	43%	43%	42%	40%

Defined Contribution Design	
Member Contribution	**6.50%**
Employer Credit	**4.00%**
Assumed Rate of Return	**6.00%**
Assumed Conversion Rate	**3.00%**
Mortality Table for Conversion	**RP-2014 White Collar (75% female, 25% male)**

Appendix



Pennsylvania Public School Employees' Retirement System

Asset/Liability Plan Change Study

May 2015

Aon Hewitt
Retirement and Investment

Investment advice and consulting services provided by Aon Hewitt Investment Consulting, Inc., an Aon Company.

Empower Results®

2015 Asset-Liability Scenarios

- In 2014 a detailed asset-liability study was conducted
  - The study included a range of portfolio asset allocations
  - The range of portfolios were then tested against various economic scenarios
    - Specifically, we run economic trails across 5,000 scenarios

- For the purpose of this review we have only included the analysis relating to:
  - Contributions under Act 120
  - The current and the 10-year target asset allocation that were approved by the Board at the meeting in April 2014

- In April 2015 the study was updated to reflect:
  - Updated valuation results as of 6/30/2014
  - Current AHIC capital market assumptions for 2015 Q1
  - Plan change scenario comparison between current plan and plan closure as of 6/30/2016

Risk/Return Profile: Approved Portfolio

Asset Class	Approved 10 Year Target (90% RS, 14% Lvg)	Destination Portfolio At 10-Year Plan Maturity
Return-Seeking	**90%**	**50%**
- Global Equity	22%	50%
- Private Equity	15%	0%
- Real Estate	12%	0%
- MLPs / Infrastructure	5%	0%
- Hedge Funds	10%	0%
- Risk Parity	10%	0%
- Commodities	8%	0%
- High Yield Bonds	6%	0%
- Emerging Market Debt	2%	0%
Risk-Reducing	**24%**	**50%**
- Core Bonds	5%	50%
- US Long Treasuries	3%	0%
- Developed Int'l Debt	1%	0%
- TIPS	12%	0%
- Cash	3%	0%
Leverage	**-14%**	**0%**
- Leveraged Cash	-14%	0%
Total	**100%**	**100%**

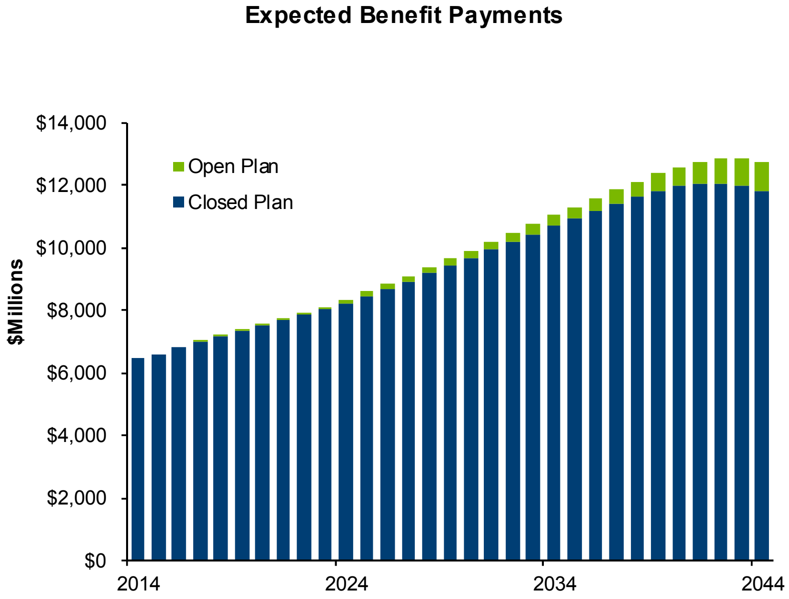
10 Year Expected Return[1]	**6.78%**	**5.13%**
10 Year Expected Risk	9.93%	9.50%
10 Year Sharpe Ratio	0.482	0.329
10 Year Expected Inflation	2.10%	2.10%
30 Year Expected Return[1,2]	**7.02%**	**5.54%**
30 Year Expected Risk	10.15%	9.63%
30 Year Sharpe Ratio	0.426	0.294
30 Year Expected Inflation	2.10%	2.10%

[1] Expected returns based on 2015 Q1 AHIC capital market assumptions

[2] Prior analysis based on 2014 Q1 capital market assumptions resulted in 30 year expected return of 7.86%

PSERS 6/30/2014 Asset-Liability Profile

Asset-Liability Snapshot as of 6/30/2014			
Metric ($, Millions)	**Value**	**Fund %: (MVA)**	**(AVA)**
Market Value of Assets	$53,092		
Actuarial Value of Assets	$57,344		
Liability Metrics			
Actuarial Liability (AL)	$92,465 [1]	57%	62%

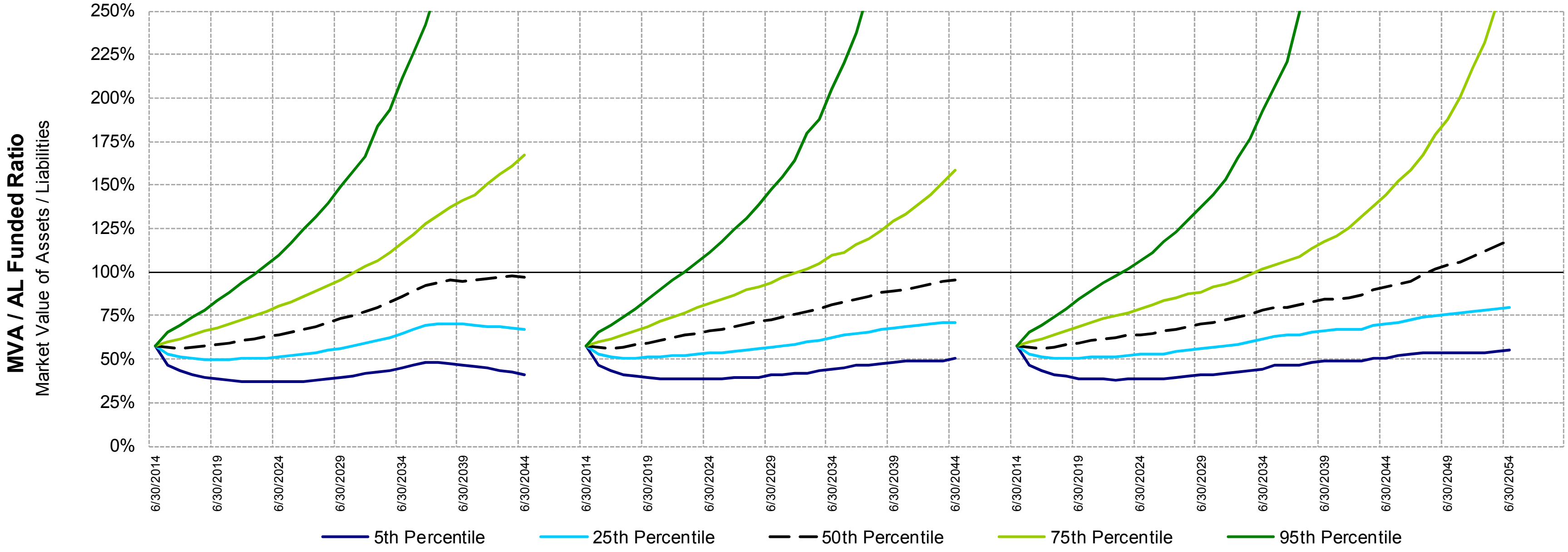


[1] Based on plan's valuation interest rate of 7.50%, including Health Insurance

Approved 10 Year Target Allocation (90% R-S, 14% Lvg)	
Metric	**Alloc %**
Global Equity	22%
Private Equity	15%
Real Estate	12%
MLPs	5%
Hedge Funds	10%
Risk Parity	10%
Commodities	8%
High Yield Bonds	6%
Emerging Market Debt	2%
Core Bonds	5%
US Long Treasuries	3%
TIPS	12%
Developed Int'l Debt	1%
Cash & Short Duration Bonds	-11%

Asset-Liability Growth Metrics			
Metric ($, Millions)	**Value**	**% Liability**	**% Assets**
AL Interest Cost	$6,934.9	7.5%	13.1%
AL Normal Cost	$2,146.3	2.3%	4.0%
Total Liability Hurdle Rate	**$9,081.2**	**9.8%**	**17.1%**
Expected Return on Assets	$3,981.9	4.3%	7.5%
ER + EE Contributions	$3,769.6	4.1%	7.1%
Total Exp. Asset Growth	**$7,751.5**	**8.4%**	**14.6%**
Hurdle Rate Shortfall	**-$1,329.7**	**-1.4%**	**-2.5%**
Benefit Payments	$6,495.8	7.0%	12.2%

Market Value of Assets / Actuarial Liability Funded Ratio

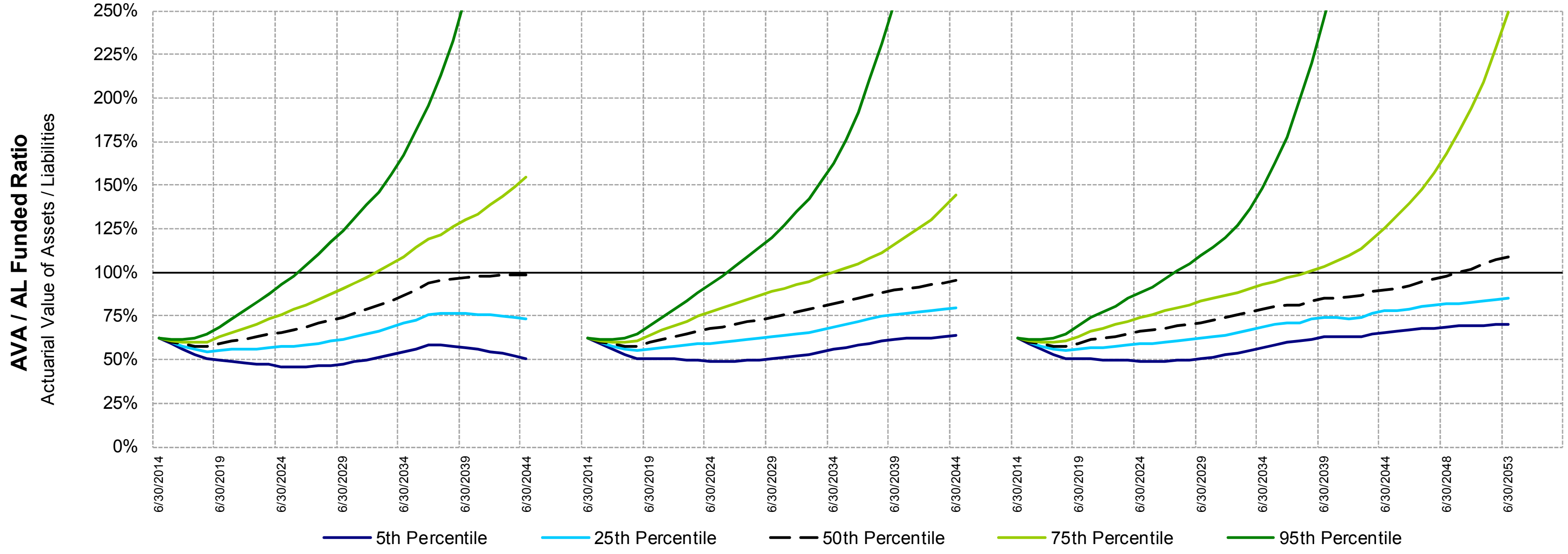


Strategy	Open Plan, Current Portfolio, Static EROA			Closed Plan, Current Portfolio, Static EROA			Closed Plan, Dynamic Portfolio, Dynamic EROA		
Year	**6/30/2024**	**6/30/2034**	**6/30/2044**	**6/30/2024**	**6/30/2034**	**6/30/2044**	**6/30/2024**	**6/30/2034**	**6/30/2044**
5th Percentile	37%	45%	41%	39%	44%	50%	39%	44%	51%
25th Percentile	51%	64%	67%	53%	62%	71%	53%	62%	70%
50th Percentile	64%	86%	**97%**	66%	81%	**96%**	64%	78%	**91%**
75th Percentile	80%	117%	167%	82%	109%	159%	79%	101%	144%
95th Percentile	110%	212%	533%	111%	205%	574%	107%	193%	596%
Probability > 100%	**12%**	**38%**	**49%**	**13%**	**33%**	**48%**	**10%**	**27%**	**46%**

Key Takeaways:

- Plan closure slightly reduces funded status volatility at the end of the projection horizon
- Lower future expectations for asset return slows funded ratio progress

Actuarial Value of Assets / Actuarial Liability Funded Ratio

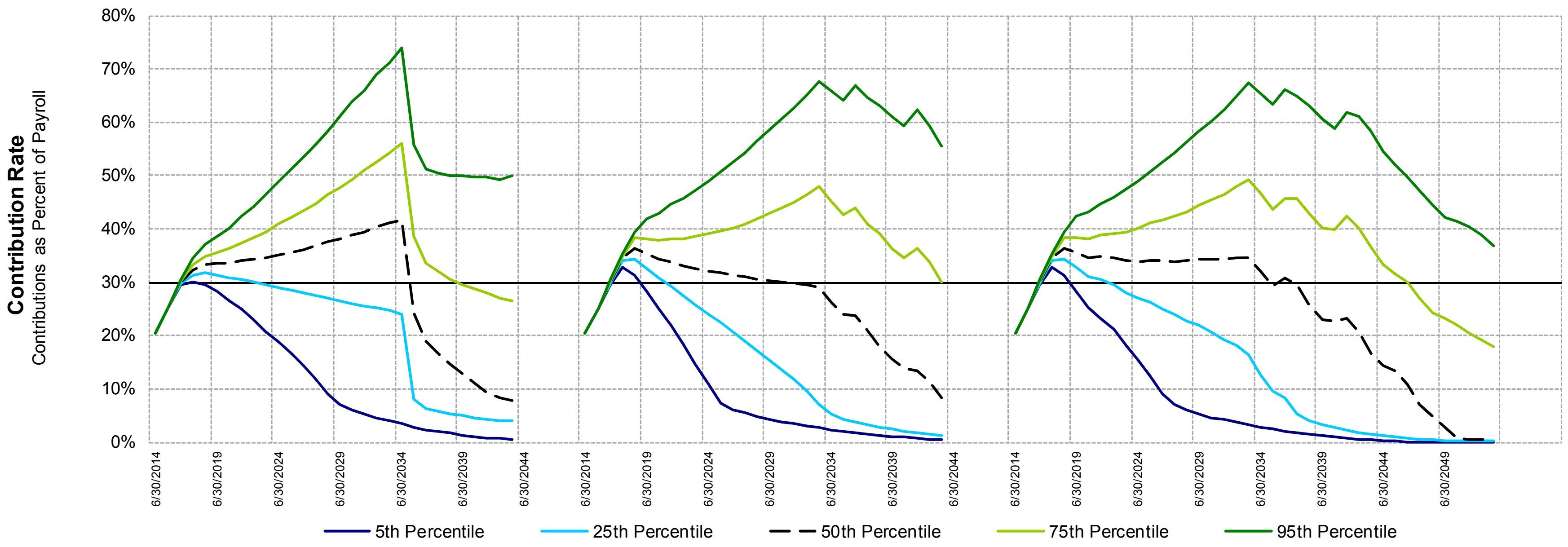


Strategy	Open Plan, Current Portfolio, Static EROA			Closed Plan, Current Portfolio, Static EROA			Closed Plan, Dynamic Portfolio, Dynamic EROA		
Year	**6/30/2024**	**6/30/2034**	**6/30/2044**	**6/30/2024**	**6/30/2034**	**6/30/2044**	**6/30/2024**	**6/30/2034**	**6/30/2044**
5th Percentile	46%	55%	51%	49%	56%	64%	49%	57%	66%
25th Percentile	57%	71%	73%	59%	69%	79%	59%	69%	78%
50th Percentile	66%	87%	**99%**	68%	82%	**95%**	66%	79%	**90%**
75th Percentile	76%	109%	155%	77%	100%	145%	74%	93%	126%
95th Percentile	93%	167%	419%	93%	163%	442%	89%	148%	454%
Probability > 100%	**<5%**	**35%**	**50%**	**<5%**	**25%**	**48%**	**<5%**	**22%**	**43%**

Key Takeaways:

- Plan closure slightly reduces funded status volatility at the end of the projection horizon
- Lower future expectations for asset return slows funded ratio progress

Employer Contribution Rate

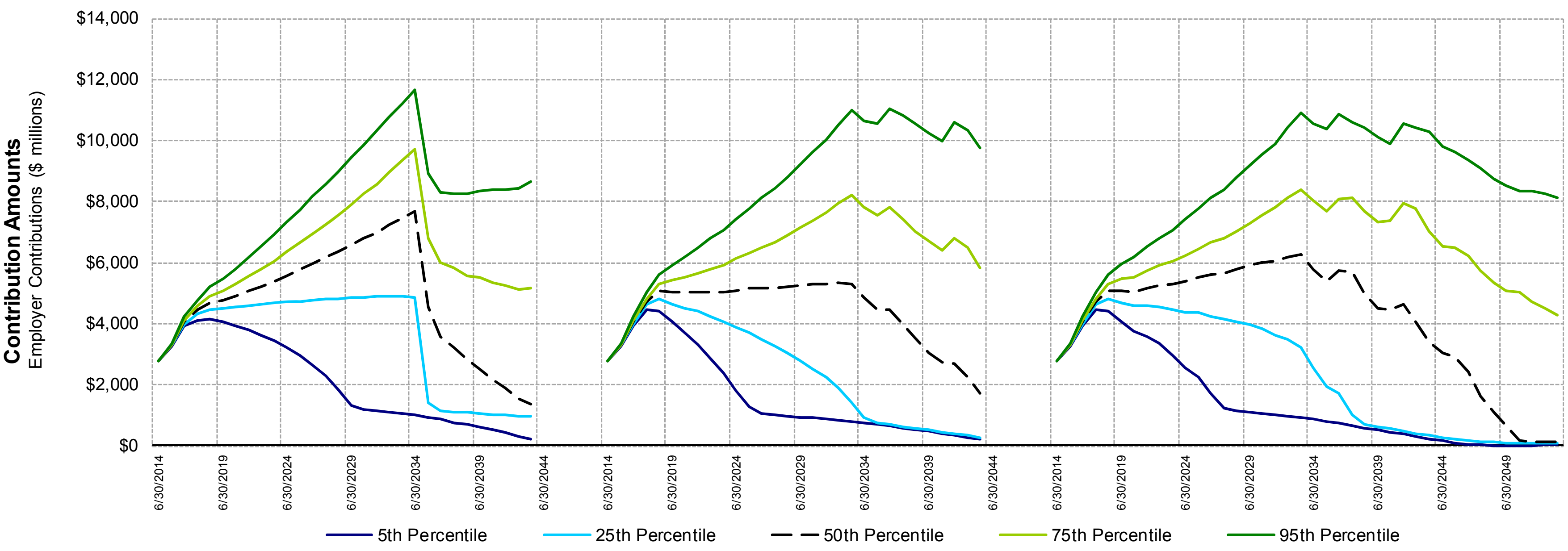


Strategy	Open Plan, Current Portfolio, Static EROA			Closed Plan, Current Portfolio, Static EROA			Closed Plan, Dynamic Portfolio, Dynamic EROA		
Year	**6/30/2023**	**6/30/2033**	**6/30/2043**	**6/30/2023**	**6/30/2033**	**6/30/2043**	**6/30/2023**	**6/30/2033**	**6/30/2043**
5th Percentile	21%	4%	0%	15%	3%	0%	18%	3%	0%
25th Percentile	29%	25%	4%	26%	7%	1%	28%	16%	1%
50th Percentile	35%	41%	**8%**	32%	29%	**8%**	34%	35%	**17%**
75th Percentile	39%	54%	26%	39%	48%	30%	39%	49%	37%
95th Percentile	46%	71%	50%	47%	68%	56%	47%	67%	58%
Probability > 30%	**72%**	**67%**	**22%**	**59%**	**49%**	**25%**	**67%**	**56%**	**33%**

Key Takeaways:

- Act 120 contribution collar drives contribution rate in early years
- In the ongoing plan scenario, the contribution rate will level out at around 40% before dropping in 2036 due to full recognition of the initial Act 120 amortization amount; the contribution rate drops to around 30% by 2033 and further thereafter
- Average future working lifetime amortization floor drives volatility in the plan closure scenario

Employer Contribution Dollars

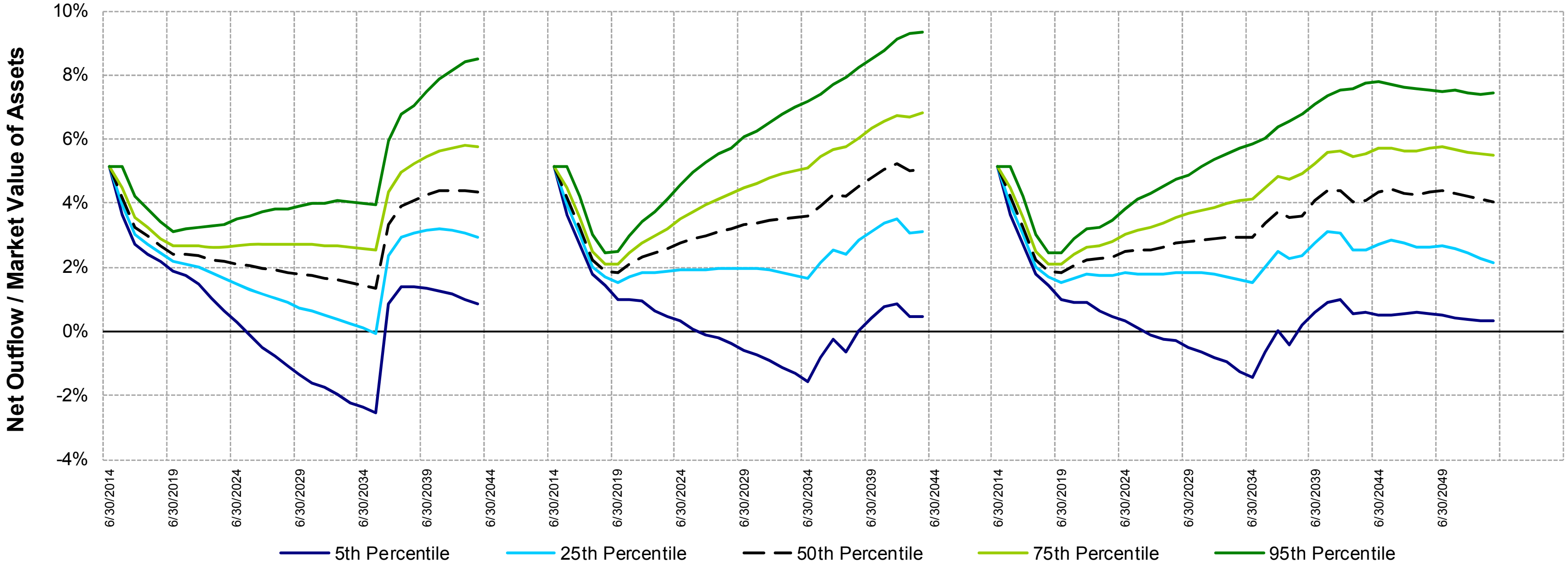


Strategy	Open Plan, Current Portfolio, Static EROA			Closed Plan, Current Portfolio, Static EROA			Closed Plan, Dynamic Portfolio, Dynamic EROA		
Year	**6/30/2023**	**6/30/2033**	**6/30/2043**	**6/30/2023**	**6/30/2033**	**6/30/2043**	**6/30/2023**	**6/30/2033**	**6/30/2043**
5th Percentile	$3,427	$1,071	$232	$2,391	$788	$226	$2,955	$926	$238
25th Percentile	$4,673	$4,914	$956	$4,069	$1,391	$285	$4,441	$3,221	$347
50th Percentile	$5,387	$7,449	**$1,361**	$5,048	$5,321	**$1,715**	$5,284	$6,288	**$3,422**
75th Percentile	$6,054	$9,344	$5,159	$5,929	$8,231	$5,834	$6,029	$8,392	$7,007
95th Percentile	$6,915	$11,234	$8,678	$7,061	$11,002	$9,776	$7,073	$10,901	$10,282

Key Takeaways:

- Act 120 contribution collar drives contribution amounts in early years
- In the expected case, contribution amounts approach $8B before dropping in 2036 due to full recognition of the initial Act 120 amortization amount

Net Outflow Analysis

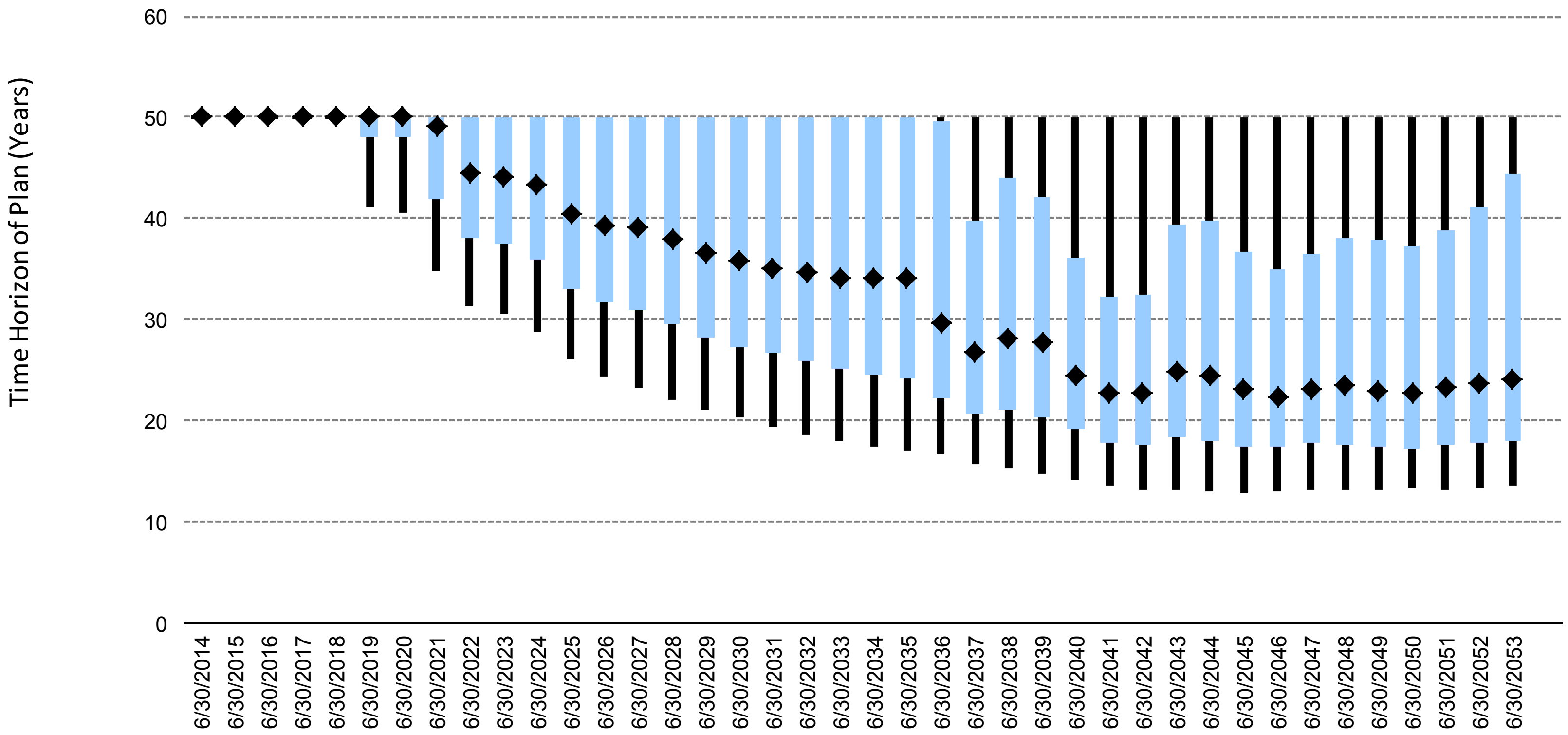


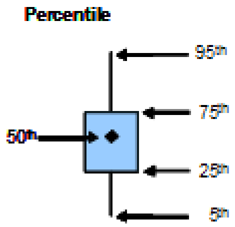
Strategy	Open Plan, Current Portfolio, Static EROA			Closed Plan, Current Portfolio, Static EROA			Closed Plan, Dynamic Portfolio, Dynamic EROA		
Year	**6/30/2023**	**6/30/2033**	**6/30/2043**	**6/30/2023**	**6/30/2033**	**6/30/2043**	**6/30/2023**	**6/30/2033**	**6/30/2043**
5th Percentile	1%	-2%	1%	0%	-1%	0%	0%	-1%	1%
25th Percentile	2%	0%	3%	2%	2%	3%	2%	2%	3%
50th Percentile	2%	2%	**4%**	3%	4%	**5%**	2%	3%	**4%**
75th Percentile	3%	3%	6%	3%	5%	7%	3%	4%	6%
95th Percentile	3%	4%	9%	4%	7%	9%	3%	6%	8%
Probability > 0%	**>95%**	**77%**	**>95%**	**>95%**	**86%**	**>95%**	**>95%**	**86%**	**>95%**

Key Takeaways:

- Large net outflows result from Act 120 imposed limits on funding, increasing the need for liquidity in early years
- If PSERS funds the actuarial required contribution, net outflow will be less than 4% per year for the next 25 years

Closed Plan Expected Plan Maturity

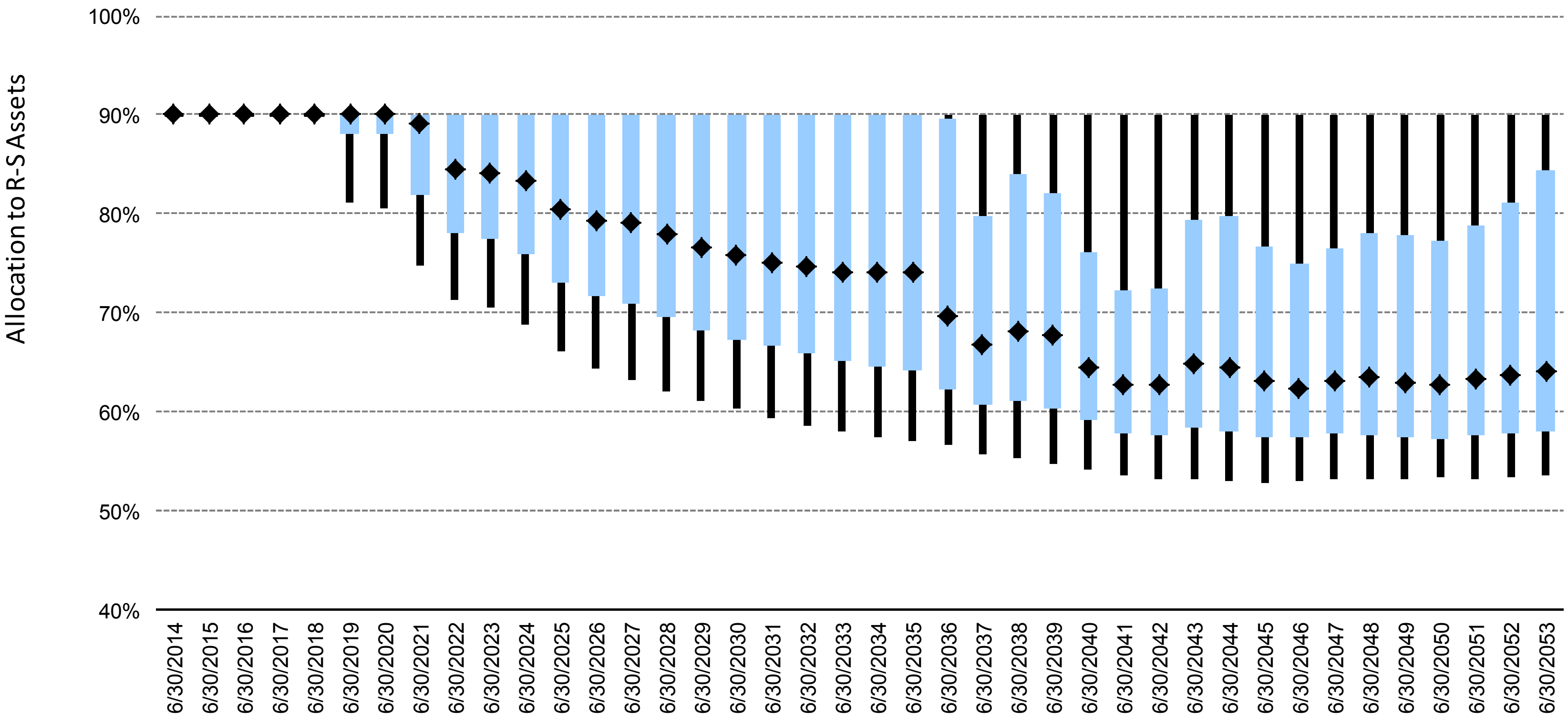


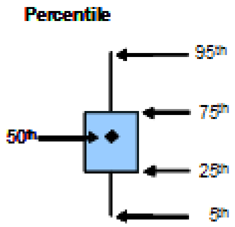


Key Takeaways:

- Projection shows the inverse of the liquidity ratio as a metric for plan maturity
- Closed plan shows decreased plan maturity over projection period

Closed Plan Dynamic Allocation to Return-Seeking Assets

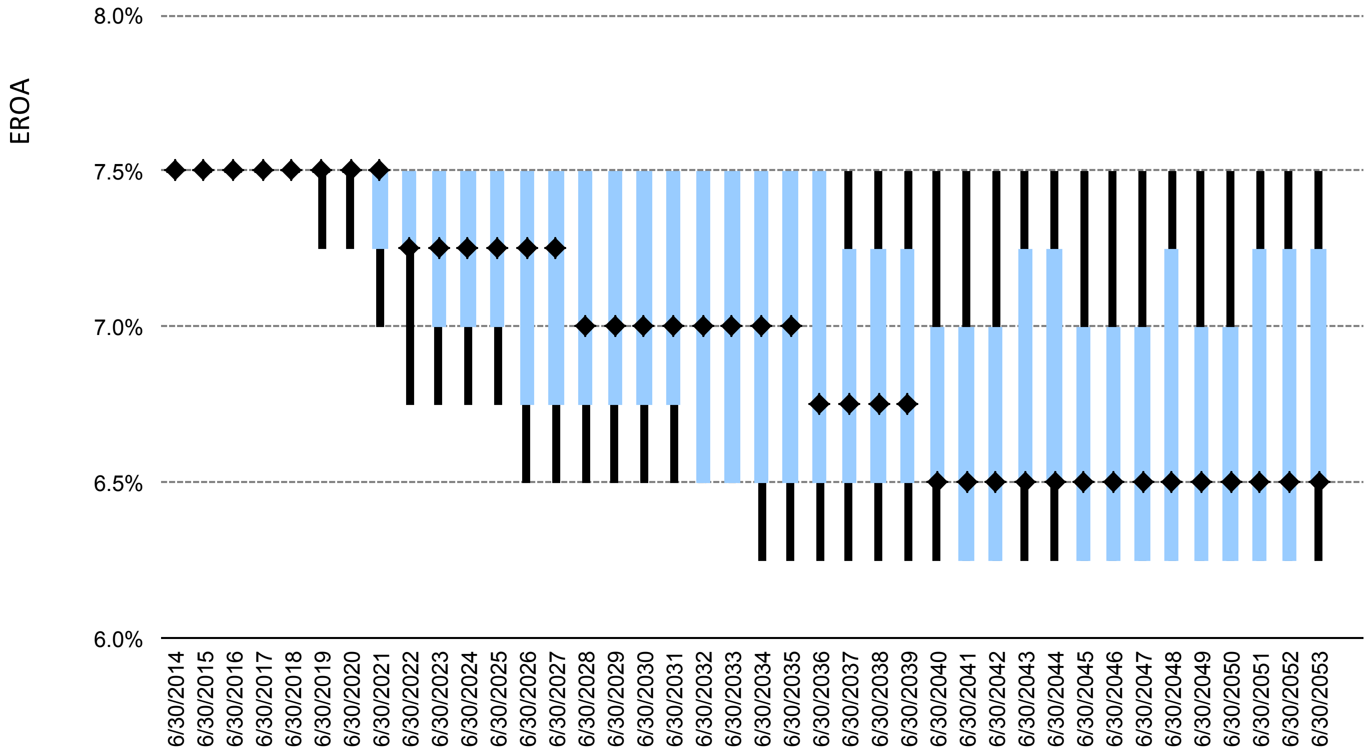




Key Takeaways:

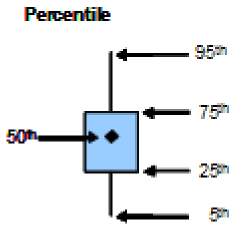
- As the plan matures, allocate more assets to liability-hedging assets

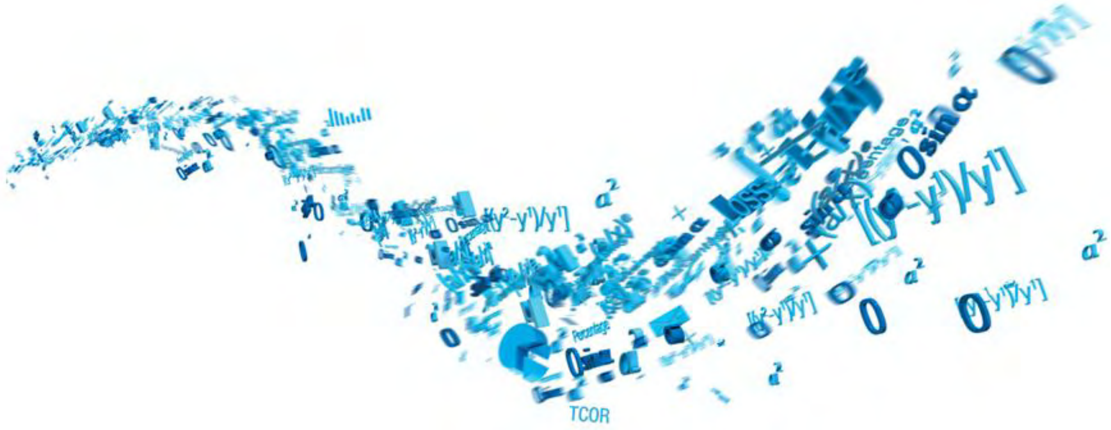
Closed Plan Dynamic Expected Return on Assets



Key Takeaways:

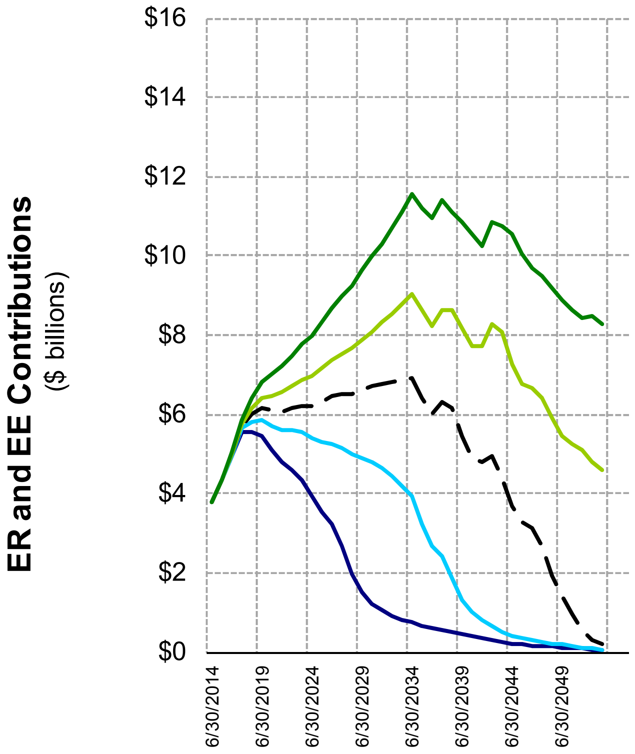
- The more mature the plan and the lower the risky asset allocation, the lower the long term asset return assumption
- EROA expected to decline about 25 basis points in 10 years and around 100 basis points in 25 years





Appendix:
Components of Liquidity Ratio

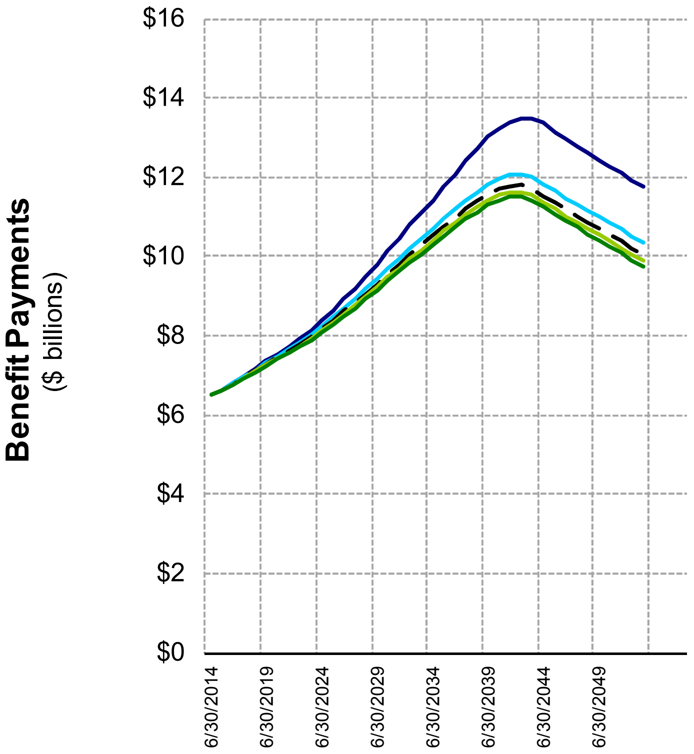
Inflow – Total Contributions



Key Takeaways:

- Employer and employee contributions are expected to quickly taper for last half of projection horizon

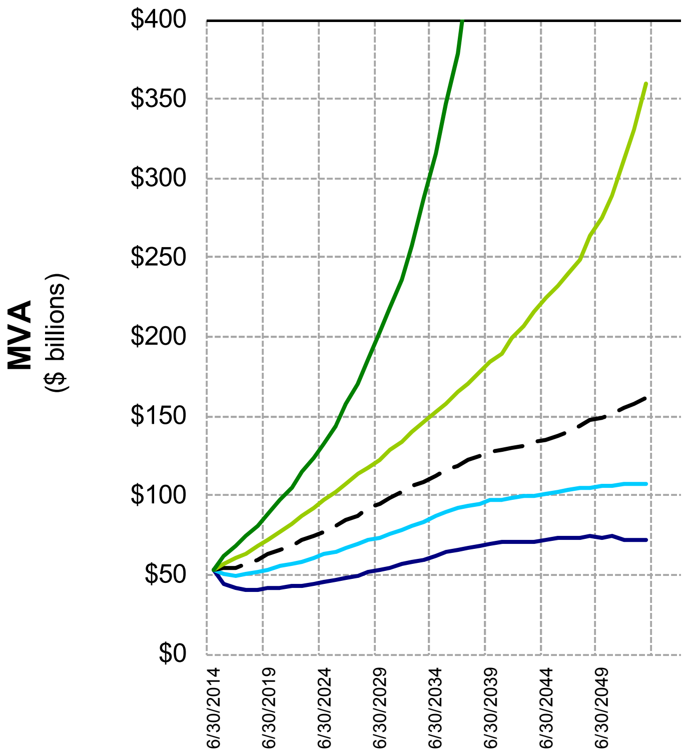
Outflow – Benefit Payments



Key Takeaways:

- Benefit payments are expected to peak at about $12B and taper off towards $10B over 40 year horizon

Denominator – Market Value of Assets



Key Takeaways:

- Market value of assets expected to reach about $150B in the median case over 40 year projection horizon

Appendix:
Q1 2015 AHIC Capital Market Assumption Detail

Q1 2015 AHIC 10-year Capital Market Assumptions

- AHIC's 10-year capital market assumptions for the total remaining universe of asset classes

	Real	Nominal	Volatility	Sharpe
Universe	Return	Return	(10y)	Ratio
Large Cap U.S. Equity	4.3%	6.5%	17.0%	0.28
Small Cap U.S. Equity	4.5%	6.7%	23.0%	0.21
International Equity	4.9%	7.1%	20.0%	0.27
Emerging Markets Equity	5.9%	8.1%	30.0%	0.21
Long Duration Bonds – Credit	1.9%	4.0%	11.5%	0.19
Long Duration Bonds – Gov't	0.9%	3.0%	8.5%	0.14
Bank Loans	1.6%	3.7%	7.0%	0.27
Non-US Developed Bond (0% Hedged)	-0.6%	1.5%	10.0%	(0.03)
Non-US Developed Bond (50% Hedged)	-0.1%	2.0%	5.5%	0.04
Core Real Estate	3.7%	5.9%	11.5%	0.36
REITs	3.9%	6.1%	18.5%	0.23
Inflation	0.0%	2.1%	1.0%	0.30
Short Govt Bonds	-0.2%	1.9%	1.0%	0.10
Short Corporate Bonds	0.3%	2.4%	1.5%	0.40
Intermediate Govt Bonds	-0.1%	2.0%	2.5%	0.08
Intermediate Corporate Bonds	0.6%	2.7%	3.0%	0.30
15-year Government Bond	0.9%	3.0%	11.0%	0.11
20-year Government Bond	0.8%	2.9%	13.5%	0.08
25-year Government Bond	0.6%	2.7%	15.0%	0.06
30-year Government Bond	0.5%	2.6%	16.0%	0.05
5-year A Corporate Bond	1.0%	3.1%	4.5%	0.29
6-year Government Bond	0.1%	2.2%	3.5%	0.11
7-year A Corporate Bond	1.4%	3.5%	6.5%	0.26
Corporate Emerging Market Bonds	2.4%	4.6%	11.0%	0.25
Hedge Funds Universe	2.6%	4.8%	9.0%	0.33

Q1 2015 AHIC 30-year Capital Market Assumptions

- AHIC’s 30-year capital market assumptions for the total remaining universe of asset classes

Universe	Real Return	Nominal Return	Volatility (30y)	Sharpe Ratio
Large Cap U.S. Equity	4.3%	6.5%	17.0%	0.24
Small Cap U.S. Equity	4.8%	7.0%	23.5%	0.20
International Equity	4.8%	7.0%	20.0%	0.23
Emerging Markets Equity	6.0%	8.2%	30.0%	0.19
Long Duration Bonds – Credit	2.1%	4.2%	14.0%	0.13
Long Duration Bonds – Gov’t	1.1%	3.2%	12.5%	0.06
Bank Loans	1.6%	3.7%	7.5%	0.17
Non-US Developed Bond (0% Hedged)	0.7%	2.8%	11.0%	0.04
Non-US Developed Bond (50% Hedged)	0.8%	2.9%	6.5%	0.08
Core Real Estate	3.7%	5.9%	11.5%	0.30
REITs	4.0%	6.2%	19.0%	0.20
Inflation	0.0%	2.1%	1.5%	(0.20)
Short Govt Bonds	0.4%	2.5%	2.0%	0.05
Short Corporate Bonds	1.0%	3.1%	2.5%	0.28
Intermediate Govt Bonds	0.5%	2.6%	3.5%	0.06
Intermediate Corporate Bonds	1.4%	3.5%	4.5%	0.24
15-year Government Bond	1.1%	3.2%	15.0%	0.05
20-year Government Bond	1.0%	3.1%	18.0%	0.04
25-year Government Bond	0.9%	3.0%	20.0%	0.03
30-year Government Bond	0.7%	2.8%	21.0%	0.02
5-year A Corporate Bond	1.7%	3.8%	6.0%	0.23
6-year Government Bond	0.7%	2.8%	5.5%	0.07
7-year A Corporate Bond	2.0%	4.1%	8.5%	0.20
Corporate Emerging Market Bonds	3.0%	5.2%	11.5%	0.24
Local Emerging Market Bonds	4.1%	6.3%	14.5%	0.27
Hedge Funds Universe	3.0%	5.2%	10.0%	0.28

Actuarial Cost Note Regarding H.B. 727, P.N.1555
June 4, 2015

House Bill No. 727 (P.N. 1555), (hereafter HB 727), if enacted, would result in significant changes, effective January 1, 2016, to the provisions of both of Pennsylvania's statewide retirement systems. Although HB 727 proposes nearly identical changes to both systems, this note addresses only the changes applicable to the Pennsylvania State Employees' Retirement System (SERS).

Summary

HB 727 proposes significant changes effective January 1, 2016, as follows:

- A new SERS Defined Contribution (DC) plan will be implemented and will replace the current SERS Defined Benefit (DB) system for those hired after December 31, 2015, with limited exceptions (as identified below).

- All new hires who are state police officers (or "Sworn Police Officers" entitled to the DiLauro award) will continue to be covered by the SERS DB system. That is, benefits for this group will continue as-is; they will not be impacted by HB 727.

- A "footprint rule" will be established, exempting anyone who was a member of the DB system prior to January 1, 2016 from participation in the DC plan.

Hay Group has performed projections to estimate the cost impact if HB 727 were enacted, based upon actuarial assumptions and methods that differ somewhat from those utilized for the most recent (December 31, 2014) annual actuarial valuation. The current actuarial valuation assumptions and methods are based upon SERS being an "open DB system" whereas HB 727 proposes that SERS become a "substantially closed DB system," effective January 1, 2016. It is Hay Group's opinion that the closure of the SERS DB system to most new hires will eventually result in lower future annual investment returns (than the currently assumed 7.50%) and shorter required amortization periods (than the current 30 years) for funding future actuarial gains/losses.

We project that HB 727, if enacted, would initially result in annual savings in employer costs. However, beginning around 2026, due to the less favorable annual investment returns expected to be earned by the SERS fund and the shorter amortization periods expected to be used for funding actuarial gains/losses, we project that HB 727 will cease to be a source of annual savings in employer costs, but rather, will begin to generate higher annual costs, and ultimately higher cumulative costs, relative to our projected costs for SERS as-is (the "baseline" costs).

Bottom line, Hay Group expects, based upon our projection through the end of fiscal 2052, the ultimate financial outcome of HB 727 will be to create additional cost, of over $3.8 billion (as described later in this cost note), when compared to the current plan.

New Defined Contribution Plan

Under HB 727, all State employees, other than state police officers, who begin State service on or after January 1, 2016, would not be eligible to join the current SERS DB system, but rather, would become participants in a new SERS DC plan. The bill calls for contributions to be made to the new SERS DC plan as follows:

- By participants at a mandatory rate of 6.5% of compensation,

- By employers of those who join upon hire at a rate of:
  - 4% of compensation, with limited exceptions (as described below), or
  - 5.5% of compensation for hazardous duty employees, excluding state police officers (who are not eligible).
- Voluntary contributions are permitted, but only through eligible rollovers or direct trustee-to-trustee transfers.
- DB system members may not elect participation in the plan.

Employee contributions would vest immediately; employer contributions would be 100% vested after 3 years of employment (and 33% after 1 year and 66% after 2 years).

HB 727 Financing Provisions

In accordance with the provisions of HB 727, any change, as of December 31, 2015, in the unfunded accrued liability that results from the changes proposed under HB 727 is to be amortized over 30 years using a level dollar amortization method.

Also, due to the SERS DB system becoming "substantially closed" by HB 727 and the resulting decline that will occur in the DB payroll, HB 727 calls for a second change related to future financing of SERS. Namely, it proposes, effective January 1, 2016, that the contribution rate toward amortization of the unfunded liability of the SERS DB system be applied to the total DB plus DC payroll.

Cost Impact of HB 727

As requested, we have performed cost projections to approximate (i) the impact on the future funding of the SERS DB system and (ii) the future (January 1, 2016 and after) employer costs required to fund the new SERS DC plan, should HB 727 become law.

DB System Under HB 727: To assess the impact of HB 727 on the future funding of the SERS DB system, Hay Group has used the results of our December 31, 2014 actuarial valuation (based upon the census and asset data, the actuarial assumptions and methods and the SERS DB benefit provisions as of December 31, 2014) and anticipated that, effective January 1, 2016, (i) the SERS DB system will be substantially closed to new entrants, with only new state police officers still becoming members of the system upon hire (as described above) and (ii) the proposed changes to SERS financing (as described above) will be implemented.

- With respect to future SERS DB asset fund investments, it should be noted that, under a substantially closed DB system, as proposed under HB 727, the expected future liquidity requirements for this group will most likely result in gradual limitations in fund investment opportunities and a shifting to an increasingly conservative (lower risk) investment portfolio. In time, therefore, lower future annual investment returns (than the currently assumed 7.5%) can be expected.

  Although the Hay Group actuaries who have authored this note are not investment consultants, we have consulted (regarding this issue of the impact of closure or near-closure of the very mature SERS DB system on investment of the SERS fund) with the SERS investment consultants to discuss the approach and the kind of advice that the investment consultants provide to their clients who have similar closed DB plans. Based upon our discussions, there is agreement that at some point after closing a DB plan, there would be a move to lower risk investments and that lower investment returns would likely result. Hay Group's specific timing and extent of implementing lower assumed returns (namely, a reduction in assumed annual returns from the current 7.5% assumption to an eventual 6.3% assumption over the 30 years that follow January 1, 2016, and use of 0.4% downward movements every 10 years), as described more fully on the next page of this note, is strictly an approximation based upon our broad professional actuarial judgment.

- Similarly, in recognition of the closed group that would be covered by the SERS DB system if HB 727 were to become law and the gradual change that would occur over future years from funding initially for a mixed active and retired population to funding eventually for a predominantly retired population, Hay Group believes that the current DB system experience gain/loss amortization period of 30 years will become excessive. Therefore, we believe it is appropriate, for purposes of these projections, to gradually shorten the gain/loss amortization period (from the 30 years currently used), ultimately to a period of only 15 years.

- Given the comments made in the preceding two bullets regarding actuarial assumptions and methods that are appropriate under a substantially closed DB system, Hay Group has performed our HB 727 cost projections based upon actuarial assumptions and methods that differ somewhat from those utilized by Hay Group in our December 31, 2014 "open DB system" actuarial valuation, as described more fully below.

DC Plan Under HB 727: To assess the future (January 1, 2016 and after) employer costs required to fund the new SERS DC plan should HB 727 become law, Hay Group has (i) projected the covered payroll (for the population that would otherwise have been covered by the SERS DB system, absent the new DC plan) beginning January 1, 2016 and (ii) projected the total annual employer costs that will apply beginning January 1, 2016. These costs were based upon HB 727's proposed DC employer contribution rates of 5.5% and 4.0% for hazardous duty employees (other than state police officers) and all other employees, respectively.

Projection Attached to This Cost Note

We have attached to this note a schedule that presents the results of our funding projections, based upon somewhat different actuarial assumptions and methods than those used for our December 31, 2014 actuarial valuation of SERS, currently an open DB system. In Hay Group's professional actuarial judgment/opinion, these different actuarial assumptions and methods, as described in detail below, are appropriate for projecting future costs for a substantially closed DB system such as that proposed under HB 727.

The attached schedule presents the results of our projection of total future employer costs under HB 727 vs. total future employer costs based upon continuation of the current SERS DB system (i.e., the baseline costs). Although the baseline cost projections were based upon Hay Group's December 31, 2014 actuarial valuation assumptions and methods remaining in effect for the full projection period, in recognition of the substantially closed SERS DB system (as discussed on the preceding page), the HB 727 cost projections assume that future annual investment returns will decline (from the current 7.5%) and that future gain/loss amortization periods will be shortened (from the current 30 years), as follows:

- For valuations from December 31, 2014 through December 31, 2024, the assumed return will remain 7.50% per year (consistent with the current valuation assumption) and the gain/loss amortization period will remain 30 years (as currently applies);

- Effective with the December 31, 2025 valuation (10 years after the closure of the SERS DB system), the assumed return is reduced by 0.4%, from 7.5% to 7.1%, and the gain/loss amortization period is shortened by 5 years, from 30 years to 25 years;

- Effective with the December 31, 2035 valuation (20 years after the closure of the SERS DB system), the assumed return is reduced by another 0.4%, from 7.1% to 6.7%, and the gain/loss amortization period is shortened by another 5 years, from 25 years to 20 years;

- Effective with the December 31, 2045 valuation (30 years after the closure of the SERS DB system), the assumed return is reduced by another 0.4%, from 6.7% to 6.3%, and the gain/loss amortization period is shortened by another 5 years, from 20 years to 15 years.

Our attached funding projection schedule presents the results of our 40-year projections of future (i) SERS DB system funding (the first set of three shaded columns), (ii) SERS DC plan funding (the two unshaded columns in between the two sets of shaded columns) and (iii) DB plus DC funding expressed in dollars and as a percentage of the combined DB plus DC payrolls (the second set of two shaded columns), including a year-by-year cumulative cost comparison of the sum of (i) and (ii) relative to the baseline (our current law projection of SERS DB-Only funding results).

Projection Results

All columns of our attached cost spreadsheet, except the last two columns on the right side, present our HB 727 employer cost projection results. The last two columns present our projected employer costs (both as a percent of payroll and in dollars) under current law (i.e., the baseline projected costs).

The "Annual (Savings)/Cost Relative to Baseline" column of our attached cost projection shows the excess (shortfall) of the projected HB 727 annual employer cost (per the "Total DB + DC Contribution" column) versus the baseline annual cost (per the "Baseline $" column). The "Cumulative (Savings)/Cost Relative to Baseline" column of our attached cost projection shows the cumulative sum of the annual (savings)/cost relative to the baseline.

As can be seen from the negative amounts in the "Annual (Savings)/Cost Relative to Baseline" column, we project that HB 727 would immediately result in lower-than-baseline annual employer costs (savings) and such annual savings would continue through fiscal 2026. Based upon the largest negative amount in the "Cumulative (Savings)/Cost Relative to Baseline" column being $0.2419 billion at the end of fiscal 2026, this is the point in time when the projected financial outcome of HB 727 (a cumulative savings of $0.2419 billion) is most favorable relative to the baseline.

However, beginning around 2026, due to less favorable annual investment returns (than the currently assumed 7.50%) expected to be earned by the SERS fund and shorter amortization periods (than the current 30 years) expected to be used for funding actuarial gains/losses, we project that HB 727 will cease to be a source of annual savings in employer costs, but rather, will begin to generate higher annual costs, and ultimately higher cumulative costs, relative to our projected baseline costs. Therefore, looking beyond 2026, our "Cumulative (Savings)/Cost Relative to Baseline" column shows the following:

- Cumulative cost relative to baseline of approximately:
  - $0.18 billion fifteen years from now (at the end of fiscal 2030);
  - $1.33 billion twenty-five years from now (at the end of fiscal 2040);
  - $3.50 billion thirty-five years from now (at the end of fiscal 2050);
  - $3.84 billion thirty-seven years from now (at the end of fiscal 2052, which is the end of Hay Group's projection period).

To provide additional relevant information regarding the long-term cumulative (savings)/cost impact of HB 727, we are also attaching to this note a Summary Table, which presents a breakdown of the cumulative (savings)/cost through the end of our projection period. This breakdown identifies the key components of the (savings)/cost under HB 727 and the approximate amount of (savings)/cost associated with each.

Notes

Please note the following regarding our handling of the attached funding projections:

1. These projections are based upon the expectation that (i) for all years after 2014, the actual economic and demographic experience of SERS will be consistent with the underlying actuarial valuation assumptions, except as noted above relative to the future assumed investment returns after the year 2025, and (ii) all future DB employer contribution amounts will, in fact, be contributed as scheduled.

2. Hay Group's past convention of showing results for employer cost projections such as these as percentages of payroll to two decimal places is somewhat misleading. This level of precision is not possible for estimates of this nature.

Actuarial Certification

To the best of our knowledge, the information we are presenting herein is complete and accurate and all costs and liabilities have been determined in conformance with generally accepted actuarial principles and on the basis of actuarial assumptions and methods which are reasonable (taking into account the past experience of SERS and reasonable expectations) and which represent our best estimate of anticipated experience under the plan.

The actuaries certifying to this valuation are members of the Society of Actuaries or other professional actuarial organizations, and meet the General Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.

Please let us know if you have any questions on any of this.

Respectfully submitted,
Hay Group, Inc.

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Brent M. Mowery, F.S.A.
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June 4, 2015

5/20/2015

SERS Projected Employer Contributions
(Based Upon Final December 31, 2014 Valuation)

					BASELINE PROJECTION - Current Entry Age Funding Method; Level Dollar Amortization; 5-Year Smoothing of Assets; 4.50% FY 15 Collar; 4.50% FY 16 Collar; 4.50% FY 17 Collar; 4.50% FY 18 Collar; 4.50% FY 19 Collar; 4.50% FY 20 Collar; 4.50% FY 21+ Collar; No Asset Fresh Start; Act 120 Benefit Provisions; 7.50% Liability Interest Rate Assumption; No Liability Fresh Start							
Year	Investment Return	Fiscal Year	Ceiling Contribution	Floor Contribution	Projected Percent Contribution	Expected FY Payroll ($ in millions)	Expected FY Contribution ($ in millions)	(Savings) / Cost Relative to Current Law Contribution	GASB Compliant (Fiscal Year Contribution)	Funded Ratio (AV%)	UAL ($ in billions)	Funded Ratio (MV%)
2008	approx -30%	2009/2010	NA	4.00%	4.00	5,660.3	226.4	-	N	89.0	3.80	66.2
2009	approx 9%	2010/2011	NA	4.00%	5.00	5,936.0	296.8	-	N	84.4	5.59	68.9
2010	approx 12%	2011/2012	NA	4.08%	8.00	5,851.7	468.1	-	N	75.2	9.76	66.1
2011	2.70%	2012/2013	NA	5.10%	11.50	5,890.7	677.4	-	N	65.3	14.69	57.6
2012	12.00%	2013/2014	NA	5.01%	16.00	5,836.4	933.8	-	N	58.8	17.78	59.0
2013	13.60%	2014/2015	NA	5.00%	20.50	5,897.6	1,209.0	-	N	59.2	17.90	62.4
2014	6.40%	2015/2016	NA	4.95%	25.00	6,021.7	1,505.4	-	Y	59.4	18.17	61.1
2015	7.50%	2016/2017	NA	4.95%	29.50	6,205.3	1,830.6	-	Y	59.7	18.42	61.3
2016	7.50%	2017/2018	NA	4.95%	30.41	6,394.6	1,944.5	-	Y	61.4	18.01	62.0
2017	7.50%	2018/2019	NA	4.95%	29.40	6,589.6	1,937.1	-	Y	63.2	17.53	63.1
2018	7.50%	2019/2020	NA	4.95%	28.82	6,790.6	1,957.0	-	Y	64.2	17.35	64.3
2019	7.50%	2020/2021	NA	4.95%	28.15	6,997.7	1,970.0	-	Y	65.4	17.07	65.5
2020	7.50%	2021/2022	NA	4.95%	27.52	7,211.2	1,984.4	-	Y	66.6	16.77	66.6
2021	7.50%	2022/2023	NA	4.95%	26.92	7,431.1	2,000.2	-	Y	67.8	16.45	67.8
2022	7.50%	2023/2024	NA	4.95%	26.34	7,657.8	2,016.9	-	Y	68.9	16.12	68.9
2023	7.50%	2024/2025	NA	4.95%	25.78	7,891.3	2,034.0	-	Y	70.0	15.76	70.0
2024	7.50%	2025/2026	NA	4.95%	25.23	8,132.0	2,051.7	-	Y	71.2	15.37	71.2
2025	7.50%	2026/2027	NA	4.95%	24.70	8,380.0	2,070.0	-	Y	72.3	14.94	72.3
2026	7.50%	2027/2028	NA	4.95%	24.19	8,635.6	2,089.0	-	Y	73.5	14.48	73.5
2027	7.50%	2028/2029	NA	4.95%	23.69	8,899.0	2,108.5	-	Y	74.8	13.98	74.8
2028	7.50%	2029/2030	NA	4.95%	23.21	9,170.4	2,128.6	-	Y	76.0	13.44	76.0
2029	7.50%	2030/2031	NA	4.95%	22.74	9,450.1	2,149.3	-	Y	77.3	12.85	77.3
2030	7.50%	2031/2032	NA	4.95%	22.29	9,738.4	2,170.7	-	Y	78.7	12.22	78.7
2031	7.50%	2032/2033	NA	4.95%	21.85	10,035.4	2,192.8	-	Y	80.1	11.54	80.1
2032	7.50%	2033/2034	NA	4.95%	21.42	10,341.5	2,215.6	-	Y	81.6	10.79	81.6
2033	7.50%	2034/2035	NA	4.95%	21.01	10,656.9	2,239.0	-	Y	83.1	9.99	83.1
2034	7.50%	2035/2036	NA	4.95%	20.61	10,981.9	2,263.2	-	Y	84.7	9.13	84.7
2035	7.50%	2036/2037	NA	4.95%	20.22	11,316.9	2,288.2	-	Y	86.4	8.19	86.4
2036	7.50%	2037/2038	NA	4.95%	19.84	11,662.0	2,314.0	-	Y	88.2	7.18	88.2
2037	7.50%	2038/2039	NA	4.95%	19.48	12,017.7	2,340.5	-	Y	90.1	6.09	90.1
2038	7.50%	2039/2040	NA	4.95%	19.12	12,384.3	2,367.9	-	Y	92.1	4.91	92.1
2039	7.50%	2040/2041	NA	4.95%	15.06	12,762.0	1,921.8	-	Y	94.2	3.63	94.2
2040	7.50%	2041/2042	NA	4.95%	12.13	13,151.2	1,595.7	-	Y	95.7	2.73	95.7
2041	7.50%	2042/2043	NA	4.95%	8.86	13,552.3	1,200.8	-	Y	96.7	2.11	96.7
2042	7.50%	2043/2044	NA	4.95%	6.85	13,965.7	957.1	-	Y	97.2	1.87	97.2
2043	7.50%	2044/2045	NA	4.95%	6.67	14,391.6	959.9	-	Y	97.2	1.87	97.2
2044	7.50%	2045/2046	NA	4.95%	6.42	14,830.6	952.1	-	Y	97.2	1.89	97.2
2045	7.50%	2046/2047	NA	4.95%	6.18	15,282.9	944.6	-	Y	97.1	1.95	97.1
2046	7.50%	2047/2048	NA	4.95%	6.30	15,749.0	992.4	-	Y	97.0	2.06	97.0
2047	7.50%	2048/2049	NA	4.95%	6.44	16,229.4	1,045.5	-	Y	96.9	2.14	96.9
2048	7.50%	2049/2050	NA	4.95%	6.42	16,724.4	1,072.9	-	Y	96.8	2.21	96.8
2049	7.50%	2050/2051	NA	4.95%	6.43	17,234.5	1,108.6	-	Y	96.8	2.29	96.8
2050	7.50%	2051/2052	NA	4.95%	6.44	17,760.1	1,144.4	-	Y	96.7	2.37	96.7

6/4/2015

SERS Projected Employer Contributions
(Based Upon Final December 31, 2014 Valuation)

				House Bill 727 = Legacy DB Plan, State Police Grandfathered in Act 120 Benefit Structure Including the DiLauro Award; New DC Plan for Non State Police New Hires; No Fresh Start; Changes Effective January 1, 2016												Baseline	
Year	Investment Return	Fiscal Year	Floor Contribution	Projected DB Percent Contribution	Expected DB Plan FY Payroll ($ in millions)	Expected FY DB Contribution ($ in millions)	Expected DC Plan FY Payroll ($ in millions)	Expected FY DC Contribution ($ in millions)	Total DB+DC Contribution ($ in millions)	Total DB+DC Contribution as a % of DB+DC Pay	Annual (Savings) / Cost Relative to Baseline	Cumulative (Savings) / Cost Relative to Baseline	Funded Ratio (AV%)	UAL ($ in billions)	Funded Ratio (MV%)	Baseline Percent	Baseline $ ($ in millions)
2011	2.70%	2012/2013	5.10%	11.50	5,890.7	677.4	-	-	677.4	11.50	-	-	65.3	14.69	57.6	11.50	677.4
2012	12.00%	2013/2014	4.95%	16.00	5,836.4	933.8	-	-	933.8	16.00	-	-	58.7	17.78	58.9	16.00	933.8
2013	13.60%	2014/2015	5.00%	20.50	5,897.6	1,209.0	-	-	1,209.0	20.50	-	-	59.2	17.90	62.4	20.50	1,209.0
2014	6.40%	2015/2016	4.95%	25.00	5,903.0	1,499.5	118.7	4.9	1,504.4	24.98	(1.0)	(1.0)	59.4	18.17	61.1	25.00	1,505.4
2015	7.50%	2016/2017	4.95%	29.50	5,843.9	1,812.7	361.4	14.9	1,827.6	29.45	(3.0)	(4.1)	59.7	18.42	61.3	29.50	1,830.6
2016	7.50%	2017/2018	4.95%	30.37	5,781.8	1,911.9	612.8	25.2	1,937.1	30.29	(7.4)	(11.5)	61.5	17.98	62.1	30.41	1,944.5
2017	7.50%	2018/2019	4.95%	29.33	5,714.1	1,889.2	875.5	36.1	1,925.3	29.22	(11.8)	(23.2)	63.2	17.48	63.2	29.40	1,937.1
2018	7.50%	2019/2020	4.95%	28.72	5,643.3	1,893.2	1,147.3	47.4	1,940.6	28.58	(16.4)	(39.6)	64.3	17.27	64.4	28.82	1,957.0
2019	7.50%	2020/2021	4.95%	28.02	5,568.7	1,889.7	1,429.0	59.2	1,948.9	27.85	(21.1)	(60.7)	65.5	16.95	65.6	28.15	1,970.0
2020	7.50%	2021/2022	4.95%	27.35	5,487.0	1,886.9	1,724.2	71.6	1,958.5	27.16	(25.9)	(86.6)	66.7	16.63	66.7	27.52	1,984.4
2021	7.50%	2022/2023	4.95%	26.72	5,397.7	1,884.7	2,033.4	84.6	1,969.3	26.50	(30.9)	(117.5)	67.9	16.28	67.9	26.92	2,000.2
2022	7.50%	2023/2024	4.95%	26.11	5,301.1	1,882.5	2,356.7	98.3	1,980.8	25.87	(36.1)	(153.6)	69.0	15.92	69.0	26.34	2,016.9
2023	7.50%	2024/2025	4.95%	25.51	5,198.2	1,880.1	2,693.1	112.5	1,992.6	25.25	(41.4)	(195.0)	70.1	15.52	70.1	25.78	2,034.0
2024	7.50%	2025/2026	4.95%	24.94	5,090.7	1,877.6	3,041.3	127.3	2,004.9	24.65	(46.8)	(241.9)	71.3	15.10	71.3	25.23	2,051.7
2025	7.10%	2026/2027	5.86%	26.76	4,979.5	2,043.3	3,400.5	142.5	2,185.8	26.08	115.8	(126.0)	69.9	16.53	69.9	24.70	2,070.0
2026	7.10%	2027/2028	5.86%	26.18	4,862.7	2,039.5	3,772.9	158.4	2,197.9	25.45	108.9	(17.1)	71.0	15.99	71.0	24.19	2,089.0
2027	7.10%	2028/2029	5.86%	25.61	4,739.5	2,035.5	4,159.5	174.9	2,210.4	24.84	101.9	84.8	72.3	15.41	72.3	23.69	2,108.5
2028	7.10%	2029/2030	5.86%	25.06	4,610.2	2,031.3	4,560.2	192.1	2,223.4	24.25	94.8	179.6	73.6	14.79	73.6	23.21	2,128.6
2029	7.10%	2030/2031	5.86%	24.53	4,473.7	2,026.7	4,976.4	209.9	2,236.6	23.67	87.3	266.9	75.0	14.11	75.0	22.74	2,149.3
2030	7.10%	2031/2032	5.86%	24.02	4,332.5	2,021.9	5,405.9	228.3	2,250.2	23.11	79.5	346.4	76.4	13.39	76.4	22.29	2,170.7
2031	7.10%	2032/2033	5.86%	23.51	4,189.4	2,017.2	5,846.0	247.3	2,264.5	22.56	71.7	418.1	77.9	12.62	77.9	21.85	2,192.8
2032	7.10%	2033/2034	5.86%	23.03	4,045.1	2,012.4	6,296.4	266.7	2,279.1	22.04	63.5	481.6	79.4	11.78	79.4	21.42	2,215.6
2033	7.10%	2034/2035	5.86%	22.56	3,899.4	2,007.8	6,757.5	286.5	2,294.3	21.53	55.3	536.9	81.0	10.89	81.0	21.01	2,239.0
2034	7.10%	2035/2036	5.86%	22.10	3,751.3	2,003.0	7,230.6	306.9	2,309.9	21.03	46.7	583.6	82.8	9.93	82.8	20.61	2,263.2
2035	6.70%	2036/2037	6.86%	23.80	3,601.0	2,163.7	7,715.9	327.8	2,491.5	22.02	203.3	786.9	82.2	10.55	82.2	20.22	2,288.2
2036	6.70%	2037/2038	6.86%	23.33	3,449.8	2,157.8	8,212.2	349.2	2,507.0	21.50	193.0	979.9	84.2	9.39	84.2	19.84	2,314.0
2037	6.70%	2038/2039	6.86%	22.88	3,299.2	2,152.1	8,718.5	371.0	2,523.1	20.99	182.6	1,162.5	86.3	8.15	86.3	19.48	2,340.5
2038	6.70%	2039/2040	6.86%	22.45	3,150.5	2,146.6	9,233.8	393.1	2,539.7	20.51	171.8	1,334.3	88.5	6.82	88.5	19.12	2,367.9
2039	6.70%	2040/2041	6.86%	18.43	3,003.9	1,682.4	9,758.1	415.7	2,098.1	16.44	176.3	1,510.6	90.9	5.40	90.9	15.06	1,921.8
2040	6.70%	2041/2042	6.86%	15.52	2,860.0	1,334.8	10,291.2	438.6	1,773.4	13.48	177.7	1,688.3	92.7	4.34	92.7	12.13	1,595.7
2041	6.70%	2042/2043	6.86%	12.28	2,720.0	921.6	10,832.3	461.9	1,383.5	10.21	182.7	1,871.1	94.1	3.55	94.1	8.86	1,200.8
2042	6.70%	2043/2044	6.86%	10.27	2,585.1	654.2	11,380.6	485.5	1,139.7	8.16	182.6	2,053.7	94.8	3.11	94.8	6.85	957.1
2043	6.70%	2044/2045	6.86%	10.02	2,457.2	623.0	11,934.4	509.4	1,132.4	7.87	172.5	2,226.2	95.2	2.90	95.2	6.67	959.9
2044	6.70%	2045/2046	6.86%	9.70	2,337.4	581.5	12,493.2	533.5	1,115.0	7.52	162.9	2,389.1	95.6	2.71	95.6	6.42	952.1
2045	6.30%	2046/2047	7.96%	11.25	2,228.4	679.4	13,054.5	557.7	1,237.1	8.09	292.5	2,681.6	94.1	3.67	94.1	6.18	944.6
2046	6.30%	2047/2048	7.96%	11.28	2,133.7	693.0	13,615.3	581.9	1,274.9	8.10	282.5	2,964.1	94.4	3.47	94.4	6.30	992.4
2047	6.30%	2048/2049	7.96%	11.34	2,053.9	712.0	14,175.5	606.1	1,318.1	8.12	272.6	3,236.7	94.8	3.23	94.8	6.44	1,045.5
2048	6.30%	2049/2050	7.96%	11.24	1,987.6	707.0	14,736.8	630.4	1,337.4	8.00	264.5	3,501.2	95.3	2.96	95.3	6.42	1,072.9
2049	6.30%	2050/2051	7.96%	11.19	1,902.4	707.5	15,332.1	656.0	1,363.5	7.91	254.9	3,756.1	95.8	2.67	95.8	6.43	1,108.6
2050	6.30%	2051/2052	7.96%	10.22	1,805.2	545.3	15,954.9	682.7	1,228.0	6.91	83.6	3,839.7	96.3	2.35	96.3	6.44	1,144.4

Summary Table

Pennsylvania State Employees' Retirement System
(Savings)/Cost Allocation of Potential Projected (Savings)/Cost
Through FY 2052 Due to HB 727
(Amounts in millions)

Benefit Reforms		
Amendment - Defined Contribution Plan for hires after December 31, 2015*	$	(3,967.8)
Implications of financing a "substantially closed" DB plan	$	7,807.5
Total HB 727 (Savings)/Cost through FY 2052	$	3,839.7

Notes:

The potential (savings)/cost was valued in the following order:

1. Defined Contribution Plan *for new entrants, other than State Police
2. Financing implications (lower assumed future investment returns and shorter future gain/loss amortization periods)

If a different order is used, the cost impact will vary from what is shown above.