Commonwealth of Kentucky

Pension Performance and Best Practices Analysis

Report #3:

Recommended Options

August 28, 2017

In conjunction with:

PRM Consulting Group
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I. Executive Summary

Overview

In the aggregate, the Commonwealth of Kentucky's pension plans are among the worst funded in the nation. Without corrective action, the large and growing unfunded liabilities associated with these pension benefits not only threaten the retirement security of plan participants, but they are also eroding the fiscal stability of the state – recently ranked among the bottom five in the nation.[1]

As detailed in our prior interim Reports #1 and #2, these challenges are linked to three major retirement systems sponsored by the Commonwealth, featuring a total of eight distinct pension plans. Collectively, these programs provide pensions and retiree healthcare benefits to tens of thousands of retired state, local government, school district, and nonprofit employees across Kentucky.

Given the high importance of these retirement systems and the severe pressures they now face, a status quo approach is simply untenable.

In this Report #3, we present ideas and alternatives for improving the long-term security, reliability, and affordability of these benefit programs. These recommended options build on our analysis of factors that have led to the current conditions as detailed in Interim Report #2, addressing the full range of causes for the current funding shortfalls:

- Actuarial assumptions
- Benefit levels and risk exposure
- Funding
- Investment practices and approach

As the Commonwealth's policy-makers and stakeholders consider these recommendations, we would like to note the following broad considerations that have informed our recommended approach:

- Through past legislative reforms, recent Board actions, and significant additional funding in FY2017-2018, Kentucky has already taken many positive steps across these critical areas. Without these prior actions, the current situation would be far worse.

- Nonetheless, the continued severity of the Commonwealth's remaining challenge requires further strong, corrective action. Kentucky's remaining underfunding is acute and growing, threatening the solvency of the most underfunded plans, and incremental steps will not suffice to restore stability. The most-stressed plans have limited assets to withstand

[1] *"Ranking the States by Fiscal Condition, 2017 Edition," George Mason University.*

downturns and, under previous actuarial assumptions and funding schedules, would not have improved their funded status for over a decade.

- If Kentucky plans were subject to federal standards for single-employer private sector plans, all but the Judicial and Legislative plans would be defined as having a severe funding shortfall based on funded status of less than 60%, and would be required to freeze benefit accruals – even as the Commonwealth plans use significantly less conservative discount rate and amortization period assumptions than used by private sector plans.[2]

- Even with a stronger foundation placed quickly and decisively into place, a long-term commitment to reform will also be needed to build on this foundation toward regaining fully sustainable fiscal health.

- The actuarial, funding, benefit, and investment approaches across the Commonwealth's different plans are complex, interconnected, and impact many, diverse stakeholders in varying ways. In our recommendations, we have sought to balance these concerns through a consistent approach that also resolves the current crisis on a sustainable basis.

- In so doing, we have also sought to reflect the policy principles and direction set forth by Governor Bevin and the Commonwealth's leadership – with a focus on strong action that places these systems on a truly sound and realistic foundation without further "kicking the can down the road." The accompanying sidebar highlights these key goals for reform.

- At the same time, we recognize that the process ahead prior to enactment of further change may result in further refinement and adjustments to the specific approaches recommended herein as Kentucky moves forward.

As the next phase of this process soon begins, it is our hope is that this Report #3 and its recommendations will provide a sound framework for the critical work just ahead, contributing to an enduring resolution that sustains competitive benefits on an affordable and sustainable basis for Kentucky's career public employees to retire with security and dignity.

[2] *26 U.S. Code § 436*

Kentucky Retiree Benefits Reform

Key Policy Principles & Goals

1. The severely distressed condition of the KERS-NH plan, and the systemically high level of unfunded liabilities across all of Kentucky's plans in the aggregate, require strong action to reduce the risks of:
   - Continued increases in funding that crowd out other vital public spending and/or reach levels that cannot be sustained in the budget while keeping the state's taxes at a competitive level to support the Commonwealth's growth.
   - Resorting to the payment of benefits on a pay-as-you-go cash basis, which could also quickly become fiscally unsustainable.
   - Plan insolvency, jeopardizing the retirement security of tens of thousands of former state and local government workers.
2. To the extent possible, accrued benefits for service earned by employees and retirees should be protected within a framework consistent with Kentucky's inviolable contract provisions and federal Employee Retirement Income Security Act ("ERISA") standards for private plans.
3. Long-term solvency of the retirement system as a whole must be ensured so that current retirees and future retirees can rely on secure retirement benefits.
4. Risk levels systemically and for each individual plan should be reduced as much as possible to avoid recurrence of the severe deterioration in the retirement systems' health. Future liabilities should be valued conservatively, and the future risk to the Commonwealth associated with economic conditions, investment returns, demographics, and actuarial methods and assumptions should be minimized.
5. The Commonwealth's benefit structures should also reduce future exposure to risk and the potential for unfunded liabilities to reemerge, in order to safeguard plan sustainability for KRS, TRS, and KJFRS participants, employers and the taxpayers.
6. The Commonwealth's overall approach as an employer should provide career state and local employees and teachers a sufficient and sustainable benefit for a dignified retirement through a combination of benefits from KRS, TRS, and KJFRS, Social Security, and personal savings, while also accommodating and providing flexible and competitive options for workers who may spend only a portion of their career in public service.

A. Actuarial Method and Assumptions

As detailed in Report #2, the largest factors in the growth of Kentucky's unfunded liability have been linked to the retirement systems' actuarial assumptions and approach:

- The Commonwealth's practice of paying down existing unfunded liabilities on a basis set as a "level percentage of payroll" has had the most significant overall adverse dollar impact. Under the level percentage of payroll approach, payments to amortize unfunded liabilities are scheduled to increase over time – effectively back-loading the pay down of pension debts – on the theory that future payrolls will be higher with greater capacity to help address these liabilities. In practice, this results in actuarially recommended employer contributions that are not sufficient to offset interest on the unfunded liability in the near-to-intermediate term, even if all other plan actuarial assumptions are met.

  For Kentucky's systems, these actuarial shortfalls were compounded by actual payroll growth that was lower than assumed over the period, and actually negative for KERS-NH. As a result, contributions based on payroll fell well short of what had been projected, in turn producing additional unfunded amounts that were continually re-amortized out further into the future on the back-loaded schedule. In addition, the practice of resetting amortization periods adopted by the KRS plans, and the use of open or rolling amortization periods prior to FY2014 in the case of TRS, where the period was reset to 30 years each year, further prevented the plans from reaching the point in the amortization period where principal payments on the unfunded liability would achieve meaningful pay down. Finally, the employer contribution for the KERS-NH, KERS-H, and SPRS plans are set for two-year periods by statute as part of the Commonwealth's biennial budget process, which has also caused shortfalls when actuarially determined funding requirements increase annually.

  In contrast, the alternative "level dollar" amortization approach would pay down the debt by a consistent, fixed amount each year, more akin to how most home mortgages are structured. Although the percentage of payroll approach is not unusual nationally[3], the continued application of this "actuarial back-loading" in Kentucky's challenged systems is projected to result in further growth of the unfunded liabilities for years to come – even if payrolls did increase at the 3.5% to 4% rate historically assumed (but inconsistent with recent experience and trends), with all actuarially recommended contributions made in full.

- Another major contributing factor to the growth in the unfunded liability has been investment performance below the plans' targeted rates of return. While some of this outcome was due to plan performance below market norms, these investment return shortfalls were primarily because the financial markets overall did not produce returns as strong as in prior

[3] *Society of Actuaries, U.S. Public Pension Plan Contribution Indices, 2006-2014, June 2017.*

generations. Further, as Kentucky's systems (like most of their counterparts nationally) began to reduce investment return assumptions to better align with this experience and revised expectations going forward, the near-term result was a further increase in the reported liabilities for the plans – since projected future liabilities were no longer offset by future, expected growth in the system assets.

Under Kentucky's current statutory framework, as illustrated in the table below, KRS is required to use the "level percentage of pay" method for amortizing unfunded liabilities. In May and July 2017, however, the Kentucky Retirement Systems ("KRS") Board effectively shifted to a funding requirement equivalent to the "level dollar" approach for the Kentucky Employees Retirement System Non-Hazardous employees plan ("KERS-NH"), Kentucky Employees Retirement System Hazardous employees plan ("KERS-H"), and the State Police Retirement System ("SPRS") by adopting the assumption – more consistent with ongoing experience – that future payroll growth will be flat. This revision thereby reduced long-term risk exposure, albeit with an increase to the near-term actuarial funding requirement. For the County Employees Retirement System ("CERS") plans, the payroll growth assumption was lowered to 2%, with similar effects to a more limited degree.

Pension Plan	Funding Method	Source
KERS-NH KERS-H SPRS	Employer contributes the full actuarial contribution (normal cost plus amortization of unfunded liability) as a percentage of creditable compensation (payroll), based on level percent of payroll amortization and entry age normal funding method. The board sets the percentage each biennium based on the prior June 30 valuation. Effective July 1, 2014, the board cannot change rates for the second year of the biennium.	KRS 61.565
CERS-NH CERS-H	Same as KERS-NH et al above, except that the KRS board may change the percentage for the second year of the biennium based on an updated valuation.	KRS 61.565

Pension Plan	Funding Method	Source
TRS	The Commonwealth pays employer contributions for non-university, board of education employee pensions. The employer matches employee contributions of 9.105% of non-university salaries for pension (7.625% for university salaries), and contributes an additional 3.25% for the system's unfunded obligations with interest and for the medical insurance (OPEB) fund. The amortization of past COLAs, annuities, and sick leave allowances "may be funded by annual appropriations from the state," which was equivalent to a special appropriation rate of 2.94% of salaries for FY2018. TRS annually requests additional appropriations to cover the shortfall between the statutory contribution and the actuarial contribution. Unlike the other systems, the contribution is currently not tied to the actuarial calculation of normal cost or unfunded liability, and the amortization method is set by TRS board policy.	KRS 161.550 KRS 161.553
JRP **LRP**	The state contributes the normal cost plus interest on the unfunded liability plus 1% of the unfunded liability per year. The board adopts the actuarial assumptions, including whether entry age normal or projected unit credit funding method is used.	KRS 21.525

The amortization method for TRS is not set by statute, as the Commonwealth does not fund the system based on an actuarially determined amount. Instead the funding method is based on a fixed percentage of pay, divorced from an actuarial requirement, and the amortization method is left to TRS board policy. To the extent that such policy requires additional Commonwealth funding above the statutory requirement (an "overmatch"), such contributions are contingent on state appropriation.

Also under the current statutory framework, each retirement system board establishes its own actuarial assumptions for investment returns, inflation, mortality, and other factors. This allows for each plan to reflect potential differences in projected cash flow needs and investment strategies and allocations. Again in May and July 2017, the KRS Board adopted changes that, among other adjustments, reduced the investment return assumption from 6.75% to 5.25% for the KERS-NH and SPRS plans, and from 7.5% to 6.25% for KERS-H and CERS.

Recommendations

1. Modify Kentucky statute KRS 61.565 to convert the level percent of payroll amortization method for KRS to a level dollar method. This consistent approach to reducing the

Commonwealth's long-term pension debt will substantially increase the likelihood of steady and meaningful progress toward regaining healthy funded status.

2. Modify Kentucky statutes KRS 161.550 and KRS 21.525 to apply a level dollar amortization method to TRS and KJFRS.

3. Maintain the current 30-year amortization periods beginning June 30, 2013 and 2014 for KRS and TRS, respectively.

4. Apply a 30-year amortization period for the existing KJFRS unfunded liability, with 20-year closed periods for future unfunded amounts.

5. With the significant shift in assumptions approved in May and July and the resulting escalation in required contributions in the near term, however, a reset period of 30 years under a new level dollar amortization could be considered to modestly smooth the fiscal impact as more prudent funding approaches come into place. Resetting the amortization period with a level dollar amortization would not shift disproportionate amounts of liability principal past the end of the current amortization period, as is the case when level percent of payroll amortization periods are reset – such as following 2013 SB 2. It is important to note, however, that resetting the amortization period is not an optimal practice, and could generate unfavorable actuarial results.

6. Adopt and maintain prudent and realistic investment return assumptions.

    - For a majority of the Commonwealth plans, we recommend investment return assumptions of 6.0-6.25%, more consistent with market experience across the past decade and aligned with the 6.0% rate adopted in May 2017[4] by the credit rating agency, Fitch Ratings, for normalizing their evaluation of retirement systems nationally. While somewhat below the most recent national median rate for major public pension plans, recent trends nationally continue to move toward lower assumed rates of return. Further, this recommended level reflects the comparatively weak funded ratio of most Kentucky plans (with all of the KRS and TRS plans funded at levels below 60% as of the most recent 2016 valuations), such that the use of lower-risk assumptions would be important for improving the likelihood of a return to a sound position.
    - For the most severely underfunded KERS-NH and State Police Retirement System (SPRS) plans, we recommend that even lower rates of 5.0-5.25% be adopted,

[4] *"Revised Pension Risk Measurements," Fitch Ratings, May 31, 2017. In this report, Fitch notes: "Despite recent market gains, relatively limited pension asset growth is likely during the current economic expansion compared to prior expansions. Expectations for returns are dampened by the slow pace of economic growth, driven by a variety of factors. In this environment, Fitch believes that lowering its standard investment return assumption to 6% from 7% better reflects the magnitude of the burden posed by pension commitments."*

reflective of the greater risk already borne by these plans due to extraordinarily low funded ratios (16.0% for KERS-NH and 30.3% for SPRS as of 2016, even prior to modified assumptions that will lower the reported rates prospectively). In addition, the cash flow pressures on these plans will likely require more conservative/liquid investment allocations.

- For the costing analysis included in this Report #3, unless otherwise noted, we have generally incorporated assumed rates of 5.1% for the KERS-NH and SPRS plans and 6.0% for all other Kentucky plans. These assumptions are broadly consistent with the 5.25% and 6.25% assumptions recently adopted by the KRS Board, and are aligned with our recommendations. The actual assumptions for the Teachers' Retirement System ("TRS") and the Judicial Form Retirement System ("JFRS") remain at 7.5% and 7.0%, respectively (It is our understanding that TRS and KJFRS may consider alternative rates at upcoming board meetings, but have not formally announced any changes).

	2016 Plan Valuation Assumption	Plan Assumption as of July 2017	Recommended Assumption Range	Assumption Used for Report #3 Costing
KERS-NH, SPRS	6.75%	5.25%	5.0%-5.25%	5.1%
KERS-H, CERS	7.5%	6.25%	6.0%-6.25%	6.0%
TRS	7.5%	7.5%	6.0%-6.25%	6.0%
JFRS	7.0%	7.0%	6.0%-6.25%	6.0%

- Because market and plan conditions and expectations will change and evolve over time, system fiduciaries should continue to have the flexibility to reevaluate and modify actuarial assumptions, consistent with mainstream practice among public pension plans, rather than establishing such assumptions in statute. At the same time, as further detailed in Section D below ("Investment Practices and Governance Approach"), below, the Commonwealth could assign this responsibility to a new, statewide investment board – a structure used by some other states to provide for economies, consistency, and transparency in managing investments – as a strategy for elevating review of these important factors.

B. Benefit Levels and Risk Exposure

From a financial perspective, there are two important dimensions to evaluating the expected cost of retiree benefits:

- How much are such benefits projected to cost assuming that all actuarial assumptions are met in full?
- How much risk exists that these assumptions may not be met, and what is the financial exposure if this occurs?

Looking backward, again, much of Kentucky's current shortfall resulted from actuarial assumptions that were not met – particularly around investment returns, but also involving payroll growth, life expectancy, and other technical factors.

Looking forward, the recommendations outlined in the preceding section are intended to reduce this risk exposure through the adoption of more prudent actuarial assumptions and funding approaches – so that, as the Commonwealth begins to pay down its liabilities, the risk of new shortfalls reemerging is decreased. In tandem with this approach, adjustments to benefit design can also reduce the risk of progress being undermined.

At the same time, retirement benefit structure and design is more than just a financial concern; such benefits are also critical from human resources and talent management perspectives:

- Competitive Salaries: A well-designed total compensation approach includes quality benefits, and also ensures that benefit costs do not consume such a large proportion of the overall dollars available for compensation that the employer can no longer afford competitive salaries. Many Kentucky public employees have seen little or no increase in salaries for many years, in part as a result of the high percentage of available resources being siphoned off to meet rising pension contribution requirements. In turn, low salaries can weaken an employer's ability to recruit and retain strong performers, many of whom focus first on salaries in their personal career decision-making.
- Portability of Benefits: For many workers, portability of retirement benefits is also a priority. Many newer entrants to the workforce value the flexibility associated with benefits that they can take with them if they decide to change employers at some point in future years. At the same time, many talented workers already established in their careers might be interested in switching to public service, and may value a 401(k) style benefit that aligns well with the retirement savings they have already started rather than joining a traditional pension system that requires many years of service to build up value.
- Building Retirement Savings: Whether an employee only dedicates a few years to public employment or their entire career, it is also important to assess whether the full program of benefits as offered provides an opportunity for workers to build toward a secure and

dignified retirement. This evaluation should include consideration of Social Security benefits (or current lack thereof in the case of Kentucky teachers and many municipal public safety employees), and the ability to build up benefits or savings through programs sponsored by the employer (or employers) over time.

- Income Replacement: When assessing the sufficiency of a retirement program, a common approach is to determine an estimated income replacement ratio – the percentage of pre-retirement income that can be sustained from the overall benefits in combination. Because retirees typically have a different spending profile (e.g., they no longer pay toward Social Security and/or retirement programs, there are no commuting costs, etc.), expert analyses have generally found that an income replacement ratio of approximately 80-85% can maintain the same standard of living experienced prior to retirement.[5]

In developing the recommendations for benefits that follow, we have sought to balance the considerations outlined above. The plan designs described are intended to reduce the risk exposure to the Commonwealth and its local governments – particularly critical in light of the current severity of the existing funding shortfalls, and the strong policy concerns articulated by the Governor and legislative leaders regarding the capacity of Kentucky's taxpayers to bear further risk. At the same time, our recommendations seek to continue to offer competitive benefits, to feature the flexibility attractive to many new and lateral recruits, and to provide career employees with the opportunity to build toward retirement security.

These recommendations are organized within three major sections – the first, addressing pension recommendations for future hires, the second addressing pensions for employees and retirees already participating in the existing programs, and the third addressing retiree healthcare. This approach recognizes that current plan participants are not starting on day one, taking into account the different degrees of practical and legal flexibility available to modify benefits for those already vested. In addition, because different employee groups may have different career trajectories (e.g., earlier retirement eligibility in public safety) and/or different existing retirement benefit structures (e.g., no Social Security for Kentucky teachers), these recommendations are further divided by retirement plan within each of the first two major sections (Future Hires, Current Employees and Retirees).

[5] Aon Consulting's 2008 Replacement Ratio Study. The optimal ratio tends to be lower for those with higher pre-retirement incomes and higher for those with lower pre-retirement incomes. The Aon-Georgia State study found a required replacement ratio of 78% for workers with a pre-retirement income of $90,000, rising to 85% with a pre-retirement income of $40,000. For those earning less prior to retirement, the desired ratio can be even higher.

Recommended Options – Future hires

KERS NH, CERS NH, JFRS

Since 2014, new hires into the KERS NH, CERS NH, and JFRS plans participate in a cash balance plan (Tier 3 for KRS, Tier 4 for JFRS), which provides a retirement annuity calculated based on a member's account balance as accumulated from employer contributions set at 4% of salary with guaranteed minimum interest earnings at a 4% rate. Under certain circumstances, actual interest earnings in excess of 4% can also be shared with the plan participants.

While this cash balance approach entails significantly less actuarial risk than Kentucky's older pension tiers, it is important to recognize that Tier 3/4 is not completely immune from exposure to market risk. Most notably, the Commonwealth bears the full risk that the guaranteed rate of interest return will actually be achieved.

Further, there is often some misunderstanding regarding the way that cash balance plans are funded. Because such plans are conceptually described in terms of account balances, many observers assume that the Commonwealth is actually contributing 4% of salary each year into a true "savings account" for each plan participant, with interest increasing this tangible balance over time. In practice, however, the "account balance" is a notional amount – not actual dollars in the bank – and the Commonwealth's contributions are only what is actuarially determined to be necessary to set aside order to generate the right amounts when plan participants retire assuming that all actuarial assumptions are met. In turn, because of this funding approach, the Commonwealth remains exposed to actuarial risk.

1. Given the Commonwealth's priority to minimize the risk that pension funding crises will continue to reemerge, an approach to eliminate this exposure going forward would be to provide future KERS NH, CERS NH, and JFRS participants with a defined contribution (DC) retirement benefit – with a mix of employer and employee contributions accumulating over time in true individual accounts.
    - DC retirement savings vehicles are the most common approach in the private sector, and would eliminate prospective actuarial risk.
    - We have evaluated the following potential plan design:
        1. Mandatory employee contribution of 3% of salary.
        2. Guaranteed base employer contribution of 2% of salary.
        3. Further employer match set at 50% of additional employee contributions up to 6% of salary (i.e., up to an additional 3% from the employer).
        4. Maximum employer contribution of 5% and total contribution of 14%.
        5. The employer contributions would vest 100% after 5 years, and 50% after 4 years.
        6. Participants would be eligible for unreduced retirement at age 65.

- In conjunction with Social Security, toward which the employer already contributes 6.2% of salary, this approach is projected to provide a career employee with income replacement sufficient for a dignified retirement. As noted above, the standard measure for evaluating such preparedness is the income replacement ratio. As detailed in the full Benefit Levels and Risk Exposure section of this report, analysis under reasonable assumptions indicates that this structure would provide a competitive level of income replacement.
- In addition to meeting the goal of eliminating prospective funding risk, this approach would provide a portable benefit attractive to many early career candidates for public employment, as well as a benefit consistent with that received by most mid/late-career job candidates considering a shift from the private sector.
- Relative to the cash balance plan, a DC plan would require increased investment education to encourage full participation in the match, as well as prudent use of the increased flexibility for personal investment approaches, to help participants achieve retirement security.

Summary of Recommended Options – Future Hires		
Plan	Primary Benefit	Other Adjustments
KERS-NH CERS-NH JFRS	Defined Contribution: 2% minimum employer contribution + 50% match on first 6% optional employee contribution above a 3% minimum employee contribution (i.e. 5% employer maximum, 14% total maximum)	No conversion of accrued sick, compensatory, and any other leave time toward pension benefit.

KERS Hazardous, CERS Hazardous, State Police Retirement System

Since 2014, new hires into the KERS Hazardous, CERS Hazardous, and SPRS plans also participate in the cash balance plan (Tier 3) structure, with eligibility for retirement at age 60 with five years of service or at any age with 25 years of service, lower than the minimum age and service requirements for normal retirement under the current Non-Hazardous plan tiers[6].

For public safety employees – given the extraordinary conditions and demands of such work – retirement ages are typically lower than for non-hazardous occupations, and other features of retirement benefit plan design are often also distinct. In addition, some municipal public safety

[6] *Generally, age 65 with five years of service, or when age plus years of service totals 87 with a minimum age of 57.*

employees do not participate in Social Security, and some Kentucky law enforcement jobs have reported increasing recruitment pressures.

Taking such factors into account, we recommend the following option for KERS Hazardous, CERS Hazardous, and SPRS:

2. Retain the current cash balance structure for Hazardous plan participants at this juncture, modifying only the requirements for normal unreduced retirement eligibility to be age 55 for Tier 1 employees and 60 for Tier 2 and 3 employees – the current age-based criteria - with no provision for unreduced retirement at any age based on years of service. Members could retire early with an actuarially reduced benefit. This adjustment will focus retirement payments on participants' later years. Such a required a minimum retirement age, irrespective of years of service, is consistent with the practices in multiple benchmark states (e.g., Illinois, Iowa, and Missouri).

Summary of Recommended Options – Future Hires		
Plan	Primary Benefit	Other Adjustments
KERS-H CERS-H SPRS	Retain the cash balance structure as now in place for post-2014 hires	Maintain the provision for retirement at age 55 for Tier 1 and 60 for Tiers 2 and 3, but eliminate eligibility for normal retirement at any age with 25 years of service

Teachers Retirement System

In considering retirement security for Kentucky teachers, a key factor in the current approach is that TRS members do not now participate in Social Security. While this structure increases take-home pay for teachers, as neither teachers nor local school districts contribute the 6.2% of salary required under Social Security, it also means that a teacher's TRS benefit is often their primary form of retirement income.[7] In the absence of Social Security, not only does a TRS retiree require a larger overall benefit, but they also do not experience the regular cost-of-living adjustments (COLAs) included in a Social Security benefit.

Looking prospectively, a shift to a combination of Social Security participation and a DC retirement benefit would address key Commonwealth goals with regard to risk exposure, while simultaneously addressing teacher retirement security needs inclusive of Social Security cost-of-living adjustments.

[7] *Some TRS members may qualify for Social Security based on other employment during their working careers, and many will have individual retirement savings.*

1. Newly hired teachers would enroll in Social Security, providing a significant new defined benefit with inflation-based COLAs.

2. To supplement this benefit, a DC plan would also be established consistent with the proposed approach for KERS and CERS participants:
    - Mandatory employee contribution of 3% of salary
    - Guaranteed base employer contribution of 2% of salary
    - Additional employer match set at 50% of additional employee contributions up to 6% of salary (i.e., up to an additional 3% from the employer)
    - Maximum employer contribution of 5% and total contribution of 14%
    - The employer contributions would vest 50% after 4 years and 100% after 5 years

3. In conjunction with Social Security, this new program would be projected to achieve an income replacement ratio of 79% if retiring at Social Security Normal Retirement Age after 30 years of service.

In evaluating this proposed approach, it should be noted that the current TRS employer normal cost for non-university members – the percentage of payroll that the actuaries calculate should be contributed each year assuming all plan assumptions are met – was reported as 14.94% as of FY2016[8]. Factoring out 9.105% employee contributions, this results in a net employer contribution of 5.835% assuming all actuarial assumptions are met. In comparison, under this new structure, combined employer Social Security contributions (6.2%) and DC plan contributions (2%-5%) would exceed this nominal rate.

At the same time, however, the Commonwealth would no longer be subject to the actuarial risk that investment returns do not reach 7.5% or that other assumptions such as those involving mortality rates are not achieved. Such factors historically have been significant contributors to the 2016 additional TRS actuarially determined contribution rate of 24.92%[9] as amortization payments are required to address a $14.5 billion unfunded liability – for a total net employer rate of 30.755%.

In other words, while the existing TRS structure meets the goals of providing sufficient benefits and (on paper) may achieve financial affordability going forward, this status quo approach also carries significant fiscal risks. By shifting to the proposed new approach, this Commonwealth would achieve its goal of ensuring that such liabilities and increased contribution requirements will not reemerge in association with future hires.

The benefit for Non-University and University members has not previously been aligned because University members participate in Social Security. In this proposed approach, however, all future

[8] *Reflects the rate for non-university members hired on or after 7/1/2008 for pension benefits only.*

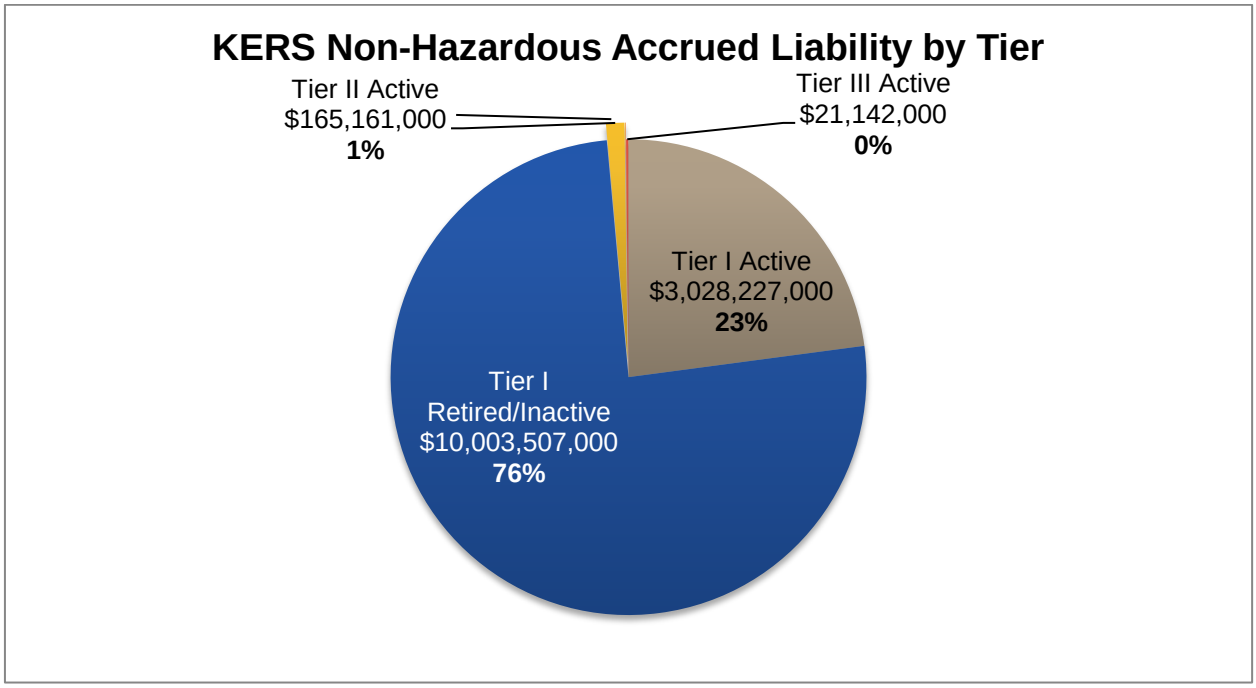
[9] *Ibid.*

hires would be enrolled in Social Security, and the new benefit structure would be the same for both groups.

Summary of Recommended Options – Future Hires		
Plan	Primary Benefit	Other Adjustments
TRS – Non-University and University members	• Social Security (generally not now provided for non-University members) • Defined Contribution: 2% minimum employer contribution + 50% match on first 6% optional employee contribution above a 3% minimum employee contribution (i.e. 5% employer maximum, 14% total maximum)	No conversion of accrued sick, compensatory, and any other leave time toward pension benefit.

Recommended Options – Current Employees and Retirees

While it is necessary that Kentucky's benefits for future hires be structured to become more sustainable, limiting modifications for those yet to be employed will not be sufficient to restore financial health to the systems. By definition, all of the Commonwealth's existing unfunded liabilities are associated with workers who are already employed – or who have already retired from covered employment. Further, as illustrated in the following chart from Report #2 for the KERS-NH plan, most of this liability is linked to older plan tiers.



Source: Cavanaugh MacDonald, based on June 30, 2016 actuarial valuation and valuation assumptions including 6.75% earnings assumption and 4% payroll growth.

If you are in a deep hole, you need to first stop digging. But to truly get out of the hole, you still need to do more.

In Kentucky, a key set of considerations to be addressed along the pathway forward involves the Commonwealth's statutory "inviolable contract" provisions. Certain "inviolable contract" statutory provisions were first enacted in 1972 and stated that "benefits provided therein [under various Kentucky retirement statutes] shall . . . not be subject to reduction or impairment by alteration, amendment, or repeal."[10] No Kentucky or other court has ruled on the scope and meaning of these provisions. Some statutory benefit provisions and groups of employees based on their dates of hire are specifically exempted from these inviolable contract provisions. These provisions do not apply to future hires.

While legal challenges to any changes the Kentucky General Assembly may make are almost inevitable, based on the advice of counsel who have studied the Kentucky inviolable contract provisions and related statutes and similar statutes nationwide, it appears that the legislature has many options that could pass judicial scrutiny in light of the extremely serious pension crisis facing all Kentuckians.

[10] *The following statutory inviolable contract provisions apply to each retirement system: KRS 61.692 – KERS, KRS 78.852 – CERS, KRS 16.652 – SPRS, and KRS 21.480 – JRP and LRP (KRS 6.525). KRS 161.714 – KTRS was not enacted until 1978.*

The severity of the Commonwealth's pension crisis requires the strong consideration of all options that fall within the relevant legal parameters, including the Commonwealth's rights to take action when reasonably necessary to serve a legitimate and important public purpose.

Taking the above considerations into account, the following represent the available and potentially available options recommended for consideration across the Kentucky plans.

KERS-NH, CERS-NH, JFRS

1. Freeze accrued benefits under the applicable existing pension tier(s), consistent with an ERISA approach, and provide the same DC benefit (as outlined above for new hires) for future years of service.
    - For Tier 1 and Tier 2 members, accruals under their current plan would be frozen, although the benefit amount associated with such prior service at the date of the freeze would continue to grow as the multiplier and years of service would be applied to the level of final average compensation attained upon eventual retirement.
    - Eligibility for normal unreduced retirement would be set at age 65 for non-hazardous plan participants age 60 for Tier 2 and 3 hazardous plan participants, and age 55 for Tier 1 hazardous plan participants. For those eligible for an earlier retirement age under prior tiers as of the effective date of plan changes, employees could still retire prior to their designated normal retirement age with an actuarially reduced benefit.
    - For Tier 3 employees hired since 2014, the accrued value in their cash balance plans would be rolled into the new DC accounts.
2. Offer a buyout for the actuarial value of accrued service benefit, with the equivalent cash value to be rolled over to the plan participant's new DC account. This approach, to be provided at the employee's option, would ensure the security of participating individual's retirement benefit, while reducing the unfunded liability and eliminating ongoing risk exposure for the Commonwealth. Please note that such a program would likely require significant administrative resources and certain one-time costs to manage.
3. Eliminate the application of unused sick and compensatory leave to increase pension benefits. Sick leave will instead be cashed out upon retirement at 25% of then-current salary rates. Compensatory time will be used prior to retirement.
4. Consider prospectively eliminating some or all of the portion of any pension benefit payments resulting from COLAs granted between 1996 and 2012 that were provided under statutes excluding such increases from any inviolable contract provisions. Such adjustment to benefit levels would be consistent with the practice in the State of Wisconsin's retirement plan, which incrementally rolls back pension increases when the plan funded status falls below targeted levels.

This option is one of the more impactful options that may be legally available to address the significant accrued unfunded liabilities that have accumulated due to past actions and inactions now threatening the Commonwealth's financial health, but it would also potentially impose hardships on existing retirees that rely on their current benefit levels. Members of KRS, TRS, or KJFRS plans who retired in 2001 or prior could have their benefit rolled back by 25% or more if past COLAs were completely eliminated from prospective benefit payments to retirees.

While the complete elimination of the past COLAs granted for each plan was modeled for illustrative purposes in this report, we recommend evaluating this option in the context of protections for former retirees, such as maintaining a minimum proportion of inflation-adjusted benefit compared to the benefit at retirement, pre-COLAs, maintaining a minimum benefit/ hold harmless amount in dollars for all retirees, or a maximum dollar reduction in benefit. These options would entail corresponding reductions in the potential liability and savings in the Actuarially Determined Employer Contribution (ADEC).

Recommended Options – Current Employees and Retirees		
Plan	Primary Benefit	Other Adjustments
KERS-NH CERS-NH JFRS	• For Tiers 1 and 2, freeze accrued benefit associated with prior service protected at levels based on plan and date of hire, with no further accrual (although the benefit value will increase as the final average salary component of the defined benefit formula increases) • Tier 3 members would see the account value of their accrued cash balance benefit rolled over into the new defined contribution plan • Future service earns a defined contribution benefit: 2% minimum employer contribution + 50% match on first 6% optional employee contribution above a 3% minimum employee contribution (i.e. 5% employer maximum, 14% total maximum) • All benefit payments for retirees would continue in full at the level in place as of 1996 or any subsequent date of retirement; payment amounts due to COLAs granted from 1996 to 2012 could be reduced prospectively	• Normal retirement age of 65 would apply (employees can retire earlier with an actuarially reduced benefit) • No conversion of accrued sick, compensatory, and any other leave time toward pension benefit • Optional buyout to be developed for accrued pension service under Tiers 1 and 2, with rollover to the new defined contribution plan

KERS-H, CERS-H, SPRS

1. Hazardous plan participants would retain the primary benefit associated with their current tier, modifying only the requirements for normal retirement eligibility to be age 60, with no provision for unreduced retirement at any age based on years of service.

Recommended Options – Current Employees and Retirees		
Plan	Primary Benefit	Other Adjustments
KERS-H CERS-H SPRS	Retain the primary benefits associated with the member's current tier	Normal retirement age of 55 (Tier 1)/ 60 would apply (employees can retire earlier with an actuarially reduced benefit).

TRS

1. Because there is not a practicable mechanism for transferring current TRS non-university participants into Social Security, a continued plan design with DB characteristics is recommended for incumbent teachers. In order to address the large, unfunded liability associated with the group, the following adjustments are recommended options for such change:
    - Establish a normal retirement age of 65, addressing one of the major outlier characteristics of the current TRS benefit design that also contributes significantly to the cost of the plan (the current design is for retirement eligibility for an unreduced benefit at any age with 27 years of service, or age 55 with 5-10 years of service depending on the date of hire). For those eligible for an earlier retirement under prior tiers, employees could still retire prior to age 65 with an actuarially reduced benefit.
    - Eliminate enhanced benefit features provided outside of any inviolable contract requirements – the provision that benefits shall be calculated based on the highest three years of pay; conversion of accrued leave and compensatory time toward pension credit; and a higher benefit multiplier applied for years of service beyond 30.

2. Consider prospectively eliminating some or all of the portion of any pension benefit payments resulting from COLAs granted between 1996 and 2012. Such adjustment to benefit levels would be consistent with the practice in the State of Wisconsin's retirement plan, which rolls back pension increases when the plan funded status falls below targeted levels.

As outlined above regarding KERS benefits, this approach is one of the more impactful options that may be legally available to address the significant accrued unfunded liabilities that have accumulated due to past actions and inactions now threatening the Commonwealth's financial health, but it would also potentially impose hardships on existing retirees that rely on their current benefit levels. Members of KRS, TRS, or KJFRS plans who retired in 2001 or prior could have their benefit rolled back by 25% or more if past COLAs were completely eliminated from prospective benefit payments to retirees. While the complete elimination of the past COLAs granted for each plan was modeled for illustrative purposes in this report, we again recommend evaluating this option in the context of protections for former retirees, such as maintaining a minimum proportion of inflation-adjusted benefit compared to the benefit at retirement, pre-COLAs, maintaining a minimum benefit/ hold harmless amount in dollars for all retirees, or a maximum dollar reduction in benefit. These options would entail corresponding reductions in the potential liability and ADEC savings.

3. Suspend future COLAs until the system reaches a minimum 90% funded level using realistic actuarial assumptions. After reaching the 90% funded level COLA payments would apply only to the first $1,500 of monthly benefit.

Recommended Options – Current Employees and Retirees		
Plan	Primary Benefit	Other Adjustments
TRS – Non-University and University	• Retain the primary benefits associated with the member's current tier • All benefit payments for retirees would continue in full at the level in place as of 1996 or any subsequent date of retirement; payment amounts due to COLAs granted from 1996 to 2012 could be reduced prospectively	• Normal retirement age of 65 would apply (employees can retire earlier with an actuarially reduced benefit) • Enhanced benefit features to be eliminated (highest three years of pay; conversion of accrued leave and compensatory time toward pension credit; and a higher benefit multiplier applied for years of service beyond 30) • Suspend future COLAs until the system reaches a minimum 90% funded level using conservative actuarial assumptions. After 90% funded level is reached COLA payments would apply to the first $1,500 of monthly benefit

Summary of Plan Benefit Recommendations – All Systems

System	Plan	Proposed Plan Reform	Benefit Reform Proposal	Minimum Contribution	Optional Employer Contribution	Average Contribution	Normal Retirement Age: All Employees
KRS	KERS -NH	Freeze All Plan Service Accruals	DC Plan	2% ER 3% EE	50% ER match on first optional EE 6%	3.2% ER, 6.5% EE: 9.7% total	65
	KERS -H	No Change	No Change	No Change	n/a	n/a	55 (Tier 1)/ 60
	SPRS	No Change	No Change	No Change	n/a	n/a	55 (Tier 1)/ 60
	CERS -NH	Freeze All Plan Service Accruals	DC Plan	2% ER 3% EE	50% ER match on first optional EE 6%	3.2% ER, 6.5% EE: 9.7% total	65
	CERS -H	No Change	No Change	No Change	n/a	n/a	55 (Tier 1)/ 60
TRS		Close Plan to New Hires	DC Plan + Social Security	2% ER 3% EE	50% ER match on first optional EE 6%	3.1% ER, 6.5% EE: 9.6% total	65
KJFRS	KJRP	Freeze All Plan Service Accruals	DC Plan	2% ER 3% EE	50% ER match on first optional EE 6%	3.2% ER, 6.5% EE: 9.7% total	65
	KLRP	Freeze All Plan Service Accruals	DC Plan	2% ER 3% EE	50% ER match on first optional EE 6%	3.2% ER, 6.5% EE: 9.7% total	65

Notes:
1) ER= employer contribution; EE=employee contribution
2) Normal retirement age would be applied to all current actives
3) Accruals toward unreduced early retirement provisions based on years of service would be frozen after the cutoff date
4) Average contribution based on expected employee contributions (not all employees are assumed to contribute the maximum optional amount)

Retiree Healthcare

In evaluating overall retiree benefits, it is important to take a holistic view that encompasses post-employment healthcare as well as income replacement. As detailed in Report #2, Kentucky provides public employees with retiree healthcare benefits that significantly enhance the overall retirement package relative to typical private sector benefits, over and above eventual Medicare eligibility. Specific eligibility, coverage, benefit plan designs and retiree premium cost-sharing varies by retirement system as well as by benefit "tier."

As also detailed in the prior report, Kentucky's retiree health plans are better funded than those of many public employers, as the Commonwealth has established special trusts to accumulate assets to pre-fund the benefits. Nonetheless, Kentucky's Other Post-Employment Benefits (or "OPEB," the accounting term for all non-pension retirement benefits that primarily consist of healthcare) still carry an aggregate unfunded liability of approximately $5.9 billion as of June 30, 2016.

In evaluating this retiree healthcare component of the Kentucky retirement programs, our team's approach sought to identify opportunities for savings – potentially freeing up resources that might be reinvested in strengthening the Commonwealth's pension plans – while continuing to provide quality competitive coverage. Led by team members from PRM Consulting Group, many Commonwealth retirees were found to receive significantly richer, more costly coverage than their active and pre-Medicare retiree counterparts.

By establishing new retiree plans across all systems that provide coverage with an actuarial value comparable to the standard plans for active employees, savings of approximately 25% may be attainable. Under this approach, preliminary analysis further indicates that no employer subsidy would be required for Medicare-eligible coverage above the employee contributions made during active years of service.

Recommended Options

1. Pursue harmonization of the level of retiree healthcare benefits for KRS, LRP, and JRP non-Medicare and Medicare retirees so that the basic plan and benefit provided to the retirees is consistent with the Livingwell PPO coverage provided to active Commonwealth employees, rather than being richer and costing more.
2. Similarly, pursue harmonization of the level of benefits for TRS Medicare-eligible retirees so that the basic plan and benefit provided to the retirees is consistent with the coverage provided to Commonwealth employees. TRS retirees could further be offered a choice between this new lower cost current, richer design – with retirees to be responsible for the full premium of the higher cost more generous coverage.
3. Harmonize the Medicare Advantage plan provided to members of the JFRS with the coverage provided to KRS and TRS members. In addition, by pooling the coverage for purposes of obtaining the premium, the JFRS will be able to leverage the additional scale of the other plans to obtain more competitive premium rates.
4. Limit retiree healthcare eligibility to employees retiring directly from Commonwealth service. This requirement would eliminate the ability of former employees who left public service early in their career (e.g. vested at age 35 with 10 years of service), from collecting Commonwealth-subsidized retiree healthcare when they eventually reach the age for beginning to draw down their public pension.

C. Funding

Until the 2016-2018 biennium, the Commonwealth routinely contributed less than the actuarially recommended amounts to both the KERS-NH and TRS plans. While not the primary reason for the systems' overall underfunding, this was a material factor. In contrast, other Kentucky plans that historically received a greater proportion of the recommended employer funding – such as the JRP and LRP – are now better funded, and in a better position going forward.

In 2016-2018, Kentucky significantly increased its employer funding levels – actually contributing in excess of the actuarial recommendations for KERS-NH. This represents a highly positive step going forward, as full and consistent funding is one of the hallmarks of stable and sustainable retirement systems.

At the same time, the adoption of more prudent actuarial approaches and assumptions will likely further increase the recommended funding levels in the near-to-intermediate term, and add pressure to the Commonwealth's finances until the plans regain healthier status across the years and decades ahead. Accordingly, retiree benefit adjustments under a balanced and shared overall approach will play a critical role in mitigating these pressures to become more manageable and sustainable.

Within this context, the following are among the recommended options for the Commonwealth.

Recommendations

1. The funding mechanism should be based on the actuarially determined contribution (ADC) in a method sufficient to make the plan actuarially sound and on a sustainable path, and the Commonwealth should commit to full funding of the employer contributions on an annual basis, using prudent actuarial assumptions and methods as outlined within this report. For TRS and KJFRS, this commitment would be enhanced by a change in the current statutory funding requirements, which are not now based actuarial recommendations. Of note, the KJFRS plan actuary has stated that "The current [statutory] method of amortizing unfunded liabilities will not result in the full amortization of those liabilities."[11]
2. Allocate the contribution out to individual employers in KRS plans, including CERS, through a percentage of payroll for the normal cost, where relevant, and a dollar amount for the unfunded liability amortization associated with that employer's liability for service accrued at the employer. This would fairly allocate liability across state departments for employees who worked in multiple departments, for example, rather than charging the last department of employment for the entire liability. If this method is not administratively viable, an alternative would be to charge the normal cost based on a percentage of payroll, and

[11] *KJRP/KLRP Actuarial Valuation and Report as of July 1, 2015*

allocate unfunded liability based on the headcount of retirees distributed according to their final employer.

It is also essential to recognize that the employers and departments that have participated in the plans share in responsibility for the unfunded liability for actives and retirees based on past service. The shift of future service to the DC plan in KERS-NH, CERS-NH, JRP and LRP requires allocating unfunded liability either as a dollar amount or based on the entire payroll of the employer, as pensionable payroll would no longer be appropriate going forward.

3. Develop a mechanism within the framework of the Commonwealth's biennial budget process to ensure that each year's payments represent the full annual funding requirement. In past years, payment shortfalls have periodically resulted from the disconnect between biennial budgets and annual actuarial valuations. For example, a reserve appropriation might be established to help provide for full annual funding. At a minimum, the actuary should estimate the second year's contribution.
4. If future teachers begin to participate in Social Security in conjunction with a redesigned state retirement benefit, local school districts could be required to pay the 6.2% employer contribution for such Social Security participation. This approach would better align this salary-driven benefit cost with the salary-setting negotiations and decision-making occurring at the local level. Because this cost would only be applicable for new hires, the budget impact for school districts would phase in gradually, providing school districts with time to manage and plan for this new fiscal responsibility. In our benchmarking of 20 states detailed in Report #2, teachers participate in Social Security in 13 of those states, and local school districts often fund some or all of the employer contribution for Social Security.
5. Explore caps or collars on the annual percentage change in the required overall employer contribution percentage for CERS-NH and CERS-H. Participating employers in the CERS plans are required by law to pay the full ADEC in each year, and have done so over time. Changes in actuarial assumptions and losses due to experience can cause sudden and volatile changes in the ADEC. Although deviating from making the actuarially required contribution on a sustained basis is a concern, a cap on how much the employer contribution percentage may change from year to year can help smooth budgetary increases over time while the benefit liabilities are consistently and conservatively valued across all plans on a transparent basis. For example, the employer contribution percentage could be allowed by statute to increase or decrease by no more than 5-10% in an individual fiscal year.

In addition to the recommended options above, we also note that we are <u>not</u> recommending the use of a Pension Obligation Bond ("POB") as a major component of Kentucky's pension reforms at this juncture in the typical form of an open-ended transfer of proceeds to fund assets in the hope of generating positive arbitrage. Although POBs in this form can potentially be appropriate for some

governments in some circumstances, the issuance of POBs to shore up Kentucky's unfunded liabilities would simply substitute a new, fixed liability (debt) for a portion of the current obligations – with the proceeds still subject to market risk and volatility.

Because one of the primary goals of this reform project is to reduce risk and improve sustainability, a strategy which relies on risk to succeed is not recommended. Further, the rating agencies have taken increasingly critical views of this type of POB, indicating that issuing POBs of the magnitude required to make significant improvement would stress the Commonwealth's bond capacity and potentially lead to negative action, risking an increase to the costs of future borrowing.

The use of a POB as a more targeted means of funding a program to reduce risk and lock in costs, however – such as the following options – merits continued exploration.

6. Offer an optional buyout/conversion of accrued service program to employees other than those in the cash balance plan for KERS-NH and CERS-NH members. The employees in the cash balance plan would have a mandatory conversion of their accrued benefit to the deferred compensation plan. The optional buyout would be based on the actuarially accrued benefit through the date of the proposed freeze or conversion to a DC plan.

   This mechanism would be similar to what was offered in KRS 61.522, which provided for nonprofit nonstock corporations participating in KRS to withdraw from the system by funding their liability. Employees had the option to leave their accrued service with KRS until retirement, or withdraw their account balances, which are defined as the employee's accumulated pension contributions based on the 5% of pay contribution rather than the accrued benefit, and roll it over to the new tax-deferred retirement program offered by the employer. Two employers to date, Kentucky Employers' Mutual Insurance (KEMI) and the Commonwealth Credit Union (CCU), have used KRS 61.522 to withdraw from KRS. KRS provided KEMI employees with a 60-day notice period to declare their intent to transfer to the new KEMI plan. It is our understanding that, by offering in parallel both a DB plan that would maintain the previous benefit structure and carry over the employee's service credit from the KRS plan, and by offering a DC plan with an employer match of 50% or 100% of the employee's account balance, KEMI incentivized all of its employees to transfer from KRS to KEMI.

   The voluntary buyout would allow employees who would prefer to manage their own assets in a DC plan to convert their benefit from the fixed DB plan to a lump sum beginning account balance in the DC plan, on a tax-exempt basis. Since the conversion would be voluntary on an employee-by-employee basis, any applicable rights under the inviolable contract provisions would not be abridged. This conversion would remove the liability from the retirement system, value the employee's accrued service as of the date of the conversion – without applying future pay increases to the frozen portion of the benefit – improve the funded ratio and reduce risk to the plan.

Savings estimates for such a program were prepared assuming up to 30% of active employees in KERS-NH and CERS-NH selected the buyout of their accrued benefit. The analysis was based on funding the buyout and the individual accounts at 100% of the liability through a POB issued by the Commonwealth. Although CERS-NH potentially has the assets to fund buyouts, particularly at lower levels of participation, the POB funding was used for analysis purposes. Employers that participated in the buyout could repay the Commonwealth under a statutory arrangement similar to the pension contribution. The analysis illustrated below, with additional details in Chapters IV and V, also assumed that the full actuarial value of the accrued benefit at the time of the buyout is offered to the employee. Other alternatives could be pursued that would:

- Potentially result in less participation and benefit to the employee but greater savings to the Commonwealth, such as discounting the value of the accrued benefit, or offering the buyout based on the employee's account balance of accumulated employee contributions to date.
- Provide an additional incentive to participate such as a match from the Commonwealth. However, considering the impact of the more conservative actuarial assumptions adopted by the KRS board, these incentives are unlikely to generate significant savings for the Commonwealth when compared to the cost of borrowing for a POB.

The 30% assumed rate is likely on the high end of the range of potential participation, based on the experience of Florida and Ohio with voluntary conversions to optional DC programs. The savings estimates are relatively linear other than fixed costs of borrowing for a POB, and so smaller buyout participation rates would have corresponding reductions in the savings estimates below.

Voluntary Buyout Estimates: $ in Millions

	KERS-NH Total	CERS-NH Total
Unadjusted Liability: Active Employees	2,655.2	4,287.2
Adjusted Outstanding Liability: Active Employees	1,615.3	2,829.8
Buyout Percentage	30.0%	30.0%
Buyout Cost to Fund	484.6	849.0
Unadjusted/Reported Liability Relief to Plan	796.6	1,286.1
Required Employer Contribution: Revised Baseline	55.0	97.4
Estimated Debt Service	30.2	52.9
Estimated Annual Savings	**24.7**	**44.4**
Estimated Annual General Fund Savings	**14.5**	n/a
Funded Ratio Benefit	**1%**	**5%**

Source: Cavanaugh Macdonald, estimated liability figures; PRM, estimated adjusted liability figures; PFM, estimated other figures

7. Explore a pension risk transfer buy-out or buy-in program, where a plan sponsor purchases annuities from an insurer to either completely and permanently shift liability, risk, and benefit administration from the system to an insurer, or to shift risk on an annual basis. Although such an approach may not be financially viable on a full scale, the systems could explore whether a partial risk transfer for particular segments or groups of retirees could be effective.

D. Investment Practices and Governance Approach

In the aggregate across all Kentucky plans, investment performance below actuarial targets drove nearly 23% of the total growth in unfunded pension liabilities from 2005 to 2016 – with more than two-thirds of that investment shortfall attributable to weakness in the overall financial markets, rather than underperformance specific to Kentucky's plans. In other words, investment returns below market averages caused less than 10% of Kentucky's aggregate shortfall.

Nonetheless, any underperformance is of high concern, particularly given the challenged overall condition of the Commonwealth's systems and the critical importance of restoring trust and confidence in these plans.

Earlier in 2017, the Kentucky Legislature and Governor Bevin worked together to enact Senate Bill 2 that took multiple, significant steps toward improving system transparency, governance, and accountability, including, among other reforms:

- Requirements for investment experience to serve on the retirement systems' boards with stricter requirements for financial disclosures.
- Enhanced, uniform requirements for reporting and disclosing investment-related fees
- Senate confirmation for board appointments to the Commonwealth's retirement systems

Looking forward, future changes to governance could potentially further build on these reforms. At the same time, it remains important to ensure that additional governance changes do not risk the creation of new administrative structures and inefficiencies that could potentially reduce the net return on the assets across the Commonwealth's multiple plans.

Recommended Options

1. Establish a single Kentucky Investment Board to provide highly transparent and expert management of assets across all of the Commonwealth's systems, while maintaining independent retirement system boards to continue to provide customized member services and review. As outlined in our Interim Report #1, states such as Wisconsin, Florida, South Carolina, and Massachusetts use variations of this approach as a mechanism for streamlining administrative structures and achieving beneficial economies of scale. Potential advantages of this approach might include:
    - Improved access and leverage with money managers and third-party vendors, as the combined asset base of all three systems will improve the ability to negotiate reduced fee schedules with money managers, consultants, custodians, and other service providers, and may provide access to additional managers, especially for the smaller plans. Based on KRS Pension's manager lineup and tiered fee schedules as of June 30, 2016, aggregating the assets from KRS, TRS and JFRS would reduce the weighted average manager fee by roughly 0.02%, which equates to *a savings of more than $5 million per year* across all

systems – this does not account for the additional savings through fee negotiation and will become even more significant as the plans shift away from alternative investments that do not typically have tiered or reduced fee schedules

- Improved position for hiring talented investment professionals. Hiring staff for a single team instead of three separate teams will allow the systems to select only the most qualified candidates and the larger combined asset base may attract more talented investment professionals.
- Simplified governance and monitoring, with lower overall costs for staff, infrastructure, and subscriptions.
- Coordinated and consistent investment philosophy, process and outlook. Investment decisions for all plans will be based on the philosophy and outlook of a single investment team and its consultants, resulting in a consistent approach and best ideas being implemented across all plans.
- Improved transparency and monitoring for legislators, taxpayers and other parties. Having a single investment team and a more concentrated list of investment managers and third-party vendors will allow for more consistent reporting and likely improve the ability for interested parties to access public information on the systems.

To maintain strong member services and stakeholder involvement, distinct retirement plans could be maintained for the dimensions of retirement system administration beyond investment management, as well as overall Board oversight and direction. Further, even within a consolidated structure, each plan can still maintain its own return objectives, asset allocation strategy, and liquidity constraints that are customized based on plan demographics and assumptions.

In addition, such a consolidated Kentucky Investment Board could better support the ongoing needs for expert, transparent, and competitively priced investment management in the event that the Commonwealth opts to provide greater independence for the CERS Board, as multiple CERS stakeholders have proposed. Of course, any significant governance change – whether carving out CERS as a separate system and/or creating a newly consolidated Investment Board – would have one-time transition challenges and costs. Over the longer-term, however, the Investment Board approach would be more likely to maximize investment returns and minimize the fees that offset them, relative to further fragmentation into smaller systems without the same economies of scale and access to best pricing structures.

2. Another area of partial consolidation that should be considered is the establishment of a committee to set actuarial assumptions, such as the discount rate. A centralized committee structure for actuarial assumptions as currently used by states such as Florida, Washington and South Carolina, and recently supported in a letter to the State Budget Director from the Kentucky Chamber of Commerce, would potentially include representation from executive

finance and budget officials, the Legislature and Legislative Research Committee, and other state officials.

This model provides a focused and clear fiduciary role for the members setting the assumptions, and would potentially ensure consistency across the various systems and enhance independence to ensure the actuarial assumptions are realistic by separating benefit administration from the assumptions. This would be helpful with the current structure of three retirement systems, and even more so if CERS is separated as contemplated by 2017 SB 226, creating a fourth system with its own board and actuarial assumptions.

E. Fiscal Impact: Developing a Balanced Approach toward Sustainable Benefits

The scale and severity of Kentucky's retiree benefit crisis places the Commonwealth's systems among the most at-risk in the nation. In turn, resolving this challenge while adhering to sound principles and policy goals will require both time and shared sacrifices across the full range of the Kentucky retirement systems' stakeholders. The problem is too big and too important to be wished away, or to be quickly solved from any single approach adopted in isolation.

As the first step in moving to fully resolve this crisis, our strong recommendation is for the adoption of an actuarial approach that both eliminates the "back-loading" responsible for much of the growth in unfunded liabilities and bases future funding on assumptions that are realistic and achievable. In turn, under the framework outlined above (level dollar amortization of unfunded liabilities, 5.0-5.25% assumed rate of investment return for KERS-NH and SPRS, 6.0%-6.25% assumed rate of return for all other plans) – and with full annual funding of the recommended employer contribution – the Commonwealth's General Fund pension contribution in FY2019 would be $2.5 billion, an increase of $1.2 billion above current FY2017 funding levels and $1.7 billion above the funding in FY2016.

Through the range of benefit reforms also summarized above, the plan actuaries project the potential for over $1.2 billion in aggregate FY2019 pension savings. At the same time, proposed buyout options and the use of DC plan structures will reduce the Commonwealth's exposure to the risk of new shortfalls emerging. The resulting FY2019 General Fund contribution requirement will still reach over $1.2 billion, but will now fall within the range of recently increased state funding levels. Even more importantly, the rate of growth in these contributions will be at much lower risk of continuing to skyrocket, and is projected to eventually stabilize and even decline over time.

All State Plans

		General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)			
#	Scenario Description	FY19	FY24	FY29	FY34
All Plans	Current Projections	1,410.5	1,724.3	2,041.8	2,421.8
All Plans	Impact of revised baseline, compared to published actuarial assumptions	1,063.2	747.8	317.8	(127.8)
	Revised Baseline	**2,473.7**	**2,472.2**	**2,359.7**	**2,294.0**
All Plans	Savings: net reduction in ADC from combination of all scenarios.	(1,247.9)	(1,237.6)	(1,178.6)	(1,148.1)
	Revised ADC after implementation of all proposed changes, above.	**1,225.8**	**1,234.5**	**1,181.0**	**1,145.9**

More detailed option-by-option costing and year-by-year projections for all eight plans are included later within the Fiscal Impacts section of this Report. As detailed in that section, the preceding projected impacts are based on a specific set of assumptions and data at a certain point in time. Actual plan experience and Board decisions will result in variances, potentially material, and these broad estimates should not be used for budgeting purposes

In addition to the above pension impacts, the options identified within this Report #3 for retiree healthcare restructuring could help to further improve overall benefit affordability, while still providing quality, competitive benefits as an important complement to income replacement.

Based on these estimated levels of premium reduction, the KRS actuarial liability would decline by about $1.4 billion and the annual employer contribution funding cost would be about $147 million lower as shown in the following table. This corresponds to an estimated $37 million in annual savings in the Commonwealth's General Fund budget for KRS plan OPEB[12], and an additional $40 million in annual General Fund savings attributable to the TRS recommended changes.

KRS (Sum of all five plans)	Current MA PPO ($ Millions)	Proposed MA PPO ($ Millions)
Actuarial Accrued Liability 6/30/2016	$7,639	$6,243
Plan Assets as of 6/30/2016	$4,605	$4,605
Unfunded Actuarial Accrued Liability	$3,034	$1,638
Funded Status	60%	74%
Normal Cost	$149	$126
ARC Funding (Using level dollar method)	$418	$271
FY2017 Annual ARC Savings		$147
FY2017 State General Fund Savings		$37

[12] *Using actuarial figures adjusted by PRM to a level dollar amortization, consistent with the pension estimates. Using the current amortization method and schedule, the estimated savings would be roughly $114 million in employer contribution, and $22 million in annual General Fund savings.*

In addition to the set of projected fiscal impacts summarized above, the following are among the key outcomes anticipated from the recommended options for reform:

- All future Kentucky state and local government employees would have access to a balanced set of retirement benefits providing positive income replacement levels, including:
    - Social Security participation (not now available to teachers and many local government public safety employees)
    - Additional defined contribution (401(k)-style) plans with significant minimum employer contributions and additional employer matches.
    - Quality retiree healthcare coverage consistent with that provided to active employees.
- All current Kentucky state and local government employees would have the value of their accrued benefits maintained, and receive benefits for future service as good as or better than those available for future hires.
- All retired Kentucky former employees would receive at least the same benefit level they were guaranteed upon retirement, and would see significant improvements to the funding of their benefits – strengthening the solvency of these vital commitments.
- In addition, all Kentucky stakeholders would begin to see steady and meaningful restoration of fiscal stability to the Commonwealth's retirement systems, with greatly reduced risk of renewed pension crises in the years ahead. In turn, this progress would ultimately lead to more resources available for critical investments and services, or fair employee raises going forward, and for improved financial health and credit strength.

As detailed in Interim Report #2, a status quo path is not sustainable. In this Report #3, we have sought to present a range of recommended options to regain a more sustainable direction. In the months ahead, we look forward to working with Kentucky's leadership to help inform the specific decisions that chart this course ahead.

With prior reforms as recently as this year's passage of 2017 Senate Bill 2, important and positive steps have already been taken. While the next steps to come will be even more challenging, they are also that much more critical to lead the Commonwealth forward.

- All future Kentucky state and local government employees would have access to a balanced set of retirement benefits providing positive income replacement levels, including:
    - Social Security participation (not now available to teachers and many local government public safety employees)
    - Additional defined contributions (401(k)-style) plans with significant minimum employer contributions and additional employer matches.
    - Quality retiree healthcare coverage consistent with that provided to active employees

Summary of Recommendations

Rec.#	Plans	Recommendation
Actuarial Assumptions		
1	KERS-NH, KERS-H, SPRS, CERS-NH, CERS-H	Modify KRS 61.565 to convert the level percent of payroll amortization method to a level dollar method
2	TRS, KJRP, KLRP	Modify KFRS 161.550 and KRS 21.525 to apply a level dollar amortization method
3	KERS-NH, KERS-H, SPRS, CERS-NH, CERS-H, TRS	Maintain current 30-year amortization periods beginning June 30, 2013 and 2014
4	KJRP, KLRP	Apply a 30-year amortization period for the existing unfunded liability with 20-year closed periods for future unfunded amounts
5	KERS-NH, KERS-H, SPRS, CERS-NH, CERS-H, TRS	Consider resetting amortization periods to 30 years if level dollar amortization is applied to smooth funding impact without elevating risk or back-loading
6	All	Adopt and maintain prudent and realistic investment return assumptions
Benefit Levels		
1	KERS-NH, CERS-NH, KJRP, KLRP	Provide future participants with a 401(k) style defined contribution (DC) retirement benefit with a mix of employer and employee contributions accumulating over time in truly individual accounts
2	KERS-NH, CERS-NH, KJRP, KLRP	Plan design: Defined Contribution: 2% minimum employer contribution + 50% match on first 6% optional employee contribution above the 3% minimum employee contribution (i.e. 5% employer maximum, 14% total maximum)
3	KERS-H, CERS-H, SPRS	Retain the current cash balance structure for new hazardous plan participants at this juncture, modifying only the requirements for normal retirement eligibility to be age 55 (Tier 1)/ 60, with no provision for retirement at any age based on years of service for those not already eligible

Rec.#	Plans	Recommendation
4	TRS	Newly hired teachers would enroll in Social Security, providing a significant new defined benefit with inflation-based COLAs
5	TRS	Plan design: Defined Contribution: 2% minimum employer contribution + 50% match on first 6% optional employee contribution above the 3% minimum employee contribution (i.e. 5% employer maximum, 14% total maximum)
6	All	Commonwealth's General Counsel review and address any litigation risk associated with an "ERISA-like" interpretation
7	KERS-NH, CERS-NH, KJRP, KLRP	For Tiers 1 and 2, accrued benefit associated with prior service protected at levels based on plan and date of hire, with no further accrual of service (although the benefit value will increase as the final average salary component of the defined benefit formula increases)
8	KERS-NH, CERS-NH, KJRP, KLRP	Tier 3 members would see the account value of their accrued cash balance benefit rolled over into the new defined contribution plan.
9	KERS-NH, CERS-NH, KJRP, KLRP	Future service earns a defined contribution benefit: 2% minimum employer contribution + 50% match on first 6% optional employee contribution above the 3% minimum employee contribution (i.e. 5% employer maximum, 14% total maximum)
10	All	All benefit payments for retirees would continue in full at the level in place as of 1996 or any subsequent date of retirement; payment amounts due to COLAs granted from 1996 to 2012 would be eliminated prospectively, within parameters protecting retirees to be further evaluated

Rec.#	Plans	Recommendation
11	KERS-NH, CERS-NH, KJRP, KLRP	Normal retirement age of 65 would apply (employees can retire earlier with an actuarially reduced benefit); No conversion of accrued sick, compensatory, and any other leave time toward pension benefit; Optional buyout to be developed for accrued pension service under Tiers 1 and 2, with rollover to the new defined contribution plan
12	KERS-H, CERS-H, SPRS	Retain the primary benefits associated with the member's current tier; Normal retirement age of 60 would apply (employees can retire earlier with an actuarially reduced benefit)
13	TRS	Continued plan design with DB characteristics for incumbent teachers; establish minimum retirement age of 65;eliminate enhanced benefit features provided outside of inviolable contract requirements
14	TRS	Suspend all prospective COLAs until the system reaches a minimum 90% funded level using conservative actuarial assumptions and apply such increases only to the amount of any benefit above a base level of $1,500 monthly
15	KERS-NH, KERS-H, SPRS, CERS-NH, CERS-H, KJRP, KLRP	Pursue harmonization of the level of benefits for non-Medicare and Medicare retirees in line with the PPO coverage provided to Commonwealth employees
16	TRS	Pursue harmonization of the level of benefits for Medicare retirees in line with the coverage provided to Commonwealth employees
17	TRS	Offer a choice to TRS retirees between the lower cost MA PPO plan and the current MA PPO plan

Rec.#	Plans	Recommendation
18	KJRP, KLRP	Harmonize the Medicare Advantage offered to members of the Judiciary and Legislator Retirement Systems with the coverage provided to KRS and TRS members
	Funding	
1	All	Funding mechanism should be based on the actuarially determined contribution (ADC) in a method sufficient to make the plan sound and on a sustainable path, and the Commonwealth should commit to full funding of the ADC for each plan
2	KERS-NH, KERS-H, SPRS, CERS-NH, CERS-H	Allocate the contribution out to individual employers through a percentage of payroll for the normal cost, and a dollar amount for the unfunded liability amortization associated with that employer's liability for service accrued at the employer
3	All	Develop a mechanism within the framework of the Commonwealth's biennial budget process to ensure that each year's payments represent the full annual funding requirement
4	TRS	If future teachers begin to participate in Social Security in conjunction with a redesigned state retirement benefit, local school districts could be required to pay the 6.2% employer contribution for such Social Security participation. This approach would align this salary-driven benefit cost with the salary-setting negotiations and decision-making occurring at the local level
5	CERS-NH, CERS-H	Explore a cap or collar on annual percentage change in overall employer contribution percentage
6	KERS-NH, CERS-NH, others optional	Offer a voluntary buyout/conversion of accrued service program to employees other than those in the cash balance plan, which would have a mandatory conversion

Rec.#	Plans	Recommendation
7	All	Explore whether a pension risk transfer for particular segments or groups of retirees could be effective
Investment Practices and Government Approach		
1	All	Establish a Kentucky Investment Board to provide transparent and expert management of assets across all Commonwealth systems

II. Recommendations: Actuarial Assumptions

As detailed in Report #2, more than two-thirds (68%) of the total increase in unfunded liability for all the Kentucky retirement plans from FY2005 to FY2016 was related to the actuarial assumptions used. Going forward, realistic and prudent actuarial approaches are critical to achieving and sustaining health plans:

- 25% was attributable to the actuarial back-loading of the liability amortization. The actuarially recommended employer contribution was not sufficient to offset interest on the unfunded liability and prevent the unfunded liability from increasing. This was compounded by reset amortization periods, in the case of KRS plans, and open or rolling amortization periods prior to FY2014 in the case of TRS, which prevented the plans from reaching the point in the amortization period where principal payments on the unfunded liability would rise to the levels needed for significant pay down. In addition, payroll growth was lower than assumed over the period, particularly for KERS-NH, such that actual contributions allocated to employers as a percentage of payroll were consistently lower than assumed in the short term – producing additional unfunded amounts that were continually re-amortized out further into the future. Finally, the employer contribution for the KERS-NH, KERS-H, and SPRS plans are fixed for two-year periods by statute as part of the Commonwealth's biennial budget process, which has also caused shortfalls amortized into the future when contribution requirements have increased annually in between the establishment of new, two-year rates.
- 22% was attributable to the actuarial assumption changes. As assumptions were revised to reflect more conservative expectations for earnings and mortality based on experience and forecasts, the unfunded portion of the liability increased.
- 15% was attributable to actuarial assumptions for investment returns being above the actual performance of the market as a whole.
- 6% was attributable to plan experience. This reflects improved mortality among retirees as well as employees retiring earlier than assumed without an offsetting reduction in benefit.

Report #2 also used more conservative actuarial assumptions for analysis purposes and quantified the potential impact on the Commonwealth's budget of those assumptions for the largest state plans, KERS-NH and TRS. Days before the release of Report #2 and presentation of the findings to the Public Pension Oversight Board on May 22nd, the Kentucky Retirement Systems Board of Trustees voted on May 18th to make significant adjustments to the actuarial assumptions for KERS-NH, KERS-H and SPRS, which were generally consistent with the alternative assumptions used in Report #2.

The following recommendations are based on the analysis prepared to date as well as the objective of reducing risk to the Commonwealth systemically and for each plan. The goal of reducing risk is to avoid recurrence of the volatility and unanticipated deterioration in the financial health of the retirement systems that have followed since 2001.

Recommendations for Actuarial Method

The current actuarial method for all KRS and TRS plans is the level percent of payroll amortization method. KRS 61.565 specifies that the KRS plans are based on a level percent of payroll amortization, and that the calculated percentage is assessed to employers based on that amortization. The KRS Board of Trustees adopted a 0% payroll growth assumption for KERS-NH and SPRS on May 18, 2017. Although the statutory actuarial method for KRS remains a level percent of payroll amortization allocated to employers as a percentage of payroll for each biennial budget, the new 0% payroll growth assumption in practice will modify the method for these plans to a level dollar amortization.

The actuarial method for the KJFRS plans requires contributions equal to normal cost plus interest on the unfunded liability plus 1 percent of the unfunded liability. The KJFRS actuary stated in the July 1, 2015 valuation report that "It is our professional actuarial option that the current legally prescribed method…is inconsistent with the plan accumulating adequate assets to make benefit payments when due, assuming all actuarial assumptions are realized. The current method of amortizing unfunded liabilities will not result in the full amortization of those liabilities."

Recommendations:

1. Modify Kentucky statute KRS 61.565 to convert the level percent of payroll amortization method for KRS to a level dollar method. This consistent approach to reducing the Commonwealth's long-term pension debt will substantially increase the likelihood of steady and meaningful progress toward regaining healthy funded status.

2. Modify Kentucky statutes KRS 161.550 and KRS 21.525 to apply a level dollar amortization method to TRS and KJFRS.

Recommendations for Actuarial Period

The amortization period for the KRS and TRS plans are closed 30-year periods beginning June 30 2013 and 2014, respectively. The KJFRS plans have a statutory amortization that does not truly eliminate the unfunded liability, as the actuary BPSM observed.

Recommendations:

3. Maintain the current 30-year amortization periods beginning June 30, 2013 and 2014 for KRS and TRS, respectively. Alternatively, although resetting the amortization period as in 2013 SB2 had unfavorable actuarial results, in the case of the significant shift in assumptions approved in May and July and the resulting escalation in required contributions in the near term, a reset period of 30 years under a new level dollar amortization would modestly smooth the impact of the increased contribution without increasing risk by back-loading principal payments as in the level percent of payroll method.

4. Apply a 30-year amortization period of the existing KJFRS unfunded liability, with 20-year closed periods for future unfunded amounts.

Recommendations for Earnings Assumption/Discount Rate

The recent trend nationally with actuarial discount rates and investment return assumptions is toward rate reduction and de-risking. As NASRA has noted, "among the 127 plans measured, nearly three-fourths have reduced their investment return assumption since fiscal year 2010."[13] The largest public plan, CalPERS, is phasing in a reduction to a 7.0% discount rate, which Moody's viewed as:

> …*credit positive… because it forces improved funding discipline of long-term liabilities, bringing reported costs and liabilities closer to their values under current market interest rates," and "will lessen the risk of unanticipated contribution hikes in the future from adverse investment performance. Investment risk-taking needed to justify a discount rate above declining return expectations would translate to a heightened chance of investment losses, which could ultimately produce even higher contribution requirements.*[14]

Fitch Ratings recently revised their standardized discount rate for adjusting state and local government pension liability from 7.0% to 6.0%, noting:

> *Despite recent market gains, relatively limited pension asset growth is likely during the current economic expansion compared to prior expansions. Expectations for returns are dampened by the slow pace of economic growth, driven by a variety of factors. In this environment, Fitch believes that lowering its standard investment return assumption to 6% from 7% better reflects the magnitude of the burden posed by pension commitments.*[15]

Studies have quantified the additional risk taken on by public plans in order to maintain discount rate assumptions despite large decreases in "risk-free" bond yields over the past decades. Analysis by the Rockefeller Institute indicated the following:

- "Public pension plans in the U.S. now invest nearly two-thirds of their assets in equity-like investments, up from one-quarter in the 1970s and about 40 percent in 1990. While public plans once were more conservative investors than private defined benefit plans, they now have a much greater share of their assets invested in equity-like investments than do private plans."

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[13] *National Association of State Retirement Administrators (NASRA) Issue Brief: Public Pension Plan Investment Return Assumptions, February 2016 and February 2017*

[14] *Moody's Investors Service, CalPERS' Reduction in Assumed Investment Returns is Credit Positive for Governments,*

[15] *Fitch Ratings, Revised Pension Risk Measurements, May 31, 2017*

- Between 1990 and 2014, “risk-free” ten-year Treasury rates dropped by roughly 6.0 percentage points, while the average public plan return assumption dropped by only roughly 0.5 percentage points.
- Public plan asset allocation to equity-like investments increased from 40% to 70% over this time period.
- Over a similar time period, on average private plan discount rate assumptions decreased from higher than public plan assumptions to over 3.0 percentage points lower.

The consequence of these trends is increased volatility and probability of deviation, losses, and under-funding.[16]

Report #2 used alternative discount rates in order to assess risk and inform analysis of the liabilities. A rate of 5.1% was applied to KERS-NH and SPRS, and a rate of 6.0% was applied to all other plans. The rate of 5.1% was based on our understanding of the process supporting the rates adopted by the KRS Board in May for KERS-NH and SPRS and discussed for other plans, in which the asset allocation approach was revised to reflect the varying degrees of stress and diminished assets of its plans. Based on this approach, we developed alternate return assumptions for a 10-year investment horizon and two levels of increased liquidity positions consistent with an updated KRS policy, with an allocation of up to 25% short-term bonds and 25% cash for the highly stressed plans. These assumptions were based on PFM Asset Management’s expected 10-year return for a portfolio with increased allocation to short-term bonds and cash. The time horizon for the investment return and the matching of asset investments to liabilities and the cash flows of paying benefits reflect the condition of the plans.

Although the policy of KRS does not directly apply to the TRS or KJFRS plans, the persistent underfunding of these plans, corresponding application of the depletion date and blended rate under GASB 67, and the recurring and large negative cash flows projected by the actuary of the TRS plan all supported the application of a similar Revised Asset Allocation rate of 6.0% for the TRS and KJFRS plans.

Furthermore, the systemic underfunding and risk of the Kentucky plans also support a more conservative assumption. The goal of the Bevin Administration is to reduce the systemic risk and adopt a consistent approach to the state-funded retirement systems.

Recommendations

5. Adopt and maintain prudent and realistic investment return assumptions.

[16] *Nelson A. Rockefeller Institute of Government, The State University of New York, How Public Pension Plan Investment Risk Affects Funding and Contribution Risk, January 2017*

- For a majority of the Commonwealth plans, we recommend investment return assumptions of 6.0-6.25%, more consistent with market experience across the past decade and aligned with the 6.0% rate adopted in May 2017[17] by the credit rating agency, Fitch Ratings, for normalizing their evaluation of retirement systems nationally. While somewhat below the most recent national median rate for major public pension plans, recent trends nationally continue to move toward lower assumed rates of return. Further, this recommended level reflects the comparatively weak funded ratio of most Kentucky plans (with all of the KRS and TRS plans funded at levels below 60% as of the most recent 2016 valuations), such that the use of lower-risk assumptions would be important for improving the likelihood of a return to a sound position.
- For the most severely underfunded KERS-NH and State Police Retirement System (SPRS) plans, we recommend even lower rates of 5.0-5.25% be adopted, reflective of the greater risk already borne by these plans due to extraordinarily low funded ratios (16.0% for KERS-NH and 30.3% for SPRS as of 2016, even prior to modified assumptions that will lower the reported rates prospectively). In addition, the cash flow pressures on these plans will likely require more conservative/liquid investment allocations.
- For the costing analysis included in the Report #3, unless otherwise noted, we have generally incorporated assumed rates of 5.1% for the KERS-NH and SPRS plans and 6.0% for all other Kentucky plans. These assumptions are is broadly consistent with the 5.25% and 6.25% assumptions recently adopted by the KRS Board. The assumptions for Teachers' Retirement System ("TRS") and the Judicial Form Retirement System ("JFRS") remain at 7.5% and 7.0%, respectively.

	2016 Plan Valuation Assumption	Plan Assumption as of July 2017	Recommended Assumption Range	Assumption Used for Report #3 Costing
KERS-NH, SPRS	6.75%	5.25%	5.0%-5.25%	5.1%
KERS-H, CERS	7.5%	6.25%	6.0%-6.25%	6.0%
TRS	7.5%	7.5%	6.0%-6.25%	6.0%
JFRS	7.0%	7.0%	6.0%-6.25%	6.0%

- Because market and plan conditions and expectations will change and evolve over time, system fiduciaries should continue to have the flexibility to reevaluate and

[17] *"Revised Pension Risk Measurements," Fitch Ratings, May 31, 2017. In this report, Fitch notes: "Despite recent market gains, relatively limited pension asset growth is likely during the current economic expansion compared to prior expansions. Expectations for returns are dampened by the slow pace of economic growth, driven by a variety of factors. In this environment, Fitch believes that lowering its standard investment return assumption to 6% from 7% better reflects the magnitude of the burden posed by pension commitments."*

modify actuarial assumptions, consistent with mainstream practice among public pension plans, rather than establishing such assumptions in statute. At the same time, as further detailed below, the Commonwealth could assign this responsibility to a new, statewide investment board – a structure used by some other states to provide for economies, consistency, and transparency in managing investments – as a strategy for elevating review of these important factors.

III. Benefit Levels and Risk Exposure

Plan Alternatives

In evaluating reform options, the team was guided by several key goals and objectives identified by the Governor's Office, State Budget Director, and staff. These goals included:

1. The extremely distressed state of the KERS-NH plan, and the systemically high level of unfunded liability and required contributions across all plans, require strong actions to reduce the risks of:
    - Continued increases in required contributions that crowd out other necessary public spending, or reach levels that cannot be sustained in the budget while keeping the state's taxes at a competitive level
    - Resorting to paying benefits on a pay-as-you-go cash basis, which could also quickly become unaffordable within the Commonwealth's budget
    - Plan insolvency
2. The accrued benefits for service earned by employees and retirees should be protected, within a framework consistent with inviolable contract provisions and federal ERISA standards for private plans;
3. Long-term solvency of the retirement system as a whole must be ensured so that current retirees and future retirees can rely on secure retirement benefits;
4. Risk levels systemically and for each individual plan should be reduced as much as possible to avoid recurrence of the drastic deterioration in the retirement systems' health that has occurred since 2001. While underfunding of the actuarially recommended employer contribution was a factor in this deterioration, such funding shortfalls comprised only 15% of the total increase in unfunded liability between 2005 and 2016. The remaining 85% was attributable to actual results being unfavorable compared to actuarial assumptions, COLA benefits awarded without funding, and modifications to the actuarial assumptions to reflect unfavorable experience trends. Future liabilities should be valued conservatively and the future risk to the Commonwealth of economic conditions, investment returns, demographics, and actuarial assumptions should be minimized.
5. In tandem with the goal above, the benefit structure should also reduce future exposure to risk and the reemergence of unfunded liabilities, in order to safeguard plan sustainability for KRS, TRS, and KJFRS participants, employers and the taxpayers;
6. The approach should provide career state and local employees and teachers a sufficient and sustainable benefit for a dignified retirement through a combination of benefits from KRS, TRS, and KJFRS, Social Security, and personal savings, while also accommodating workers who may spend only a portion of their career in public service.

In the context of the goals outlined above, PFM was tasked with helping to assess and analyze a number of alternative approaches to the redesign of the benefit provisions offered state employees through KRS, TRS, and KJFRS. Within this process, the PFM and Commonwealth teams analyzed the pros and cons of plan design alternatives, and assessed the potential that each would have on the overall goals and objectives outlined above.

The major reform approaches considered included:

1. Modifying key provisions of the current cash balance and defined benefit pension plans;
2. Creating a hybrid DB-DC plan.
3. Creating a pure defined contribution plan with expanded Social Security participation where necessary and possible.

The size and severity of the challenge is such that implementing reforms only for new hires for all plans, which would produce only nominal short-term savings as the impact of plan redesign will in the initial years apply to relatively few newly hired employees, is not likely to achieve sufficient impacts. Reforming future retirement benefits for current and already-retired employees effective immediately is critical for ensuring the system's long-range sustainability for retirees and the Commonwealth.

Modified Cash Balance and Defined Benefit Pension

Under this reform option, the Commonwealth would modify the current defined benefit pension plan for TRS employees, and the cash balance plan authorized in 2013 SB 2 for new hires in KERS, CERS, SPRS, and KJFRS plans. Potential reforms under this approach could include, but would not be limited to, increasing employee contributions, raising retirement eligibility ages, reducing benefit multipliers or the employer match/crediting rate, suspending or eliminating post-retirement COLAs, and other modifications as deemed necessary.

There would be minimal transition issues with establishing a modified cash balance or defined benefit pension plan for new employees. In general, the system would add an additional benefit tier, one for current employees and another for employees hired after the effective date of the enabling legislation.

While this approach would help to reduce system employers' normal cost for new hires, the employers would maintain substantial exposure to investment and other actuarial risks. With a modified defined benefit plan or cash balance plan, the potential would still exist for the system to develop unfunded liabilities notwithstanding the benefit modifications. In turn, these additional unfunded liabilities could add to the Commonwealth's long-term burdens from both a credit rating and balance sheet perspective.

Kentucky followed Kansas and Nebraska among states in introducing a cash balance plan in 2013 for KRS and KJFRS new hires. Cash balance plans are described as a type of hybrid plan that combines elements of a defined contribution and defined benefit pension plan, although they differ

significantly from a standard hybrid DB-DC model. Under the cash balance approach, all contributions (employee and employer) are credited and tracked on an individual basis. Each year, or as frequently provided by the plan, the contributions to the account are credited with some level of guaranteed minimum interest, which is 4% for Kentucky's plans.

The investment risk primarily remains with the employer in a cash balance plan. Employer and employee contributions are paid into the fund and pooled with the assets of the other employees and retirees. Further, while KJFRS has established a separate fund for the cash balance plan, and therefore prepares a separate actuarial valuation of the cash balance plan fund, the KRS plans pool the assets of the Tier 3 cash balance plan employees with those of the Tier 1 and Tier 2 defined benefit plans. Each Tier 3 cash balance plan member's account is essentially a notional account; unlike a defined contribution plan where the specific contributions associated with that employee are maintained in the employee's account, in the cash balance plan the contributions are pooled in the larger asset base, and benefits at retirement are paid from that common asset base. Cash balance plans still require that an employee be credited with the guaranteed interest rate regardless of investment performance of the common assets of the fund over the employee's career. Compounding this investment risk is the feature in Kentucky's plan that provides employees with an additional 75% of the returns over the guaranteed 4% interest for the previous year, if the five-year average geometrical return exceeds 4%.

Although the cash balance plan is often described as a hybrid plan that features elements of a defined contribution plan, it is in major respects a defined benefit plan with a different benefit calculation than traditional plans. The cash balance plan has an individual employee account like a defined contribution plan, and calculations are made to that employee's account on an annual basis, but the individual account does not hold hard assets equal to the account basis. The contributions into the plan and the assets required to meet the obligation of the employee's future retirement benefit payments are instead managed generally with fund assets by the system, with the same structure of investment consultants, fund managers, actuarial assumptions and calculations, and risks associated with a defined benefit plan, but with reduced risks and more defined contribution and benefit parameters.

Positive Factors of a Modified Defined Benefit Plan

Defined benefit pension plans may contribute to favorable recruitment and retention of employees, particularly when the employer is competing against other public employers with similar plans.

1. There would be minimal administrative burdens on the system if reform is limited to adjusting the existing defined benefit plan, and the overall complexity of the benefit plan for employees would also remain consistent with the status quo.

Negative Factors of a Modified Defined Benefit Plan

1. Investment and actuarial risks stay entirely with the employer.
2. Unfunded liabilities will likely remain at elevated levels for a long period.
3. Even with employee contributions and modified benefits, continued reliance on a DB plan will risk further growth in long-term employer costs and the potential for additional unfunded liabilities, with inherent volatility in funding requirements.

Positive Factors of a Modified Cash Balance Plan

1. There would be minimal administrative burdens on the system if reform is limited to adjusting the existing cash balance plan, and the overall complexity of the benefit plan for employees would also remain consistent with the status quo.
2. The current tier of benefits provides a comparable and sufficient benefit level (see Report #2 page 108) and reduced investment, longevity and under-funding risk than the legacy defined benefit plans.
3. The cash balance plan was selected in 2013 in part because in the KRS plans the new Tier 3 employees have been entered into the same funds for each plan as the legacy employees, which provided more favorable cash flow to the system than a defined contribution plan would have with segregated assets under the actuarial assumptions and methods in place. However, note that based on the actuarial assumptions adopted for KERS-NH and SPRS at the May 2017 board meeting, where the discount rate was lowered significantly and the payroll assumption was changed to 0%, or effectively a level dollar amortization, the increased contributions in the short term improve cash flow substantially, offsetting the unfavorable cash flow impact of entering new hires in a defined contribution plan.

Negative Factors of a Modified Cash Balance Plan

1. The employer retains investment and actuarial risk.
2. Unfunded liabilities will likely remain at elevated levels for a long period.
3. Although the perception is often that the cash balance plan is like a defined contribution plan where contributions are made, employees have individual accounts, and the plan then runs on “auto-pilot” - and therefore the potential for unfunded liabilities is eliminated - in practice the plans are still subject to investment, under-funding, economic and demographic risks, due to the guaranteed return as well as the employee receiving the majority of sustained upside returns. Although these risks are reduced compared to a traditional defined benefit plan, the perception that the risks have been eliminated in itself raises the possibility that unfunded liabilities can emerge over the long-term.

Defined Contribution Plan

1. Among state plans, Alaska and Michigan require state civilian employees to participate in a defined contribution plan. Several other states offer an optional defined contribution plan (Colorado, Florida, Montana, North Dakota, Ohio, South Carolina, and Utah, and effective February 1, 2018, the Michigan teachers plan), although they tend to have lower take-up rates.

Positive Factors

1. A defined contribution plan would stabilize the Commonwealth's cost for new hires as a fixed percentage of salary with the potential for slight variations based on how the employer matching contributions are structured, if any.
2. A defined contribution plan will eliminate all investment risk for the employer. A pure defined contribution plan, by definition, eliminates the accrual of unfunded liabilities for new hires, although the Commonwealth would still face sizable liabilities associated with its legacy defined benefit plan.
3. The portability feature of defined contribution plans may enhance the attractiveness of a position in state or local service for some potential employees, although the impact of this feature is likely to vary across different employee groups. For Millennial workers who may have non-traditional employment patterns (i.e., shorter-tenures across more employers), this benefit may be particularly attractive at the time of recruitment. Another area where a defined contribution or hybrid plan may be beneficial is with the recruiting of mid-career professionals with specific skill sets. In some situations, a defined contribution or hybrid plan may also be attractive to recruits with specialized skills who are recruited to public service, but do not anticipate devoting the balance of their career to this endeavor.
4. Administrative burdens on the Commonwealth to administer a pure DC plan could be manageable, as the voluntary DC plan and record-keeper through the Deferred Compensation Authority (DCA) are already in place, if a plan were not established within each system.

Negative Factors

1. While the portability of a DC plan may be attractive for some employees during recruitment, this same characteristic may also weaken the incentive for retention relative to a traditional DB plan.
2. A defined contribution plan has a finite, yet unknown time horizon for each plan participant. As a result, timing and investment environment will drive decisions good or bad. These decisions may have an impact on the predictability of the benefit available for employees in retirement. Losses in individual accounts, as experienced during the most recent recession, may substantially reduce the benefit available for employees nearing retirement and/or alter normal retirement patterns – creating individual hardships and, in some cases, creating pressure on the employer to provide relief.

3. Members in a DC plan, many of whom have little experience in the market, will be faced with the challenging task of directing their own investments. In simple terms, a defined contribution plan participant's benefit is determined by the level of contributions made (employee and employer) and the rate of return on investments. The rate of return is a factor of overall market performance and the employee's selected asset allocation and investment strategy. Some past studies have indicated that employees directing their own investments often earn lower rates of return than professionally managed defined benefit plans, although others have found that in more recent ten-year periods of analysis the differences between DB and DC plans had been reduced to almost zero and were not statistically significant. One report cited the increased use of balanced default-investment options, target-date funds, and index funds among DC plans as the reason for increasingly comparable performance between DB and DC plans.[18]
4. While the Commonwealth can structure a defined contribution plan to partially insulate members from the impact of poor investment decisions (e.g., by limiting the number of investment options, offering efficient default and target-date options, and/or by monitoring the costs and fees associated with investment options), the Commonwealth will nonetheless need to commit more resources to educational programs to ensure an appropriate level of member understanding.
5. Mutual funds and other investment options commonly found in 401(k) plans assess fees that can vary by the type of investment and whether or not the accounts are actively managed or index based. Professionally managed assets in a defined benefit plan are pooled and, as such, tend to have lower administrative and investment costs, resulting in higher net returns, according to past studies.[19]
6. The transition costs of enrolling new members in a DC plan could be significant. While the administrative burden would be difficult for the retirement systems to absorb, the Commonwealth could negotiate with the record-keeper of the DCA voluntary plan to scale up operations and accommodate the transition.

Hybrid Retirement Plan

Several states in recent years have moved toward providing a hybrid retirement plan, a shift away from the traditional defined benefit pension that has been the historical norm. Under this alternative approach, the retirement benefit combines elements of a reduced defined benefit (DB) pension with an individually directed defined contribution account.

As of July 1, 2012, there were a total of nine states offering a hybrid DB-DC plan (mandatory or optional) to broad groups of public employees, including Georgia, Michigan (teachers), Rhode Island, Utah, and Virginia (prospectively). Federal government employees hired after 1984 also

[18] *Manhattan Institute, Defined Contribution Pensions Are Cost-Effective, August 2015*

[19] *Center for Retirement Research at Boston College, Investment Returns: Defined Benefit vs. Defined Contribution Plans", December 2015*

have access to a hybrid type retirement benefit. Under the federal model, employees are eligible for a pension with a benefit multiplier ranging from 1.0% to 1.1% (varying by years of service) and are automatically enrolled in the Thrift Savings Plan, a type of defined contribution account with an employer contribution and match.

One of the greatest strengths of a hybrid plan is simply that it balances the inherent advantages and weaknesses of pure DB and DC plans. With a hybrid plan, an employer is able to combine the favorable elements of each plan design, manage to an acceptable level of cost uncertainty, and rebalance the distribution of investment risk.

Positive Factors:

1. The DB component gives the employer the ability to invest a portion of total funds over a longer horizon (greater than any one individual can invest in a DC account), taking advantage of more investment options, increased buying power, and potential for greater returns, while continuing to provide a base level of income in retirement that is guaranteed and less susceptible to market conditions.
2. The DC component incudes the employee in sharing investment risk, while providing individuals with the option to control their asset portfolio according to their own risk appetite and investment preferences.
3. The DC component provides additional flexibility in pre-retirement savings levels. Employees targeting to retire early can boost their savings to generate a larger share of retirement income from the DC plan.
4. The DC component also provides additional flexibility in meeting post-retirement expenses. Employees can access their account to cover large one-time expenses (e.g. costs associated with moving/ selling a home).
5. With less reliance on the defined benefit component, the magnitude of the potential for growth in unfunded pension liabilities would be substantially curtailed.
6. The defined benefit component may be a key contributor to favorable recruitment and retention of some employees. At the same time, the portability feature of the defined contribution component may be seen as a positive factor for some other employees (again, varying by employee).
7. There would be some additional administrative burdens on the Commonwealth to manage both the defined benefit plan and the modified 401(k) or 401(a) plan, but this would also occur while managing legacy DB plans alongside a DC plan for new hires.

Negative Factors:

1. The employer retains some portion of the investment and other funding cost risk from adverse actuarial experience (less than present in a pure DB plan, but more than in a DC plan).

2. As a result, even with a reduced defined benefit component, the potential exists (albeit mitigated) for unfunded liabilities relative to a pure DC approach, although this risk could be mitigated by cost control provisions as in the Tennessee and new Michigan teachers' plans.
3. There would be an additional layer of complexity for members in understanding the hybrid benefit structure and in making prudent investment decisions. The Commonwealth would likely be called on to devote additional resources in enhanced, ongoing educational programs to help ensure the quality of investment decisions by individual members.

Recommended Options for Future Hires

KERS-NH, CERS-NH, JFRS

To minimize risk moving forward a defined (DC) retirement benefit with a mix of employer and employee contributions should be provided to future participants of KERS-NH, CERS-NH, and JFRS.

Recommended Options – Future Hires

Plan	Primary Benefit	Other Adjustments
KERS-NH CERS-NH JFRS	Defined Contribution: 2% minimum employer contribution + 50% match on first 6% optional employee contribution above a 3% minimum employee contribution (i.e. 5% employer maximum, 14% total maximum)	No conversion of accrued sick, compensatory, and any other leave time toward pension benefit.

KERS-H, CERS-H, SPRS

Maintain the current cash balance structure for KERS-H, CERS-H, and SPRS with a modification to the normal retirement eligibility age to remain at 60 years of age but with no ability for unreduced retirement at any age based on years of service.

Recommended Options – Future Hires

Plan	Primary Benefit	Other Adjustments
KERS-H CERS-H SPRS	Retain the cash balance structure as now in place for post-2014 hires	Maintain the provision for retirement at age 55 for Tier 1 and 60 for Tiers 2 and 3, but eliminate eligibility for normal retirement at any age with 25 years of service

TRS

To minimize risk and provide teachers with a larger employer-provided benefit future teachers would participate in Social Security, which would provide a new defined benefit with inflation- based COLAs, along with a new primary employer-provided DC plan established similarly to KERS-NH and CERS-NH participants.

Recommended Options – Future Hires

Plan	Primary Benefit	Other Adjustments
TRS – Non-University and University members	• Social Security (generally not now provided for non-University members) • Defined Contribution: 2% minimum employer contribution + 50% match on first 6% optional employee contribution above a 3% minimum employee contribution (i.e. 5% employer maximum, 14% total maximum)	No conversion of accrued sick, compensatory, and any other leave time toward pension benefit.

Recommended Options for Current Employees and Retirees

KERS-NH, CERS-NH, JFRS

Freeze accrued benefits under the applicable existing pension tier(s) and provide a defined contribution plan as noted above. Provide an optional buyout of the actuarial value of accrued services with an equivalent cash value to be rolled over to the plan participant's new DC account. Cash out all sick leave upon retirement at 25% of the then-current salary rates and eliminate the ability to apply unused sick and compensatory leave to pension benefits. Consider prospective elimination of some or all benefit payments as a result of COLAs granted between 1996 and 2012 that are not protected by the inviolable contract provisions.

Plan	Primary Benefit	Other Adjustments
KERS-NH, CERS-NH, JFRS	• For Tiers 1 and 2, freeze accrued benefit associated with prior service protected at levels based on plan and date of hire, with no further accrual (although the benefit value will increase as the final average salary component of the defined benefit formula increases) • Tier 3 members would see the account value of their accrued cash balance benefit rolled over into the new defined contribution plan.	• Normal retirement age of 65 would apply (employees can retire earlier with an actuarially reduced benefit). • No conversion of accrued sick, compensatory, and any other leave time toward pension benefit.

Plan	Primary Benefit	Other Adjustments
	• Future service earns a defined contribution benefit: 2% minimum employer contribution + 50% match on first 6% optional employee contribution above a 3% minimum employee contribution (i.e. 5% employer maximum, 14% total maximum) • All benefit payments for retirees would continue in full at the level in place as of 1996 or any subsequent date of retirement; payment amounts due to COLAs granted from 1996 to 2012 could be reduced prospectively	• Optional buyout to be developed for accrued pension service under Tiers 1 and 2, with rollover to the new defined contribution plan

KERS-H, CERS-H, SPRS

All hazardous employee plan participants would retain primary benefits associated with their Tier, modifying only the requirements for normal retirement age and eliminating the ability to retire at any age based on years of service.

Plan	Primary Benefit	Other Adjustments
KERS-H, CERS-H, SPRS	• Retain the primary benefits associated with the member's current tier	• Normal retirement age of 60 would apply (employees can retire earlier with an actuarially reduced benefit).

TRS

For incumbent non-university members, a continued defined benefit plan is recommended, with the establishment of a minimum retirement age requirement and elimination of enhanced benefit features provided outside of any inviolable contract requirements. The suspension of all future COLAs until the system reaches a minimum 90% funded level using conservative actuarial assumptions, and apply such increases only to the amount of benefits up to a base level of the first $1,500 monthly.

Plan	Primary Benefit	Other Adjustments
TRS – Non-University and University	Retain the primary benefits associated with the member's current tier	• Normal retirement age of 65 would apply (employees can retire earlier with an actuarially reduced benefit). • Enhanced benefit features to be eliminated (highest three years of pay; conversion of accrued leave and compensatory time toward

Plan	Primary Benefit	Other Adjustments
		pension credit; and a higher benefit multiplier applied for years of service beyond 30) • Suspend all future COLAs until the system reaches a minimum 80% funded level using realistic actuarial assumptions, and apply such increases only to the amount of any benefit above a base level of $1,500 monthly.

Summary of Plan Benefit Recommendations – All Systems

System	Plan	Proposed Plan Reform	Benefit Reform Proposal	Minimum Contribution	Optional Employer Contribution	Average Contribution	Normal Retirement Age: All Employees
KRS	KERS-NH	Freeze All Plan Service Accruals	DC Plan	2% ER 3% EE	50% ER match on first optional EE 6%	3.2% ER, 6.5% EE: 9.7% total	65
	KERS-H	No Change	No Change	n/a	n/a	n/a	55 (Tier 1)/ 60
	SPRS	No Change	No Change	No Change	n/a	n/a	55 (Tier 1)/ 60
	CERS-NH	Freeze All Plan Service Accruals	DC Plan	2% ER 3% EE	50% ER match on first optional EE 6%	3.2% ER, 6.5% EE: 9.7% total	65
	CERS-H	No Change	No Change	n/a	n/a	n/a	55 (Tier 1)/ 60
TRS		Close Plan to New Hires	DC Plan + Social Security	2% ER 3% EE	50% ER match on first optional EE 6%	3.1% ER, 6.5% EE: 9.6% total	65
KJFRS	KJRP	Freeze All Plan	DC Plan	2% ER 3% EE	50% ER match on first	3.2% ER, 6.5% EE: 9.7% total	65

System	Plan	Proposed Plan Reform	Benefit Reform Proposal	Minimum Contribution	Optional Employer Contribution	Average Contribution	Normal Retirement Age: All Employees
		Service Accruals			optional EE 6%		
	KLRP	Freeze All Plan Service Accruals	DC Plan	2% ER 3% EE	50% ER match on first optional EE 6%	3.2% ER, 6.5% EE: 9.7% total	65

Notes:

1) ER= employer contribution; EE=employee contribution
2) Normal retirement age would be applied to all current actives
3) Accruals toward unreduced early retirement provisions based on years of service would be frozen after the cutoff date
4) Average contribution based on expected employee contributions (not all employees are assumed to contribute the maximum optional amount)

Replacement of Income at Retirement

When an employee retires, pay stops and the employee must begin using the financial resources accumulated during active work. These resources include pension plans, defined contribution accounts such as 401(k), 457(b), 403(b) or IRAs; Social Security; and personal savings including inheritances.

A person's financial needs decrease at retirement. Broadly speaking, need here is defined as the amount of income a retiree needs to maintain his or her preretirement standard of living after retirement. Several of the factors that might affect a change in financial needs at retirement include:

- Work related expenses are substantially reduced or eliminated altogether.
- Taxes, particularly payroll taxes for FICA/FUTA, are not paid from retirement income.
- Income taxes are lower after retirement because income is typically lower, and because some sources of income, such as Social Security benefits are taxed at lower rates.
- Contributions to savings plans are completed.
- The cost of raising a family typically diminishes.
- There may be some added costs due to travel in retirement, etc.

- Medical costs may change both at retirement and if retired under age 65, at age 65 when the employee will be covered by Medicare

While the amount of income a person needs is going to vary by individual, it is possible to develop a target income from the analysis of a large group of individuals.

The most recent of periodic studies completed by Aon Hewitt in partnership with Georgia State University examines "retirement income replacement ratios" and that information has been used in assessing the typical range of income replacement needed at retirement for Commonwealth of Kentucky retirees. While published nearly a decade ago, this most recent study remains relevant since federal income tax rates have not changed materially since the 2008 study except at the highest income levels.[20]

Here we define retirement income replacement ratios as:

$$Replacement\ Ratio = \frac{\text{income after retirement}}{\text{income before retirement}}$$

[20] *http://www.aon.com/about-aon/intellectual-capital/attachments/human-capital-consulting/RRStudy070308.pdf*

Aon Hewitt Study

The underlying data source for this Aon Hewitt report is the U.S. Department of Labor's Bureau of Labor Statistics' Consumer Expenditure Survey (CES). This is essentially the same database that is used to construct the Consumer Price Index and provides a broad look at income needs.

The "Replacement Ratio" is the percentage of an employee's salary that is needed after retirement to maintain the employee's pre-retirement standard of living. Thus, if an employee has a needed replacement ratio of 85%, the employee will need 85% of pre-retirement income after he or she retires. For this analysis, we elected to use what is called the "Base Case" in the Aon Hewitt report. The assumptions are that the employee is married and is the sole wage earner of the family, retiring at age 65, with the spouse three years younger at age 62. Therefore, the family is eligible for family Social Security benefits, which are 1.375 times the wage earner's benefit. The following are the needed replacement income levels at age 65 for a Base Case employee.

Table 1 Replacement Income Needed by Source			
Income Before Retirement	From Social Security	Private and Employer Plan	Replacement Needed
$30,000	59%	31%	90%
$40,000	54%	31%	85%
$50,000	51%	30%	81%
$60,000	46%	32%	78%
$70,000	42%	35%	77%
$80,000	39%	38%	77%
$90,000	36%	42%	78%
$150,000	23%	61%	84%

As stated above, these results are for a married individual as a sole wage earner. However, other family situations required only minor adjustments to the replacement ratios so the single wage earner table is used for analysis. Further adjustments can be made to these results, the primary of which are for savings rates and medical costs.

Social Security Benefits

Participants in the KERS Non-Hazardous plan, CERS Non-Hazardous plan, State Police plan, the Judicial Form Retirement System as well as University employees in the Teachers Retirement System are assumed to be eligible for Social Security benefits. Employees who are not enrolled in Social Security (i.e. non-University employees in the Teachers Retirement System and a typical employee in the CERS-Hazardous plan) will not be paying Social Security contributions so will have more take-home pay and greater resources available for personal savings.

Income from Defined Contribution Plans

Retirees will have considerable flexibility in the amount that they withdraw from their defined contribution accounts each year to supplement their Social Security income and Defined Benefit plan income. For analysis purposes, we have assumed that a smaller percent of the account balance at retirement will be withdrawn for employees retiring at a younger age and a larger percent for employees retiring at older ages, as employees retiring at older ages will have shorter life expectancies. The table below shows the percent of the account balance assumed to be withdrawn at retirement by age at retirement.

Table 2 – Income from Defined Contribution Plans by Age at Retirement	
Age at Retirement	**Percent Withdrawn as Income**
55	7.0%
60	7.6%
62	7.8%
65	8.5%
67	9.0%

For example, an employee with a defined contribution account balance of $200,000 who retires at age 62, is assumed to draw an income of $15,600 per year annually (7.8%, $1,300 per month).

Illustrations in 2018 Dollars

The replacement ratio analysis examines the separate benefit structures for the eight retirement systems (KERS Non-Hazardous, KERS Hazardous, CERS Non-Hazardous, CERS Hazardous, State Police, Teachers, Legislators, and Judiciary), as well as the retirement eligibility and benefit accruals under the different benefit tiers. Sample employees for each retirement system and benefit tiers were selected to illustrate the expected retirement benefit after a career employment with the Commonwealth.

The expected retirement income at retirement is illustrated in 2018 dollars for all benefit tiers. All sample employees, including those with 15 years or past service and newly hired employees have retirement incomes as if they are retiring in 2018 after a full career with the Commonwealth earning a benefit under the appropriate benefit tier.

KERS Non-Hazardous Plan

Based on current pay levels for career employees the illustrations for KERS Non-Hazardous participants assume employees retire at age 65 on a final salary of $60,000. Historical salary levels are projected back to date of hire using a 3% annual rate of pay plus the same merit/promotion rates as set out in the 2016 valuation report.

For Tier 1 employees (i.e. employees hired before 9/1/2008), the sample employee has 15 years of service in Tier 1 and is assumed to retire with 35 years of total Commonwealth service, so will have 20 years' accrual under the defined contribution plan. The 15 years of Tier 1 service credit will be applied to the final average salary at retirement using the benefit multiplier of 2.0%. For the defined contribution plan the employee is assumed to maximize the employer contribution amount. For illustration purposes, the values are calculated as of January 2018 (i.e. using the expected Social Security Income of $21,300 for someone retiring in 2018 at age 65 on a final salary of $60,000).

For Tier 2 employees (i.e. employees hired between 9/1/2008 and 12/31/2013) the sample employee has 7 years of service in Tier 2 and is assumed to retire with 35 years of total Commonwealth service, so will have 28 years' accrual under the defined contribution plan. The 7 years of Tier 2 service credit will be applied to the final average salary at retirement using the benefit multiplier of 1.1%. For the defined contribution plan the employee is assumed to maximize the employer contribution amounts, so is assumed to contribute 9% of pay.

For Tier 3 employees (i.e. employees hired after 1/1/2014) the sample employee has 4 years of service in the Cash Balance plan. That service will be converted into an account balance as if the new defined contribution plan had been in effect at the date of hire. For the years of service while in the Cash Balance plan the defined contribution account will be developed based on the full 6% employee contribution, and an employer contribution of 5 percent. These contributions are accumulated from date of hire to the new plan date earning 5.25% interest.

New hires will accrue benefits in the defined contribution plan throughout their career. For employees born after 1966, the Social Security Normal Retirement Age is 67. We have therefore illustrated the retirement benefits for a new hire who retires at age 67 with 37 years of service. The "Tier 4" employee is also assumed to retire on a final salary of $60,000.

Table 3 KERS Non-Hazardous Plan

Employee	Final Salary	Age	Service	From Social Security	From KERS DB Plan	From DC Plan	Total Retirement Income	Ratio of Retirement Income to Final Salary
A-Tier 1	$60,000	65	35	$21,300	$16,823	$17,335	$55,458	92%
B-Tier 2	$60,000	65	35	$21,300	$4,318	$26,063	$51,681	86%
C-Tier 3	$60,000	65	35	$21,300	$3,764	$29,595	$54,660	91%
D-New Hire	$60,000	67	37	$24,324	$0	$39,014	$63,338	106%

As noted above in Table 1, the target replacement income for an individual earning $60,000 at retirement is 78% of pre-retirement earnings. Table 3 shows that career employees in KERS Non-Hazardous retiring at age 65 will have retirement resources that exceed this target amount.

Employees who plan to continue working until Social Security Normal Retirement Age will be able to build above-target replacement income if they maximize the employer match, and can achieve 90% replacement ratio with an optional employee contribution rate below the rate that maximizes the employer match.

KERS Hazardous Plan

Based on current pay levels for career employees the illustrations for KERS Hazardous participants assume employees in Tier 1 today will retire at age 55 on a final salary of $58,000. To estimate final average compensation, historical salary levels are projected back using a 3% annual rate of pay plus the same merit/promotion rates as set out in the 2016 valuation report. For benefit tiers with a Normal Retirement Age of 60, employees are assumed to retire at (or after) Normal Retirement Age.

For Tier 1 employees (i.e. employees hired before 9/1/2008) the sample employee is assumed to retire with 25 years of service. The years of service credit will be applied to the final average salary at retirement using the benefit multiplier of 2.49%. For illustration purposes, the values are calculated as of January 2018.

For Tier 2 employees (i.e. employees hired between 9/1/2008 and 12/31/2013) the sample employees are assumed to have 30 years of service at age 60. One retires at age 60, while the other retires at age 62 (with 32 years of service). The years of service credit will be applied to the final average salary at retirement using the benefit multiplier of 2.5%.

For Tier 3 employees (i.e. employees hired after 1/1/2014) the sample employees are assumed to have 30 years of service at age 60, or with 32 years of service at age 62.

	Table 4 KERS Hazardous Plan							
Employee	Final Salary	Age	Service	From Social Security at 62	From KERS DB Plan	From KERS 4% Cash Balance Plan	Total Retirement Income	Ratio of Retirement Income to Final Salary
A- Tier 1	$58,000	55	25	$12,912	$34,898	$0	$47,810	82%
B - Tier 2	$58,000	60	30	$15,168	$42,046	$0	$57,214	99%
C - Tier 2	$58,000	62	32	$16,224	$44,849	$0	$61,073	105%
D- Tier 3	$58,000	60	30	$15,168	$0	$26,785	$41,953	72%
E - Tier 3	$58,000	62	32	$16,224	$0	$30,366	$46,590	80%

As noted above, the target replacement income for an individual earning $60,000 at retirement is 78% of pre-retirement earnings. Table 4 shows that most employees exceed the target replacement ratios even before including any income sources from employment before entering

service with the Commonwealth or after retiring from the Commonwealth, or from personal savings. The exception is the Tier 3 employee retiring at age 60 (employee D), who will fall slightly below at a replacement income of 72% of the pre-retirement income if the interest earnings credited to the member's account are at the assumed level of 5.25 per year.

CERS Non-Hazardous Plan

Based on current pay levels for career employees the illustrations for CERS Non-Hazardous participants, we assume employees retire at age 65 on a final salary of $55,000. Historical salary levels are projected back to date of hire using a 3% annual rate of pay plus the same merit/promotion rates as set out in the 2016 valuation report.

For Tier 1 employees (i.e. employees hired before 9/1/2008) the sample employee has 15 years of service in Tier 1 and is assumed to retire with 35 years of total service, so will have 20 years' accrual under the defined contribution plan. The 15 years of Tier 1 service credit will be applied to the final average salary at retirement using the benefit multiplier of 2.2%. For the defined contribution plan the employee is assumed to maximize the employer contribution amount. For illustration purposes, the values are calculated as of January 2018 (i.e. using the expected Social Security Income of $20,592 for someone retiring in 2018 at age 65 on a final salary of $55,000).

For Tier 2 employees (i.e. employees hired between 9/1/2008 and 12/31/2013) the sample employee has seven years of service in Tier 2 and is assumed to retire with 35 years of total CERS service, so will have 28 years accrual under the defined contribution plan. The seven years of Tier 2 service credit will be applied to the final average salary at retirement using the benefit multiplier of 1.1%. For the defined contribution plan the employee is assumed to maximize the employer contribution amounts, so is assumed to contribute 9% of pay.

For Tier 3 employees (i.e. employees hired after 1/1/2014) the sample employee has four years of service in the Cash Balance plan. That service will be converted into an account balance as if the new defined contribution plan had been in effect at the date of hire. For the years of service while in the Cash Balance plan the defined contribution account will be developed based on the full 6% employee contribution, and an employer contribution of 5 percent. The account balance and future defined contribution amounts are accumulated from the new plan date with an assumed earning rate of 5.25%.

New hires will accrue benefits in the defined contribution plan throughout their career. For employees born after 1966, the Social Security Normal Retirement Age is 67. We have therefore illustrated the retirement benefits for a new hire who retires at age 67 with 37 years of service. The new hire employee is therefore assumed to retire two years later on a slightly larger final salary of $58,633.

Table 5 CERS Non-Hazardous Plan								
Employee	Final Salary	Age	Service	From Social Security	From CERS DB Plan	From DC Plan	Total Retirement Income	Ratio of Retirement Income to Final Salary
A - Tier 1	$55,000	65	35	$20,592	$17,043	$16,283	$53,918	98%
B - Tier 2	$55,000	65	35	$20,592	$3,977	$24,751	$49,320	90%
C - Tier 3	$55,000	65	35	$20,592	$3,741	$28,227	$52,560	96%
D - New Hire	$55,000	67	37	$23,568	$0	$37,537	$61,105	111%

As noted above in Table 1, the target replacement income for an individual earning between $50,000 and $60,000 at retirement is 81% of pre-retirement earnings. Career employees in CERS Non-Hazardous retiring at age 65 will have retirement resources that exceed this target amount. Employees who plan to continue working until Social Security Normal Retirement Age will be able to build above-target replacement income if they maximize the employer match, and can achieve 90% replacement ratio with an optional employee contribution rate below the rate that maximizes the employer match.

CERS Hazardous Plan

Based on current pay levels for career employees, the illustrations for CERS Hazardous participants assume employees today will retire at age 55 on a final salary of $72,000. Historical salary levels are projected back to date of hire using a 3% annual rate of pay plus the same merit/promotion rates as set out in the 2016 valuation report. For benefit tiers with a Normal Retirement Age of 60, employees are assumed to retire at Normal Retirement Age.

For Tier 1 employees (i.e. employees hired before 9/1/2008) the sample employee is assumed to retire with 25 years of service. The years of service credit will be applied to the final average salary at retirement using the benefit multiplier of 2.5%.

For Tier 2 employees (i.e. employees hired between 9/1/2008 and 12/31/2013) the sample employees are assumed to have 30 years of service at age 60. One retires at age 60, while the other retires at age 62 (with 32 years of service). The years of service credit will be applied to the final average salary at retirement using the benefit multiplier of 2.5%.

For Tier 3 employees (i.e. employees hired after 1/1/2014) the sample employees are assumed to retire with 30 years of service at age 60, or with 32 years of service at age 62.

Table 6 CERS Hazardous Plan (No Social Security)							
Employee	Final Salary	Age	Service	From CERS DB Plan	From CERS CB Plan	Total Retirement Income	Ratio of Retirement Income to Final Salary
A - Tier 1	$72,000	55	25	$43,702	$0	$43,702	61%
B - Tier 2	$72,000	60	30	$52,442	$0	$52,442	73%
C - Tier 2	$72,000	62	32	$55,939	$0	$55,939	78%
D - Tier 3	$72,000	60	30	$0	$35,848	$35,848	50%
E - Tier 3	$72,000	62	32	$0	$40,877	$40,877	57%

As noted above in Table 1, the target replacement income for an individual earning between $70,000 and $80,000 at retirement is 77% of pre-retirement earnings. Table 6 shows that the Tier 1 Hazardous employee retiring at age 55 with 25 years of service would fall short of the target replacement ratio based on just the CERS benefit. As CERS Hazardous employees are not participating in Social Security, they do not pay Social Security taxes and therefore have larger take-home pay and can set aside funds in a personal savings account. If a CERS Hazardous employee saves 6.2% of pay in a personal savings account, the funds would accumulate to produce an additional income of 14% of final salary by age 55 after 25 years, 20% by age 60 with 30 years, and 23% by age 62 with 32 years of contributions. Tier 2 Hazardous employees retiring at age 62 would meet the replacement income target before taking into account any personal savings. Tier 2 Hazardous employees retiring at age 60 would need about 5% of pay from personal savings, which could be achieved by savings about 1.5% of pay during their career. Tier 3 employees retiring at age 62 would meet the replacement income target of 77% with personal savings of 20% of their final pay – which could be achieved by savings about 5.5% of pay during their career (less than the Social Security employee contribution rate of 6.2%). Tier 3 employees retiring at age 60 would need additional income from other sources to cover about 27% of their final pay. This could be achieved by saving 8.4% of pay annually during their career.

State Police Retirement System

Based on current pay levels for career employees the illustrations for SPRS participants assume employees today will retire at age 55 on a final salary of $78,000. Historical salary levels are projected back to date of hire using a 3% annual rate of pay plus the same merit/promotion rates as set out in the 2016 valuation report. For benefit tiers with a Normal Retirement Age of 60, employees are assumed to retire at Normal Retirement Age.

For Tier 1 employees (i.e. employees hired before 9/1/2008) the sample employee is assumed to retire with 25 years of service. The years of service credit will be applied to the final average salary

at retirement using the benefit multiplier of 2.5%. For illustration purposes, the values are calculated as of January 2018.

For Tier 2 employees (i.e. employees hired between 9/1/2008 and 12/31/2013) the sample employee is assumed to retire with 25 years of service. The years of service credit will be applied to the final average salary at retirement using the benefit multiplier of 2.5%.

For Tier 3 employees (i.e. employees hired after 1/1/2014) the sample employees are assumed to retire with 30 or 32 years of service.

	Table 7 SPRS Plan							
Employee	Final Salary	Age	Service	From Social Security at 62	From SPRS DB Plan	From SPRS CB Plan	Total Retirement Income	Ratio of Retirement Income to Final Salary
A-Tier 1	$78,000	55	25	$16,080	$47,344	$0	$63,424	81%
B-Tier 2	$78,000	60	25	$16,656	$47,344	$0	$64,000	82%
C-Tier 2	$78,000	62	27	$18,072	$51,131	$0	$69,203	89%
D-Tier 3	$78,000	60	30	$19,404	$0	$37,549	$56,953	73%
E-Tier 3	$78,000	62	32	$20,640	$0	$42,883	$63,523	81%

As noted above in Table 1, the target replacement income for an individual earning $80,000 at retirement is 77% of pre-retirement earnings. As shown in Table 7, both the Tier 1 and Tier 2 employees exceed the target ratio. Tier 3 employee E would have sufficient income to maintain his/her standard of living retiring at age 62, whereas employee D to retire comfortably at age 60 would need to supplement their pensions with additional savings.

KTRS Plan

Based on current pay levels for career employees the illustrations for KTRS participants assume employees today will retire at age 55 or 60 with 30 years of service on a final salary of $85,000. Historical salary levels are projected back to date of hire using a 3% annual rate of pay plus the same merit/promotion rates as set out in the 2016 valuation report. For benefit tiers with a Normal Retirement Age of 60, employees are assumed to retire at Normal Retirement Age.

For Tier 1 employees (i.e. employees hired before 9/1/2008) the sample employee is assumed to retire at age 55 with 30 years of service. The years of service credit will be applied to the final average salary at retirement using the benefit multipliers of 2.0% for University and 2.5% for Non-University. For illustration purposes, the values are calculated as of January 2018.

For Tier 2 employees (i.e. employees hired between 9/1/2008 and 12/31/2013) the sample employee is assumed to retire at age 60 with 30 years of service. The years of service credit will be

applied to the final average salary at retirement using the benefit multiplier of 2.0% for University and 2.5% for Non-University.

For new hires ("Proposal") the sample employees are assumed to retire with 30 and 32 years of service. For the years of service, the account will be developed based on a 9% employee contribution, and an employer contribution of 5%. These contributions are accumulated from date of hire to the new plan date earning 5.25% interest.

Table 8 KTRS

Employee	Final Salary	Age	Service	From Social Security	From KTRS DB Plan	From DC Plan	Total Retirement Income	Ratio of Retirement Income to Final Salary
University - Tier 1	$85,000	55	30	$17,916	$49,125	$0	$67,041	79%
University - Tier 2	$85,000	60	30	$19,080	$49,187	$0	$68,267	80%
Non-University - Tier 1	$85,000	55	30	$0	$61,407	$0	$61,407	72%
Non-University - Tier 2	$85,000	60	30	$0	$61,483	$0	$61,483	72%
New hire	$85,000	65	30	$23,592	$0	$37,699	$61,291	72%
New hire	$85,000	67	30	$27,048	$0	$40,202	$67,250	79%
New hire	$85,000	67	32	$27,660	$0	$43,274	$70,934	83%

Table 8 shows that University employees in Tier 1 or Tier 2 can expect to retire with an income that meets the target replacement ratio of 78%. Non-University employees retiring at or close to age 60 can also expect to meet the target replacement income ratio.

Table 8 also shows that new hires retiring at age 67 with 30 years of service meet the target, while new hires retiring at age 67 with 32 years of service exceed the target.

Employees who are not covered by Social Security will have additional take-home pay during their working career as they will not be paying FICA taxes. These individuals can build additional retirement income from savings to supplement the benefit they receive from the Commonwealth retirement plans.

KLRP Plan

Based on current pay levels for career employees the illustrations for KLRP participants assume employees retire at age 65 on a final salary of $50,000. Historical salary levels are projected back to date of hire using a 4% annual rate of pay.

For Tier 3 employees (i.e. employees hired between 7/1/1980 and 12/31/2013) the sample employee has 18 years of service in Tier 3 and is assumed to retire with 35 years of total service, so will have 17 years' accrual under the defined contribution plan. The 18 years of Tier 3 service credit will be applied to the final average salary at retirement using the benefit multiplier of 3.5%. For the defined contribution plan the employee is assumed to maximize the employer contribution amount. For illustration purposes, the values are calculated as of January 2018.

For Tier 4 employees (i.e. employees hired after 1/1/2014) the sample employee has 3 years of service in the Cash Balance plan. That service will be converted into an account balance as if the new defined contribution plan had been in effect at the date of hire. For the years of service while in the Cash Balance plan the defined contribution account will be developed based on the full 6% employee contribution, and an employer contribution of 5%. These contributions are accumulated from date of hire to the new plan date earning 5.25% interest.

New members will accrue benefits in the defined contribution plan throughout their legislative service. For employees born after 1966, the Social Security Normal Retirement Age is 67. We have therefore illustrated the retirement benefits for a new hire who retires at age 65 with 35 years of service and at age 67 with 37 years of service. The new employee who retires at age 67 is also assumed to retire on a final salary of $50,000.

Table 9 KLRP

Employee	Final Salary	Age	Service	From Social Security	From KLRP DB Plan	From DC Plan	Total Retirement Income	Ratio of Retirement Income to Final Salary
Tier 3	$50,000	65	35	$17,772	$30,304	$11,487	$59,563	119%
Tier 4	$50,000	65	35	$17,772	$2,144	$23,753	$43,669	87%
New Member	$50,000	65	35	$17,772	$0	$26,481	$44,253	89%
New Member	$50,000	67	37	$20,208	$0	$29,864	$50,072	100%

Table 9 shows that all sample plan members' retirement income exceeds the target replacement ratio of 81% even before including any income sources from employment before entering service with the Commonwealth, during, or after retiring from the Commonwealth.

KJRP Plan

Based on current pay levels for career employees the illustrations for KJRS participants assume employees retire at age 65 on a final salary of $125,000. Historical salary levels are projected back to date of hire using a 4% annual rate of pay.

For Tier 3 employees (i.e. employees hired between 7/1/1980 and 12/31/2013) the sample employee has 18 years of service in Tier 3 and is assumed to retire with 35 years of total service, so will have 17 years accrual under the defined contribution plan. The 18 years of Tier 1 service credit will be applied to the final average salary at retirement using the benefit multiplier of 2.75%. For the defined contribution plan the employee is assumed to maximize the employer contribution amount. For illustration purposes, the values are calculated as of January 2018.

For Tier 4 employees (i.e. employees hired after 1/1/2014) the sample employee has 3 years of service in the Cash Balance plan. That service will be converted into an account balance as if the new defined contribution plan had been in effect at the date of hire. For the years of service while in the Cash Balance plan the defined contribution account will be developed based on the full 5% employee contribution, and an employer contribution of 4%. These contributions are accumulated from date of hire to the new plan date earning 5.25% interest.

New hires will accrue benefits in the defined contribution plan throughout their career. For employees born after 1966, the Social Security Normal Retirement Age is 67. We have therefore illustrated the retirement benefits for a new hire who retires at age 65 with 35 years of service and at age 67 with 37 years of service. The new employee who retires at age 67 is also assumed to retire on a final salary of $125,000.

Table 10 KJRP

Employee	Final Salary	Age	Service	From Social Security	From KJRP DB Plan	From DC Plan	Total Retirement Income	Ratio of Retirement Income to Final Salary
Tier 3	$125,000	65	35	$30,792	$59,806	$29,896	$120,494	96%
Tier 4	$125,000	65	35	$30,792	$6,283	$64,365	$101,440	81%
New Member	$125,000	65	35	$30,792	$0	$68,531	$99,323	79%
New Member	$125,000	67	37	$35,532	$0	$79,713	$115,245	92%

Based on Table 1, the target replacement ratio range is about 82%. Table 10 shows that the Tier 3 sample employee's retirement income will exceed that target, as do the new members retiring at age 67.

Retiree Healthcare

In evaluating overall retiree benefits, it is important to take a holistic view that encompasses retiree healthcare as well as income replacement. As detailed in Report #2, Kentucky provides public employees with post-employment healthcare benefits that significantly enhance the overall retirement package relative to typical private sector benefits, over and above eventual Medicare eligibility. Specific eligibility, coverage, benefit plan designs and retiree premium cost-sharing varies by retirement system as well as by benefit "tier".

As also detailed in this prior report, Kentucky's retiree health plans are comparatively better funded than those of many public employers, as the Commonwealth has established separate trusts to accumulate assets to advance fund the benefits. Nonetheless, Kentucky's Other Post-Employment Benefits (or "OPEB," the accounting term for all non-pension retirement benefits that primarily consist of healthcare) still carry an aggregate unfunded liability of approximately $5.9 billion as of June 30, 2016.

In evaluating this retiree healthcare component of the Kentucky retirement programs, our team's approach sought to identify opportunities for savings – potentially freeing up resources that might be reinvested in strengthening the Commonwealth's pension plans – while continuing to provide quality competitive coverage. Led by team members from PRM Consulting Group, this evaluation resulted in the following findings and recommendations.

- Harmonize retiree benefit plans with coverage having the same actuarial value as the standard health benefit plan provided to Commonwealth employees:
    - For retirees under age 65 (i.e. not yet eligible for Medicare), maintain the current program through KEHP.
    - For retirees age 65 and older (i.e. enrolled in Medicare), establish Medicare Advantage plans that provide coverage with an actuarial value comparable to the standard KEHP plan.
- Limit retiree healthcare eligibility to employees retiring directly from Commonwealth service.

KRS, LRP, JRP

For retirees not yet eligible for Medicare, coverage is provided through the Kentucky Employees Health Plan, the plan that covers active employees. Annually, KRS trustees select the specific health care plan that is provided premium-free. Retirees who choose to enroll in another health plan are required to pay the difference in premium. When retirees become eligible for Medicare, coverage is provided through a Medicare Advantage plan. The premium cost-sharing depends on the coverage tier and length of service.

Benefit Tier	Service Requirement	Commonwealth Funding
Hired before 7/1/2003	20 or more years of service 15-19 years of service 10-14 years of service 4-9 years of service 0-3 years of service	100% KRS paid 75% KRS paid 50% KRS paid 25% KRS paid 0% KRS paid
Hired after 6/30/2003 and before 9/1/2008	10 or more years of service	$12.80 per month for each year of service, increased annually at 1.50%
Hired after 9/1/2008	15 or more years of service	$12.80 per month for each year of service, increased annually at 1.50%

For 2017, KRS trustees chose the Livingwell PPO as the "standard" healthcare plan for non-Medicare retirees. The key features of the plan are shown in the following table and compared to the features of the Medicare Advantage PPO. The table shows that Medicare retirees in the Medicare Advantage PPO have substantially smaller out-of-pocket costs than non-Medicare retirees in the Livingwell PPO. For example for a $100 specialist visit, the Non-Medicare retiree would pay $45 whereas the Medicare retiree would only pay $4 and for a $4,000 2-day hospitalization the non-Medicare retiree's out-of-pocket costs would be $800, whereas the Medicare retiree would pay $231.

Benefits and Coverage	Livingwell PPO		KRS Medicare Advantage PPO
	In-Network Services	Out-of-Network Services	All Services
Annual Deductible Individual	$750	$1,500	$320
Annual Out-of-Pocket Maximum Individual	$2,750	$5,500	$1,000
Primary Care Physician	$25	40%	4%
Specialist	$45	40%	4%
Office Surgery	$25 PCP $45 Specialist	40%	4%
Urgently Needed Care (Contracted Providers) Cost Share (Waived if admitted to the hospital within 24 hours for the same condition).	$50	$50 (conditions must be met)	Lesser of $65 or 4%
Emergency Department Services (waived if admitted to the hospital within 24 hours for the same condition)	$150 then deductible then 20%	$150 then deductible then 20% (conditions must be met)	Lesser of $65 or 4%

Benefits and Coverage	Livingwell PPO		KRS Medicare Advantage PPO
	In-Network Services	Out-of-Network Services	All Services
Ambulance Services	20%	20% (conditions must be met)	4%
Inpatient Hospital Care	20%	40%	$231 per admit

Members of the Legislative and Judiciary retirement systems and their dependents are also covered for retiree medical benefits. The amount of the premium paid by the retirement system varies by years of service.

Years of Service	Judicial	Legislators
20 or more	100%	100%
15, but less than 20	75%	75%, plus 5% per year in excess of 15
10, but less than 15	50%	50%, plus 5% per year in excess of 10
4, but less than 10	25%	25%
Less than 4	0%	0%

Teachers Retirement System

Similar to KRS participants, Medicare-eligible TRS members receive substantially richer benefits than their active counterparts.

Benefits and Coverage	Livingwell PPO		TRS Medicare Advantage PPO
	In-Network Services	Out-of-Network Services	All Services
Annual Deductible Individual	$750	$1,500	$150
Annual Out-of-Pocket Maximum Individual	$2,750	$5,500	$1,200
Primary Care Physician	$25	40%	4%
Specialist	$45	40%	4%
Office Surgery	$25 PCP $45 Specialist	40%	4%
Urgently Needed Care (Contracted Providers) Cost Share (Waived if admitted to the hospital within 24 hours for the same condition).	$50	$50 (certain conditions must be met)	$35

Benefits and Coverage	Livingwell PPO		TRS Medicare Advantage PPO
Emergency Department Services (waived if admitted to the hospital within 24 hours for the same condition)	$150 then deductible then 20%	$150 then deductible then 20% (certain conditions must be met)	$50
Ambulance Services	20%	20% (certain conditions must be met)	4%
Inpatient Hospital Care	20%	40%	$200 per admit

Recommended Options

1. Pursue harmonization of the level of benefits for KRS, LRP, and JRP non-Medicare and Medicare retirees so that the basic plan and benefit provided to the retirees is consistent with the Livingwell PPO coverage provided to active Commonwealth employees, rather than being richer and costing more.[21] The premium for a medical plan with benefits comparable to the Livingwell PPO and meeting the requirements of the Centers for Medicare and Medicaid Services is expected to be about 25% lower than the current cost.
2. Similarly, pursue harmonization of the level of benefits for TRS Medicare-eligible retirees so that the basic plan and benefit provided to the retirees is consistent with the Livingwell PPO coverage provided to Commonwealth employees.[22] TRS retirees could further be offered a choice between the lower cost Medicare Advantage PPO plan with benefits comparable to the Livingwell PPO and the current Medicare Advantage PPO plan design. Retirees would be responsible for the full premium of the higher cost more generous coverage, therefore retirees could choose the plan design that best meets their family needs. Under this approach, preliminary analysis indicates that under current market conditions, no employer subsidy would be required for Medicare-eligible coverage above the employee contributions made during active years of service.

[21] *KRS 61.702 (1) (b) "The board may authorize present and future recipients of a retirement allowance from any of the three retirement systems to be included in the state employees' group for hospital and medical insurance and shall provide benefits for recipients equal to those provided to state employees".*

[22] *KRS 61.702 (1) (b) "The board may authorize present and future recipients of a retirement allowance from any of the three retirement systems to be included in the state employees' group for hospital and medical insurance and shall provide benefits for recipients equal to those provided to state employees".*

3. Harmonize the Medicare Advantage plan provided to members of the KJFRS with the coverage provided to KRS and TRS members. In addition, by pooling the coverage for purposes of obtaining the premium, the KJFRS will be able to leverage the additional scale of the other plans to obtain more competitive premium rates.

IV. Funding

The current variety of mechanisms for funding pensions has, as illustrated in Report #2, contributed to the growth in unfunded liability and stress on the plans. Improving the financial health of the pension plans requires not just sustainable funding, but a mechanism for assessing and collecting the funding that addresses past deficiencies.

The funding method authorized for each plan is described in the table below:

Pension Plan	Funding Method	Source
KERS-NH, KERS-H, SPRS	Employer contributes the full actuarial contribution (normal cost plus amortization of unfunded liability) as a percentage of creditable compensation (payroll), based on level percent of payroll amortization and entry age normal funding method. The board sets the percentage each biennium based on the prior June 30 valuation. Effective July 1, 2014, the board cannot change rates for the second year of the biennium.	KRS 61.565
CERS-NH, CERS-H	Same as KERS-NH et al above, except that the board may change the percentage for the second year of the biennium based on the updated valuation.	KRS 61.565
TRS	The Commonwealth pays the entire cost of employer contributions for non-university, board of education employee pensions. The employer matches employee contributions of 9.105% of non-university salaries for pension (7.625% for university salaries), and contributes an additional 3.25% for the system's unfunded obligations with interest and for the medical insurance (OPEB) fund. The amortization of past COLAs, annuities, and sick leave allowances "may be funded by annual appropriations from the state," which was specified as a special appropriation rate of 2.94% of salaries for FY2018. TRS requests additional appropriation to cover the shortfall between the statutory contribution and the actuarial contribution. Unlike the other systems, the contribution is currently not tied to the actuarial calculation of normal cost or unfunded liability, and the amortization method is set by board policy.	KRS 161.550 KRS 161.553
JRP, LRP	The state contributes the normal cost plus interest on the unfunded liability plus 1% of the unfunded liability per year. The board adopts the actuarial assumptions, including whether entry age normal or projected unit credit funding method is used.	KRS 21.525

The funding mechanism should be based on the actuarially determined contribution (ADC) in a method sufficient to make the plan actuarially sound and on a sustainable path. The statutory mechanism for TRS has provided budgetary flexibility to the Commonwealth but not the funding discipline to consistently fund the benefit structure. Tying the employer contribution to a fixed percentage of payroll is associated with significantly lower funding of required contributions. According to a NASRA review of data from FY2001 to FY2013, state plans that had a contribution tied to the actuarial requirement funded on average 98% of the ARC over the period, while the plans that had a fixed contribution, such as TRS, funded only 79% of the ARC.[23]

The timing discrepancies caused by the Commonwealth's biennial budget and the lag between actuarial valuations and application of the recommended employer contribution to the budget are not uncommon among state plans. However, the financial condition of the Kentucky plans highlights the challenge. The high number of quasi-governmental employers participating in the KERS and CERS plans also creates relatively unique issues around enforcement and compliance with a funding method based on a common employer contribution percentage applied to current payroll.

It is also common for state multi-employer plans to allocate pension employer contributions out to employers as a percentage of payroll, even in cases where the amortization method is level dollar rather than level percent. In the last several years, CalPERS has implemented a slightly different method. The valuation report and subsequent bill for the upcoming fiscal year includes a percentage of payroll amount for the normal cost for that employer, and a dollar amount for the unfunded liability associated with that employer's liability based on service accruals earned by employees at that employer. The unfunded liability is presented as a fixed dollar amount due for that fiscal year, with an estimate of the next year's liability payment for planning purposes. The actual unfunded liability amount due for each year is revised annually based on updated valuations. This makes the employer contributions received by non-state CalPERS participating employers more stable and predictable, while reducing incentives to game the system through changes in employment practice and payroll.

Recommendations for Funding Method

1. The funding mechanism for all plans should be based on the actuarially determined contribution (ADC) in a method sufficient to make the plan actuarially sound and on a sustainable path. Commit to full funding of the employer contributions on an annual basis, using prudent actuarial assumptions and methods as outlined within this report.

2. Allocate the contribution out to individual employers in KRS plans, including CERS, through a percentage of payroll for the normal cost, where relevant, and a dollar amount for the unfunded

[23] *NASRA, The Annual Required Contribution Experience of State Retirement Plans, FY 01 to FY 13, March 2015*

liability amortization associated with that employer's liability for service accrued at the employer. This would fairly allocate liability across state departments for employees that worked in multiple departments, for example, rather than charging the last department of employment for the entire liability. An alternative would be to charge the normal cost based on a percentage of payroll, and allocate unfunded liability based on the headcount of retirees distributed according to their final employer.

It is also essential to recognize that the employers and departments that have participated in the plans share in responsibility for the unfunded liability for actives and retirees based on past service. The shift of future service to the DC plan in KERS-NH, CERS-NH, JRP and LRP requires allocating unfunded liability either as a dollar amount or based on the entire payroll of the employer, as pensionable payroll would no longer be appropriate going forward.

3. Develop a mechanism within the framework of the Commonwealth's biennial budget process to ensure that each year's payments represent the full annual funding requirement. In past years, payment shortfalls have periodically resulted from the disconnect between biennial budgets and annual actuarial valuations. For example, a reserve appropriation might be established to help provide for full annual funding. At a minimum, the actuary should estimate the second year's contribution.

4. If future teachers begin to participate in Social Security in conjunction with a redesigned state retirement benefit, local school districts could be required to pay the 6.2% employer contribution for such Social Security participation. This approach would better align this salary-driven benefit cost with the salary-setting negotiations and decision-making occurring at the local level. Because this cost would only be applicable for new hires, the budget impact for school districts would phase in gradually, providing school districts with time to manage and plan for this new fiscal responsibility. In our benchmarking of 20 states detailed in Report #2, teachers participate in Social Security in 13 of those states, and local school districts often fund some or all of the employer contribution for Social Security. Furthermore, in Kentucky the school districts already pay Social Security for the non-teaching employees that participate in CERS-NH.

5. Explore caps or collars on the annual percentage change in the required overall employer contribution percentage for CERS-NH and CERS-H. Participating employers in the CERS plans are required by law to pay the full ADEC in each year, and have done so over time. Changes in actuarial assumptions and losses due to experience can cause sudden and volatile changes in the ADEC. Although deviating from making the actuarially-required contribution on a sustained basis is a concern, a cap on how much the employer contribution percentage may change from year to year can help smooth budgetary increases over time while the benefit liabilities are consistently and conservatively valued across all plans on a transparent basis. For example, the employer contribution percentage could be allowed by statute to increase or decrease by no more than 5-10% in an individual fiscal year.

Recommendations for Funding Alternatives

There are several alternative considerations for structuring or re-structuring the funding of the pension systems. These include:

- Pension Obligation Bonds (POBs)
- Voluntary Buyouts/Conversion of Accrued Service to Deferred Compensation Plan
- Pension Risk Transfer

Pension Obligation Bonds

A POB is a taxable bond issued to provide assets to fund pension liabilities. The common structure is for a plan sponsor to issue a POB, using the bond proceeds to provide assets to the pension fund. This increases the funded ratio of the fund with the hope that the proceeds will earn a higher return than the cost of the interest on the bonds, creating positive arbitrage. *We do not recommend the Commonwealth pursue this form of a POB for an open-ended transfer of proceeds to fund assets in the hopes of generating positive arbitrage*. As one of the goals of this reform project is to reduce risk and improve sustainability, a strategy which relies on risk to succeed is not preferred.

Further, the rating agencies have taken increasingly critical views of this type of POB, indicating that issuing POBs of the magnitude required to make significant improvement would stress the Commonwealth's bond capacity and potentially lead to negative action, increasing the costs of future borrowing. Fitch Ratings has stated that it "views the impact of pension obligation bonds (POBs) on an issuer's credit quality to range from neutral to negative in most situations."[24] Moody's and Standard and Poor's have both highlighted the risk involved in the arbitrage strategy. In general terms, Moody's has commented "There is also the risk that returns on the invested pension bond proceeds may underperform expectations, leaving the government to make up the lost investment returns in addition to paying debt service on the bonds. For these reasons, extensive use of bond financing for pensions could be viewed as credit negative."[25]

For example, in late 2016 the State of Alaska authorized as much as $3 billion of POBs, and Moody's responded "While we generally have considered Pension Obligation Bonds neutral at best, in this case we find them to be more negative than usual due to the state's expectation of significant savings, the large role this debt will play in the state's overall debt portfolio, and the fact that under the governor's proposed fiscal structure the state's general fund would be in a weaker position to fund additional pension contributions if the invested pension assets underperform."[26] Standard and

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[24] *Fitch Ratings, Pension Obligation Bonds: Weighing Benefits and Costs, March 31, 2015*

[25] *Moody's Investors Service, Adjustments to US State and Local Government Reported Pension Data: Frequently Asked Questions, August 17, 2012*

[26] *Moody's Investors Service, Alaska Pension Obligation Bond Corp. Credit Opinion, October 7, 2016*

Poor's went further and placed the State on negative watch with the intent to downgrade the State's ratings if it completed the POB transaction, stating "Because of the possibility that pension system investment returns could fall short of actuarial assumptions or worse--below the interest cost on the POBs--we view the state's strategy to debt finance its pension liabilities as increasing the risk to its budget." Ultimately the State of Alaska did not complete the POB transaction.

A use of a POB as a means of funding a program that would terminally fix out liability, reduce risk, and set costs, such as the following options, would however be worth further consideration.

Optional Buyouts/Conversion of Accrued Service to Deferred Compensation Plan

The Commonwealth could offer to buy out or convert accrued service and roll it over to a deferred compensation plan, in conjunction with the proposal to offer defined contribution plans for new service/new hires. This mechanism would be similar to what was offered in KRS 61.522, which provided for nonprofit nonstock corporations participating in KRS to withdraw from the system by funding their liability. Employees had the option to leave their accrued service with KRS until retirement, or withdraw their account balances, which are defined as the employee's accumulated pension contributions based on the 5% of pay contribution, and roll it over to the new tax-deferred retirement program offered by the employer. Two employers to date, Kentucky Employers' Mutual Insurance (KEMI) and the Commonwealth Credit Union (CCU), have used KRS 61.522 to withdraw from KRS. KRS provided KEMI employees with a 60-day notice period to declare their intent to transfer to the new KEMI plan. It is our understanding that, by offering both a DB plan that would maintain the overall benefit structure and carry over the employee's service credit from the KRS plan, and by offering a DC plan with an employer match of 50% or 100% of the employee's account balance, KEMI incentivized all of its employees to transfer from KRS to KEMI.

The State of Florida offered a similar option when it first established the Florida Retirement System (FRS) Investment Plan defined contribution 401(a) plan option in June 2002. A total of over 21,000 existing employees, or 3.5% of covered active members, chose to convert the present value of their FRS pension plan accrued benefit into the Investment Plan option during an initial enrollment period of June 2002 to February 2003.[27] Subsequently, voluntary selection of the Investment Plan option for new hires has ranged between 21% and 30% each year since FY2005. In contrast, the Ohio Public Employees Retirement System has offered the option of a hybrid DB-DC plan (the Combined Plan) and a Defined Contribution plan (the Member-Directed Plan) alongside the traditional Defined Benefit plan since 2003, and roughly 2% of employees hired within 5 years prior to 2003 converted to one of the optional plans, and roughly 5% of hires since 2003 have selected one of the optional plans.[28]

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[27] *Florida Retirement System, Update on Choice in the Florida Retirement System Fact Sheet, March 2017*

[28] *Data file provided by Ohio PERS, November 2016*

The Fiscal Impacts section has further detail on the estimated potential savings to the Commonwealth and reduction of unfunded liability, based on a range of assumptions and potential outcomes. The estimates assume that the Commonwealth would fund the rollover amounts through POB financing for the KERS-NH and CERS-NH systems. The CERS-NH plan potentially has sufficient assets to fund conversion amounts, but could receive greater funding benefit through a POB financing. As there are many employers in the system, a potential solution to fund a POB for CERS would be for the state or a state-related entity to issue the bonds with debt service supported by an assessment to the CERS employers.

6. Offer an optional buyout/conversion of accrued service program to employees other than those in the cash balance plan for KERS-NH and CERS-NH members. The employees in the cash balance plan would have a mandatory conversion of their accrued benefit to the deferred compensation plan. The optional buyout would be based on the actuarially accrued benefit through the date of the proposed freeze or conversion to a DC plan.

Pension Risk Transfer

An additional option is to enter a transaction with an insurance company to exchange risk and potentially administration burdens. In a risk transfer "buy-out" structure the plan purchases an annuity for all or some portion of retirees. The plan pays the insurance company up-front for the annuity, and the insurer then administers the annuity and takes the investment, longevity, and other risks from the plan in exchange for the up-front fixed fee. This transaction is irrevocable.

An alternative structure is the pension "buy-in," where the plan purchases coverage for retiree liabilities at a set price and the insurer manages the investment, longevity and other risk, but the plan can terminate the agreement, remains the primary obligor of the liability, and continues to administer the benefits.

Pension risk transfer is a $30 billion annual market for private plans in the U.S. including buy-outs and buy-ins.[29] Although pension risk transfer is a developed market in the United Kingdom, it accelerated in the U.S. in 2012 when General Motors and Verizon executed $25 billion and $8 billion buy-outs of their pension liability, respectively.[30] However, there has been little activity in the public sector for a number of reasons:

- A buy-out is priced at the full value of the liability. Since most public plans are funded far below 100%, and are seeking solutions for making annual contributions affordable and plan funding sustainable, plan sponsors lack the ability to fund the transaction.

[29] *LIMRA Secure Retirement Institute Quarterly U.S. Group Annuity Risk Transfer Survey, March 1, 2017*

[30] *Prudential Retirement, Preparing for Pension Risk Transfer, July 2016*

- The higher discount rates used in the public sector compared to private sector requirements, as illustrated in Report #2, reduce the feasibility of the buy-out or buy-in. The insurance company will price the buy-out based on corporate bond rates similar to those used in private pension accounting, and similar to the type of investments the insurer will use to match the liabilities while meeting regulatory requirements.
- The financial focus in the public sector is typically on balancing budgets and sustainably providing services, rather than reducing liability or managing risk.
- Shifting administration of the retirement benefit through a buy-out annuity can be perceived as "privatizing" the benefit, although the benefit itself is protected and customer service may potentially improve.

The significant reduction in discount rates for the KRS plans from December 2016 through the present improves the relative attractiveness of the pricing of a buy-out or buy-in, compared to other public plans. Applying the discount rates recommended in this report to the other plans would have a similar impact. However, the plan under-funding still provides a challenge to buy-outs in particular. There may be a benefit to the Commonwealth of shifting the risk for particular retiree segments or population groups to an insurance structure.

7. Explore a pension risk transfer buy-out or buy-in program, where a plan sponsor purchases annuities from an insurer to either completely and permanently shift liability, risk, and benefit administration from the system to an insurer, or to shift risk on an annual basis. Although such an approach may not be financially viable on a full scale, the systems could explore whether a partial risk transfer for particular segments or groups of retirees could be effective.

V. Investment Practices and Approach

The Commonwealth of Kentucky Retirement Systems currently consist of three separate entities with their own investment teams operating autonomously. The three entities consist of the Kentucky Retirement System ("KRS"), Teachers Retirement System ("TRS") and Judicial Form Retirement System ("JFRS"). The governance structure of these three systems is outlined below, including the recent changes as a result of the Governor's reorganization Executive Order dated June 17, 2016 and further reforms enacted in 2017 SB2 on March 10, 2017:

KRS	TRS	JFRS
As provided by KRS 61.645	*As provided by KRS 161.250*	*As provided by KRS 21.540*
13-member Board of Trustees • 6 Trustees Elected o CERS (3), KERS (2), SPRS (1) • 6 Appointed by Governor o 2 with "investment experience" o 1 with knowledge of pension impact on local gov't o 3 from list provided by KLC, KACO, KSBA • Sec. of the Personnel Cabinet	9-member Board of Trustees • 7 Trustees Elected o Active Teachers (4), Retired Teacher (1), "Lay" Trustees (2) • State Treasurer • Commissioner of Education	8-member Board of Trustees • All Appointed o 3 by Supreme Court o 1 by Speaker of House o 1 by Senate President o 1 by Speaker/President jointly o 2 by Governor
As amended by SB 2 (2017 RS)	*As amended by SB 2 (2017 RS)*	*As amended by SB 2 (2017 RS)*
17-member Board of Trustees • 6 Trustees Elected o CERS (3), KERS (2), SPRS (1) • 10 Appointed by Governor o 6 with investment experience o 1 with knowledge of	11-member Board of Trustees • 7 Trustees Elected o Active Teachers (4), Retired Teacher (1), "Lay" Trustees (2) • State Treasurer • Commissioner of Education	8-member Board of Trustees • All Appointed o 3 by Supreme Court o 1 by Speaker of House o 1 by Senate President o 1 by Speaker/President jointly o 2 by Governor with investment experience

pension impact on local gov'ts o 3 from list provided by KLC, KACO, KSBA • Sec. of the Personnel Cabinet	• 2 Appointed by Governor with investment experience	

Source: Public Pension Investment Return Assumptions / Board Structures, Public Pension Oversight Board, February 27, 2017; 2017 SB2

The above Boards are responsible for oversight of both investment and benefit administration functions for their respective retirement systems and are supported by various staff members. In the following sections, we will explore some of the options that should be considered for improving the overall governance of these systems.

There are a range of governance structures in place at the state level for retirement systems. Variation occurs in how much centralization and consolidation occurs among types of plans and members, i.e. state civilians, public safety, teachers, local government workers, etc., as well as the extent to which administrative and investment functions are consolidated, segregated, or administered by a sole fiduciary or limited group of fiduciaries, usually elected and appointed officials. It is important to note that there are success stores for each variation and structure, and that the structure alone will not produce positive outcomes. However, there are potential benefits to particular structures that can be identified and in some cases quantified, and may better support the Commonwealth's goals and challenges.

Full Consolidation (Administrative & Investment)

The first and most comprehensive option would be the complete consolidation of both the administrative and investment functions for all three systems. This would result in a single administrative board and a single investment board that oversee all of the underlying systems. The most obvious benefit of full consolidation is the significant cost savings from reduced staff, systems, rent, etc., such as the $347 million net present value savings reported by the Indiana Public Retirement System as a result of fully consolidating their separate state and teacher systems (source: Fiscal 2014 Financial Report). Additional benefits would include a greater level of consistency across all three systems and the various investment-related benefits that are outlined in more detailed in the next section. However, this would represent a significant change from the Commonwealth's current structure and would be expected to entail a very difficult transition process over an extended period of time. In the case of Indiana, it took three years for legislative approval and a gradual consolidation process.

Although the full consolidation approach is likely the most logical if starting a retirement system from scratch, the difficulties involved in the consolidation process represent a significant barrier that may make full consolidation unattractive given the systems' current structure. As discussed in the following section, a partial consolidation approach that focuses on the investment side can achieve many of the same benefits with far less disruption to ongoing operations.

Partial Consolidation (Investment Only)

While there are clear differences in benefits administration between the three systems that would likely make full consolidation challenging, the investment functions and resources needed are very similar and therefore may be redundant in many areas. As a result, PFM believes there may be significant benefits to the systems by consolidating the investment functions under a centralized investment team that reports to a new Investment Committee comprised of board members with financial, investment, accounting, actuarial, or economics expertise. The following is an outline of the potential benefits and costs of consolidating the investment functions:

Benefits of a Single Investment Team

- ***Lower overall costs for staff, infrastructure, subscriptions, etc.***

Consolidation of staff, systems, etc. can be expected to significantly reduce overall costs of managing the systems, similar to the Indiana example above but restricted to investment-related functions.

- ***Improved access and leverage with money managers and third-party vendors***

The combined asset base of all three systems will improve the ability to negotiate reduced fee schedules with money managers, consultants, custodians, etc. and may provide access to additional managers, especially for the smaller plans

Based on the KRS pension fund's manager lineup and tiered fee schedules as of June 30, 2016, *aggregating the assets from KRS, TRS and JFRS would reduce the weighted average manager fee by roughly 0.02%, which equates to a savings of more than $5 million across all systems* – this does not account for the additional savings through further fee negotiation and will become even more significant as the plans shift away from alternative investments that do not typically have tiered or reduced fee schedules.

- ***Easier to hire talented investment professionals***

Hiring staff for a single team instead of three separate teams will allow the systems to select only the most qualified candidates and the larger combined asset base may attract more talented investment professionals.

- ***Simplified governance and monitoring***

A single investment team will tend to invest the plans in a similar set of managers and utilize a similar set of consultants, greatly reducing the overall time spent on due diligence, monitoring and reporting.

- ***Improved consistency in actuarial return assumptions***

At a minimum the Investment Committee would provide a single set of capital market assumptions to apply to actuarial analysis and valuations. While responsibility for conducting the actuarial valuation, hiring the professionals and adopting the assumptions could be left with the benefits administration systems, as is the case in Massachusetts, Oregon and Wisconsin, which have similar segregated administration and investment entities, it may be more appropriate to charge the Investment Committee with responsibility for adopting the actuarial assumptions and ensuring consistency for the state and local systems and their budgeting. The segregated Investment Board adopts the assumptions in Iowa, for example.

- ***Coordinated & consistent investment philosophy, process and outlook***

Investment decisions for all plans will be based on the philosophy and outlook of a single investment team and its consultants, resulting in a consistent approach and best ideas being implemented across all plans.

- ***Larger plans have been shown to achieve higher returns***

A study by the Center for Retirement Research at Boston College found that returns from 1990 – 2012 increased as plan size increased.[31]

Plan Size (assets)	Geometric Return 1990 - 2012 (DB Plans)
< $100m	6.5%
$100 - $500m	7.5%
$500m - $1b	7.8%
$1b - $5b	8.0%
> $5b	8.3%

- ***Improved transparency and monitoring for legislators, taxpayers and other parties***

Having a single investment team and a more concentrated list of investment managers and third-party vendors will allow for more consistent reporting and likely improve the ability for interested parties to access public information on the systems.

[31] *Center for Retirement Research at Boston College, Investment Returns: Defined Benefit vs. Defined Contribution Plans, December 2015*

Costs of a Single Investment Team

- ***May lose some customization of strategy for each system***

Consolidated and streamlined investment process may limit the amount of portfolio customization between the plans, but each plan can still maintain its own return objectives, asset allocation strategy, liquidity constraints, etc. that are customized based on plan demographics and assumptions.

For the reasons outlined above, we recommend strong consideration of consolidating the systems' investment functions into a single, centralized team under a common Investment Committee or Board that would handle all investment matters in support of each system. Although there are many benefits to consolidation, likely the most noticeable and immediate will be the monetary savings by removing duplicate staff, infrastructure, subscriptions and other resources, as well as negotiating lower fees with money managers and other plan providers. The savings from consolidation could help increase net investment returns to the plans, thereby improving the future outlook and funded ratios.

In addition, this consolidated investment team approach would mitigate the most adverse consequences of separating CERS from the rest of KRS, as recently contemplated in 2017 SB 226. All of the same benefits and costs outlined above for the consolidation of the investment teams would apply to the decision of whether CERS should remain part of KRS or become a separate entity from an investment standpoint. The following is an excerpt of the analysis provided in Report #2 that discusses just a small aspect of the potential investment-related impact on CERS and the other plans if they were to separate:

> *More than one-third of the portfolios are invested in managers with tiered fee schedules. Separating CERS assets from the other plans will reduce purchasing power and result in higher fees based on the current tiered fee schedules. The CERS weighted average fees would remain largely unchanged if they could retain the same contract terms, increasing by less than 1bp ($450k for Pension, $210k for Insurance). However, KERS & SPRS weighted average fees would be more impacted due to smaller asset size, increasing by roughly 3bps ($805k for Pension, $260k for Insurance). These estimates are based on the manager fee schedules outlined in RV Kuhn's quarterly report plus the private equity manager fee schedules from the internal KRS report. The fee impact noted above is likely understated as it would also limit the ability to negotiate reduced fees in the future as the aggregate asset size is reduced if the plans are separated. This may also impact KRS' ability to negotiate fees with other providers (i.e. consultants, custodian, etc.). Lastly, separating illiquid alternative assets (private equity, etc.) may not be possible in near-term.*

In addition to the potential additional investment management fees of $1.7 million identified above from separating CERS, a preliminary analysis by KRS leadership estimates potential recurring additional costs from operating separate administrative systems for KERS/SPRS and CERS of at least $3.6 million or more across the systems for duplicative salaries, insurance, custodial and professional services, and IT needs. This represents additional resources that would otherwise be used to build the asset base and pay retiree benefits, redirected to the goal of decentralization that has no corresponding quantitative benefits to offset these added costs.

Partial Consolidation (Actuarial Assumptions)

Another area of partial consolidation that could be considered is the establishment of a joint or conference committee with authority to set actuarial assumptions, such as the discount rate. In the event investment function consolidation is not pursued, this would be an alternative to establishing consistent actuarial methodology and assumptions. A centralized conference committee structure for actuarial assumptions as currently used by states such as Florida, Washington and South Carolina, could potentially include representation from executive finance and budget officials, the Legislature and Legislative Research Committee, and other state officials.

This model would provide a focused and clear fiduciary role for the members setting the assumptions, and would potentially ensure consistency across the various systems and enhance the independence to ensure the actuarial assumptions are realistic by separating benefits from the assumptions. This would be helpful with the current structure of three retirement systems, and even more so if CERS is split off for a fourth system with its own board and actuarial assumptions.

VI. Fiscal Impact of Recommendations

The revised assumptions already adopted by KRS, recommended changes in assumptions for other plans, and the benefit design recommended options presented here entail significant financial impacts for the Commonwealth and participating local employers. The impacts of these changes and recommendations are broadly illustrated below through the General Fund ADEC impact to the Commonwealth and estimated funded ratio for representative years, including FY2019, the first fiscal year that changes made in 2017 would impact the ADC. The contribution impacts for CERS-NH and CERS-H are illustrated through the employer contribution as a percentage of payroll rather than General Fund contributions.[32]

Please note: the estimated fiscal impacts of recommended options herein are presented for the purposes of evaluating and planning potential reforms. These estimates should not be relied on for actuarial valuation purposes or for the purpose of setting annual budget amounts or required employer contributions. The estimates were prepared based on the actuarial valuation of June 30, 2016, reflecting the then-current actuarial assumptions, alternative assumptions, and plan modifications. Experience over the past year has already deviated from what was assumed, and some of the actuarial assumptions effective at that time have been modified in ways that vary from what has been modeled for this Report. It is our understanding that assumptions at other systems may currently be under review. As such, actual results and future actuarial measurements will vary year-by-year – potentially materially - from the estimates presented in this Report, due to factors such as modification of assumptions, experience differing from that anticipated, and changes in provisions or law.

Scenario Estimates

The revised assumptions are estimated to significantly increase the required employer contribution to KERS-NH in the short-term. The General Fund portion of the KERS-NH employer contribution is estimated to increase by over 70% in FY19 to $521 million. A more moderate impact in annual required contribution compared to the prior/published June 30, 2016 assumptions is estimated by FY29, but by then the funded ratio is estimated to be 45.4%, more than double what it would have been under the old assumptions, when the level percent of payroll amortization would have maintained the same sub-20% funded ratio if all assumptions were met for over ten years.

[32] *Certain actuarial data and calculations were developed by Cavanaugh Macdonald Consulting LLC, plan actuaries for the KRS and TRS systems as of the June 30, 2016 valuation, and Bryan, Pendleton, Swats & Macallister LLC ("BPSM"), plan actuaries for the KJFRS plans as of the June 30, 2016 valuation, under subcontracts with PFM in order to help ensure the accuracy of the estimates and projections herein. Estimates of impacts to the Commonwealth's budget, or of comparisons between scenarios and baselines, were compiled by PFM based in part on information provided by the Office of the State Budget Director. In certain cases, where noted, if information had not been requested of the plan actuaries in time for completion of the report, the calculations by the plan actuaries were supplemented by high-level estimates prepared by PRM.*

The combined impact of implementing all the recommended and potential benefit options is estimated to reduce the required employer contribution by over $100 million of General Fund impact annually. In the short term, until roughly FY2027, the revised contribution after savings would still be higher than under the previous assumptions as the plans funding levels improve. Later, as the contributions in the old back-loaded schedule increase, the savings result in an estimated reduced General Fund expenditure.

Kentucky Employee Retirement System - Non-Hazardous (KERS-NH)

#	Scenario Description	FY19 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY29 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY34 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
KERS NH 1	Baseline: - 6.75% discount rate, 4% payroll growth	299.8	445.8	534.6	12.9%	18.0%	32.9%
KERS NH 1	Impact of revised baseline, compared to published actuarial assumptions	221.3	30.9	(82.0)	0.5%	27.4%	31.7%
	Revised Baseline - 5.1% discount rate, 0% payroll growth	**521.1**	**476.7**	**452.6**	**13.4%**	**45.4%**	**64.6%**
KERS NH 2	Savings: Eliminate past COLAs from future payments to current retirees	(54.4)	(52.8)	(50.5)	3.2%	4.1%	3.2%
KERS NH 3	Savings: Freeze service accruals in plan on 7/1/17, future service and new hires in DC plan	(25.5)	(33.6)	(34.3)	-1.2%	-12.2%	-14.8%
KERS NH 4	Savings: Combination of Scenario 3 and conversion of actuarial value of accrued service in Tier 3 plans to a lump sum contribution to the DC plan defined in Scenario 3	(25.8)	(36.9)	(51.1)	-2.1%	-9.5%	-11.4%
KERS NH 5	Savings: Retirement at age 65, eliminate unreduced retirement with 27 years of service or years of service plus age of 87 after 7/1/2017	(47.9)	(43.0)	(38.1)	0.3%	-2.0%	-1.5%
KERS NH 7	Savings: Eliminate use of accrued sick/comp time toward calculations for active employees and new hires, convert time to lump sum payment of 25%	(10.1)	(8.4)	(7.6)	0.1%	-0.3%	-0.2%

#	Scenario Description	FY19 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY29 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY34 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
KERS NH 8	Savings: net reduction in ADC from combination of all scenarios above.	(117.0)	(116.2)	(110.4)	2.9%	-9.2%	-12.2%
	Revised ADC after implementation of all scenarios, above.	**404.1**	**360.4**	**342.2**	**16.3%**	**36.2%**	**52.4%**

The revised assumptions would increase the required employer contribution for KERS-H by 85% in FY2019, while having the effect of reducing the estimated funded ratio that year from 59% to 51%. The funded ratio would then increase faster than in the published/baseline assumptions. After assuming implementation of all the recommended scenarios for the hazardous plans, including retaining the existing benefit structure for actives and new hires, the impact of the revised baseline assumptions on the General Fund contribution is roughly halved in FY2019, and the funded ratio would be improved to over 80% by FY2029.

Kentucky Employee Retirement System - Hazardous (KERS-H)

#	Scenario Description	FY19 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY29 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY34 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
KERS H 1	Baseline: - 7.5% discount rate, 4% payroll growth	20.5	28.1	32.7	59.0%	69.1%	77.6%
KERS H 1	Impact of revised baseline, compared to published actuarial assumptions	17.3	6.8	0.4	-7.9%	6.7%	8.9%
	Revised Baseline - 6% discount rate, 0% payroll growth	**37.8**	**35.0**	**33.2**	**51.2%**	**75.9%**	**86.5%**
KERS H 2	Savings: Eliminate past COLAs from future payments to current retirees	(3.2)	(3.0)	(2.9)	3.6%	2.4%	1.6%
KERS H 6	Savings: Establish minimum retirement age of 60 for all active employees with no future application of the unreduced early retirement provision based on years of service for those not eligible as of 7/1/2017	(3.5)	(2.5)	(2.7)	1.8%	1.7%	1.3%

#	Scenario Description	FY19 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY29 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY34 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
KERS H 7	Savings: Eliminate use of accrued sick, comp, and any other time toward pension calculations for new hires and active employees in all plans	(1.2)	(1.0)	(0.7)	0.7%	0.2%	0.1%
KERS H 9	Savings: future service in current tiers continues, new hires continue in Tier 3. Establish minimum retirement age of 55 for Tier 1, and 60 for Tiers 2 & 3, eliminating unreduced early retirement based on years of service,	(7.9)	(6.5)	(6.4)	6.4%	4.5%	3.0%
	Revised ADC after implementation of Alternate Scenario 9, above.	**29.8**	**28.4**	**26.7**	**57.6%**	**80.3%**	**89.4%**

Implementation of the reform scenarios for the State Police system, the second-most stressed system, would have rapid benefits to the system in conjunction with the accelerated funding schedule associated with the level dollar amortization. The estimated funded ratio in FY2019 would be approximately 30%, higher than the 26% estimated under the published/old baseline assumptions and funding method, and by FY2029 would be more than double under the old baseline – 58% rather than 27%.

State Police Retirement System (SPRS)

#	Scenario Description	FY19 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY29 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY34 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
SPRS 1	Baseline: - 6.75% discount rate, 4% payroll growth	18.4	26.4	31.5	26.3%	27.4%	40.2%
SPRS 1	Impact of revised baseline, compared to published actuarial assumptions	12.8	2.6	(3.5)	-2.4%	22.4%	27.0%

#	Scenario Description	FY19 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY29 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY34 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
	Revised Baseline - 5.1% discount rate, 0% payroll growth	**31.3**	**29.0**	**28.0**	**24.0%**	**49.9%**	**67.2%**
SPRS 2	Savings: Eliminate past COLAs from future payments to current retirees	(4.2)	(4.2)	(4.1)	5.3%	5.7%	4.4%
SPRS 6	Savings: Establish minimum retirement age of 60 for all active employees with no future application of the unreduced early retirement provision based on years of service for those not eligible as of 7/1/2017	(0.9)	(0.1)	(0.6)	0.2%	2.8%	3.0%
SPRS 7	Savings: Eliminate use of accrued sick, comp, and any other time toward pension calculations for new hires and active employees in all plans	(0.5)	(0.4)	(0.3)	0.2%	-0.2%	-0.1%
SPRS 9	Savings: future service in current tiers continues, new hires continue in Tier 3. Establish minimum retirement age of 55 for Tier 1, and 60 for Tiers 2 & 3, eliminating unreduced early retirement based on years of service,	(5.6)	(4.7)	(4.9)	5.9%	8.3%	7.0%
	Revised ADC after implementation of all scenarios, above.	**25.6**	**24.3**	**23.0**	**29.9%**	**58.1%**	**74.2%**

Similarly, if all recommended options were fully implemented for CERS-NH, the estimated funded ratio in FY2019 would be higher at nearly 63%, compared to 57% under the published/old baseline, despite the significant short-term reduction of 8% that would be associated with the more conservative assumptions applied in the revised baseline. By FY2029 the employer contributions with the revised baseline and implementation of all scenarios would be roughly equivalent to the published/old baseline at 16.8%, but the estimated funded ratio would be significantly higher, and with a greater degree of confidence due to the reduced investment earnings rate.

County Employee Retirement System - Non Hazardous (CERS-NH)

#	Scenario Description	FY19 Contribution vs Baseline Increase/ (Savings)	FY29 Contribution vs Baseline Increase/ (Savings)	FY34 Contribution vs Baseline Increase/ (Savings)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
CERS NH 1	Baseline: - 7.5% discount rate, 4% payroll growth	383.1	549.8	643.2	57.3%	64.8%	72.4%
CERS NH 1	Impact of revised baseline, compared to published actuarial assumptions	325.2	147.6	8.5	-7.9%	6.0%	8.5%
	Revised Baseline - 6% discount rate, 0% payroll growth	**708.3**	**697.4**	**651.7**	**49.5%**	**70.8%**	**80.9%**
CERS NH 2	Savings: Eliminate past COLAs from future payments to current retirees	(62.8)	(63.2)	(59.3)	3.6%	2.8%	2.0%
CERS NH 3	Savings: Freeze service accruals in plan on 7/1/17, future service and new hires in DC plan	(70.1)	(106.9)	(107.5)	5.9%	-3.7%	-6.1%
CERS NH 4	Savings: Combination of Scenario 3 and conversion of actuarial value of accrued service in Tier 3 plans to a lump sum contribution to the DC plan defined in Scenario 3	(71.7)	(107.2)	(106.4)	5.5%	-4.2%	-6.6%
CERS NH 5	Savings: Establish minimum retirement age of 65 for all active employees with no future application of the unreduced early retirement provision based on years of service for those not eligible as of 7/1/2017	(130.0)	(121.7)	(102.4)	4.4%	1.0%	0.5%
CERS NH 7	Savings: Eliminate use of accrued sick, comp, and any other time toward pension calculations for new hires and active employees in all plans	(28.8)	(25.0)	(21.7)	0.9%	0.4%	0.3%
CERS NH 8	Savings: Combined impact of the above as applicable	(269.5)	(319.2)	(324.8)	13.2%	1.6%	-1.8%
	Revised ADC after implementation of all scenarios, above.	**438.9**	**378.2**	**326.9**	**62.7%**	**72.4%**	**79.1%**

#	Scenario Description	FY19 Employer Contribution as a % of Payroll vs Baseline Increase/ (Savings)	FY29 Employer Contribution as a % of Payroll vs Baseline Increase/ (Savings)	FY34 Employer Contribution as a % of Payroll vs Baseline Increase/ (Savings)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
CERS NH 1	Baseline: - 7.5% discount rate, 4% payroll growth	15.73%	16.81%	16.90%	57.3%	64.8%	72.4%
CERS NH 1	Impact of revised baseline, compared to published actuarial assumptions	12.1%	2.7%	-1.3%	-7.9%	6.0%	8.5%
	Revised Baseline - 6% discount rate, 0% payroll growth	**27.84%**	**19.54%**	**15.59%**	**49.5%**	**70.8%**	**80.9%**
CERS NH 2	Savings: Eliminate past COLAs from future payments to current retirees	-2.5%	-1.8%	-1.4%	3.6%	2.8%	2.0%
CERS NH 3	Savings: Freeze service accruals in plan on 7/1/17, future service and new hires in DC plan	-1.3%	0.7%	1.1%	5.9%	-3.7%	-6.1%
CERS NH 4	Savings: Combination of Scenario 3 and conversion of actuarial value of accrued service in Tier 3 plans to a lump sum contribution to the DC plan defined in Scenario 3	-0.2%	1.8%	2.2%	5.5%	-4.2%	-6.6%
CERS NH 5	Savings: Establish minimum retirement age of 65 for all active employees with no future application of the unreduced early retirement provision based on years of service for those not eligible as of 7/1/2017	-5.2%	-3.3%	-2.4%	4.4%	1.0%	0.5%
CERS NH 7	Savings: Eliminate use of accrued sick, comp, and any other time toward pension calculations for new hires and active employees in all plans	-1.1%	-0.7%	-0.5%	0.9%	0.4%	0.3%
CERS NH 8	Savings: Combined impact of the above as applicable	-6.1%	-2.8%	-1.5%	13.2%	1.6%	-1.8%
	Revised ADC after implementation of all scenarios, above.	**21.7%**	**16.8%**	**14.1%**	**62.7%**	**72.4%**	**79.1%**

The revised assumptions would increase the required employer contribution for CERS-H by 80% in FY2019, while having the effect of reducing the estimated funded ratio that year from 57% to 48%.

The funded ratio would then increase faster than in the published/baseline assumptions. After assuming implementation of all the recommended scenarios for the hazardous plans, including retaining the existing benefit structure for actives and new hires, the impact of the revised baseline assumptions on the required employer contribution is significantly reduced in FY2019, and the funded ratio would be improved to 76% by FY2029. The CERS-NH impacts are illustrated both by the aggregate dollar value of the employer contribution (ADEC) and by the ADEC as a percentage of payroll, as it is assessed to member employers.

County Employee Retirement System - Hazardous (CERS-H)

#	Scenario Description	FY19 Contribution vs Baseline Increase/ (Savings)	FY29 Contribution vs Baseline Increase/ (Savings)	FY34 Contribution vs Baseline Increase/ (Savings)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
CERS H 1	Baseline: - 7.5% discount rate, 4% payroll growth	126.6	179.8	209.4	56.5%	64.8%	72.9%
CERS H 1	Impact of revised baseline, compared to published actuarial assumptions	113.3	46.2	6.5	-8.1%	4.4%	6.6%
	Revised Baseline - 6% discount rate, 0% payroll growth	**239.9**	**226.0**	**215.8**	**48.4%**	**69.3%**	**79.6%**
CERS H 2	Savings: Eliminate past COLAs from future payments to current retirees	(27.9)	(26.3)	(25.2)	4.4%	3.5%	2.6%
CERS H 6	Savings: Establish minimum retirement age of 60 for all active employees with no future application of the unreduced early retirement provision based on years of service for those not eligible as of 7/1/2017	(39.0)	(32.9)	(31.0)	3.3%	2.4%	2.3%
CERS H 7	Savings: Eliminate use of accrued sick, comp, and any other time toward pension calculations for new hires and active employees in all plans	(8.6)	(8.1)	(6.9)	0.8%	0.2%	-0.1%
CERS H 9	Savings: future service in current tiers continues, new hires continue in Tier 3. Establish minimum retirement age of 55 for Tier 1, and 60 for Tiers 2 & 3, eliminating unreduced early retirement based on years of service,	(72.6)	(64.0)	(60.4)	9.0%	6.7%	5.2%

#	Scenario Description	FY19 Contribution vs Baseline Increase/ (Savings)	FY29 Contribution vs Baseline Increase/ (Savings)	FY34 Contribution vs Baseline Increase/ (Savings)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
	Revised ADC after implementation of Alternate Scenario 9, above.	**167.3**	**162.0**	**155.5**	**57.5%**	**75.9%**	**84.8%**

#	Scenario Description	FY19 Employer Contribution as a % of Payroll vs Baseline Increase/ (Savings)	FY29 Employer Contribution as a % of Payroll vs Baseline Increase/ (Savings)	FY34 Employer Contribution as a % of Payroll vs Baseline Increase/ (Savings)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
CERS H 1	Baseline: - 7.5% discount rate, 4% payroll growth	25.09%	26.77%	25.95%	56.5%	64.8%	72.9%
CERS H 1	Impact of revised baseline, compared to published actuarial assumptions	20.19%	5.52%	(0.21%)	-8.1%	4.4%	6.6%
	Revised Baseline - 6% discount rate, 0% payroll growth	**45.28%**	**32.29%**	**25.74%**	**48.4%**	**69.3%**	**79.6%**
CERS H 2	Savings: Eliminate past COLAs from future payments to current retirees	(5.19%)	(3.77%)	(2.99%)	4.4%	3.5%	2.6%
CERS H 6	Savings: Establish minimum retirement age of 60 for all active employees with no future application of the unreduced early retirement provision based on years of service for those not eligible as of 7/1/2017	(7.42%)	5(5.86%)	(4.25%)	3.3%	2.4%	2.3%
CERS H 7	Savings: Eliminate use of accrued sick, comp, and any other time toward pension calculations for new hires and active employees in all plans	(1.60%)	(1.13%)	(0.76%)	0.8%	0.2%	-0.1%

#	Scenario Description	FY19 Employer Contribution as a % of Payroll vs Baseline Increase/ (Savings)	FY29 Employer Contribution as a % of Payroll vs Baseline Increase/ (Savings)	FY34 Employer Contribution as a % of Payroll vs Baseline Increase/ (Savings)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
CERS H 9	Savings: future service in current tiers continues, new hires continue in Tier 3. Establish minimum retirement age of 55 for Tier 1, and 60 for Tiers 2 & 3, eliminating unreduced early retirement based on years of service,	(13.60%)	(10.11%)	(7.66%)	9.0%	6.7%	5.2%
	Revised ADC after implementation of Alternate Scenario 9, above.	**31.68%**	**22.18%**	**18.08%**	**57.5%**	**75.9%**	**84.8%**

Applying the more conservative assumptions for TRS also increases the FY2019 estimated General Fund required employer contribution by over 77% from the current assumptions. As the TRS plan has a higher asset base than KERS-NH, the more conservative assumptions would also result in a reduced funded ratio initially, with the increased funding being offset by the lower discount rate. The combined impact of implementing all the recommended benefit options would significantly reduce the required contribution to below the current assumptions/baseline, while also resulting in rapid and immediate improvement to the funded ratio of over 20% in FY2019.

Teachers Retirement System (TRS)[33]

#	Scenario Description	FY19 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY29 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY34 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
KTRS 1	Baseline: - 7.5% discount rate, 3.5% payroll growth	1,057.6	1,530.9	1,813.2	55.3%	63.1%	70.8%
KTRS 1	Impact of revised baseline, compared to published actuarial assumptions	819.1	283.4	(37.0)	-8.5%	4.5%	6.3%
	Revised Baseline - 6.0% discount rate, 0% payroll growth	**1,876.7**	**1,814.4**	**1,776.1**	**46.8%**	**67.5%**	**77.2%**
KTRS 2	Savings: Eliminate past COLAs from future payments to current retirees	(201.3)	(200.9)	(202.3)	4.2%	3.9%	3.1%
KTRS 3	Savings: New hires (Non-University and University) in DC plan after 7/1/17	(28.2)	(71.5)	(93.6)	-0.1%	-2.2%	-3.5%
KTRS 4	Savings: Freeze service accruals in plan for University members on 7/1/17, future service and new hires in DC plan	(12.0)	(22.8)	(26.3)	0.1%	-0.2%	-0.3%
KTRS 5	Savings: Retirement at age 65, eliminate unreduced retirement with 27 years of service	(463.5)	(430.7)	(422.7)	5.2%	1.8%	1.8%
KTRS 6	Savings: Eliminate provisions for future service that are not subject to the inviolable contract (3% accrual rate over 30 years, final 3 retiring over age 55 instead of final 5, sick/comp time toward service time)	(56.4)	(56.4)	(56.0)	0.6%	0.1%	0.0%

[33] *Estimates based on the June 30, 2016 valuation but incorporating 0% payroll growth were prepared by PRM.*

#	Scenario Description	FY19 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY29 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY34 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
KTRS 7	Savings: Roll back benefits of current retirees to eliminate provisions not subject to the inviolable contract	(45.2)	(43.9)	(43.5)	0.9%	0.8%	0.6%
KTRS 9a	Savings: Suspend future COLAs until the plan is 90% funded, after which the COLA is the lesser of 1.5% or CPI-U, applied to first $1,500 per month only	(497.9)	(474.6)	(460.8)	7.4%	2.8%	1.6%
KTRS 9b	Savings: Suspend future COLAs until the plan is 90% funded, after which the COLA is the lesser of 1.5% or CPI-U, applied to first $2,000 per month only	(497.9)	(474.6)	(460.8)	7.4%	2.8%	1.6%
	Revised Baseline, above	**1,876.7**	**1,814.4**	**1,776.1**	**46.8%**	**67.5%**	**77.2%**
KTRS 10a	Savings: net reduction in ADC from combination of all scenarios above including 9a.	(1,117.2)	(1,051.0)	(1,026.2)	20.6%	10.3%	7.2%
	Revised ADC after implementation of all scenarios, above.	**759.4**	**763.3**	**749.9**	**67.4%**	**77.9%**	**84.4%**
KTRS 10b	Savings: net reduction in ADC from combination of all scenarios above including 9b.	(1,117.2)	(1,024.4)	(1,000.0)	20.6%	9.4%	6.5%
	Revised ADC after implementation of all scenarios, above.	**759.4**	**790.0**	**776.1**	**67.4%**	**76.9%**	**83.7%**

The impact of a revised baseline for KJRP applying a 6% discount rate rather than a 7% rate is an increase in the required General Fund contribution of 29% in FY2019. Note that the actuarial estimates for KJRP and KLRP differ significantly from other estimates in that a level dollar/ 0% payroll growth assumption was not prepared, and that rather than calculating the ADC, the plan actuary applied the current statutory funding formula, which, as noted previously, is not sufficient to amortize the liability. The combined impact of the recommended options on KJRP, if fully implemented, would offset the reduction in the discount rate and generate an estimated $3 million in FY2019 General Fund savings relative to the published/current assumptions.

Kentucky Judicial Retirement Plan (KJRP)[34]

#	Scenario Description	FY19 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY29 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY34 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
KJRP Legacy	Current Projections	8.6	5.5	4.6	78.1%	75.9%	72.0%
KJRP Legacy	Impact of revised baseline, compared to published actuarial assumptions	2.5	2.1	1.8	-8.0%	-7.0%	-6.6%
KJRP Legacy	**Revised Baseline - 6.0% discount rate**	**11.1**	**7.6**	**6.4**	**70.0%**	**68.8%**	**65.4%**
KJRP Legacy	Savings: Eliminate past COLAs from future payments to current retirees	(1.3)	(2.0)	(2.2)	7.6%	11.2%	13.8%
KJRP Legacy	Savings: Suspend future COLAs	(1.2)	(0.9)	(0.7)	10.6%	13.1%	14.7%
KJRP Legacy	Savings: Freeze service accruals in plan on 7/1/17, future service and new hires in DC plan	(1.8)	(1.5)	(1.1)	15.9%	19.3%	22.6%

[34] *Estimates with level dollar amortization/0% payroll growth were not obtained for KJRP and KLRP. In addition, the plan actuary prepared estimates applying the existing statutory funding method, which results in a declining funded ratio over time under every scenario, rather than full funding of the liability over the amortization period.*

#	Scenario Description	FY19 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY29 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY34 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
KJRP Legacy	Savings: net reduction in ADC from combination of all proposed changes.	(5.5)	(4.5)	(4.2)	9.1%	10.3%	11.4%
	Revised Baseline	**5.6**	**3.1**	**2.2**	**87.2%**	**86.1%**	**83.4%**
KJRP Hybrid	Current Projections	0.07	0.05	0.03	-	-	-
KJRP Hybrid	Savings: net reduction in ADC from combination of all proposed changes.	(0.01)	(0.009)	(0.006)	-	-	-
	Revised Baseline	**0.06**	**0.04**	**0.02**	**-**	**-**	**-**
KJRP New Entrants	Current Projections	0.5	1.1	1.6	-	-	-
KJRP New Entrants	Savings: net reduction in ADC from combination of all proposed changes.	(0.1)	(0.2)	(0.2)	-	-	-
	Revised Baseline	**0.4**	**0.9**	**1.3**	**-**	**-**	**-**
KJRP Combined	Savings: net reduction in ADC from combination of all scenarios.	(5.6)	(4.7)	(4.5)	9.1%	10.3%	11.4%
	Revised ADC after implementation of all proposed changes, above.	**6.1**	**4.1**	**3.6**	**87.2%**	**86.1%**	**83.4%**

The impacts of the revised KJFRS baseline on the KLRP plan would be similar to the KJRP impacts, with the difference that if the recommended options were fully implemented, the estimated funded ratio would actually exceed 100% in FY2019.

Kentucky Legislative Retirement Plan (KLRP)

#	Scenario Description	FY19 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY29 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY34 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
KJRP Legacy	Current Projections	1.5	0.8	0.6	85.2%	86.2%	85.4%
KJRP Legacy	Impact of revised baseline, compared to published actuarial assumptions	0.6	0.5	0.4	-9.6%	-10.4%	-11.3%
KJRP Legacy	**Revised Baseline - 6.0% discount rate**	**2.1**	**1.3**	**1.12**	**75.6%**	**75.8%**	**74.0%**
KJRP Legacy	Savings: Eliminate past COLAs from future payments to current retirees	(0.4)	(0.5)	(0.5)	9.5%	11.8%	13.4%
KJRP Legacy	Savings: Suspend future COLAs	(0.7)	(0.5)	(0.4)	17.8%	11.9%	7.1%
KJRP Legacy	Savings: Freeze service accruals in plan on 7/1/17, future service and new hires in DC plan	(0.3)	(0.1)	(0.1)	25.8%	29.3%	34.6%
KJRP Legacy	Savings: net reduction in ADC from combination of all proposed changes.	(1.7)	(1.2)	(1.0)	16.5%	18.7%	22.9%
	Revised Baseline	**0.4**	**0.1**	**0.06**	**101.6%**	**104.9%**	**108.3%**
KJRP Hybrid	Current Projections	0.01	0.01	0.01	-	-	-
KJRP Hybrid	Savings: net reduction in ADC from combination of all proposed changes.	(0.002)	(0.002)	(0.002)	-	-	-
	Revised Baseline	**0.01**	**0.009**	**0.009**	**-**	**-**	**-**

#	Scenario Description	FY19 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY29 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY34 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY19 Funded Ratio	FY29 Funded Ratio	FY34 Funded Ratio
KJRP New Entrants	Current Projections	0.08	0.1	0.2	-	-	-
KJRP New Entrants	Savings: net reduction in ADC from combination of all proposed changes.	(0.01)	(0.03)	(0.04)	-	-	-
	Revised Baseline	**0.06**	**0.1**	**0.1**	**-**	**-**	**-**
KJRP Combined	Savings: net reduction in ADC from combination of all scenarios.	(1.7)	(1.2)	(1.1)	16.5%	18.7%	22.9%
	Revised ADC after implementation of all proposed changes, above.	**0.4**	**0.2**	**0.2**	**101.6%**	**104.9%**	**108.3%**

Under the framework outlined previously, with level dollar amortization of unfunded liabilities and reduced investment return assumptions for all plans, and full annual funding of the recommended employer contribution, the Commonwealth's General Fund pension contribution in FY2019 would be $2.5 billion, an increase of $1.2 billion above current FY2017 funding levels and $1.7 billion above the funding in FY2016.

Through the range of benefit reforms also summarized above, the plan actuaries project over $1.2 billion in aggregate FY2019 pension savings. At the same time, proposed buyout options and the use of DC plan structures will reduce the Commonwealth's exposure to the risk of new shortfalls emerging. The resulting FY2019 General Fund contribution requirement will still reach over $1.2 billion, but will now fall within the range of recently increased state funding levels. Even more importantly, the rate of growth in these contributions will be at much lower risk of continuing to skyrocket, and is projected to eventually stabilize and even decline over time.

All State Plans

#	Scenario Description	FY19 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY24 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY29 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)	FY34 General Fund Contribution vs Baseline Increase/ (Savings) ($Millions)
All Plans	Current Projections	1,410.5	1,724.3	2,041.8	2,421.8
All Plans	Impact of revised baseline, compared to published actuarial assumptions	1,063.2	747.8	317.8	(127.8)
	Revised Baseline	**2,473.7**	**2,472.2**	**2,359.7**	**2,294.0**
All Plans	Savings: net reduction in ADC from combination of all scenarios.	(1,247.9)	(1,237.6)	(1,178.6)	(1,148.1)
	Revised ADC after implementation of all proposed changes, above.	**1,225.8**	**1,234.5**	**1,181.0**	**1,145.9**

Cash Flow

One of the challenges noted in Report #2 was the pattern of recurring negative cash flows historically for KERS-NH, KERS-H, CERS-NH, and TRS, and the significant continued negative cash flows estimated for future years under the published actuarial assumptions for KERS-NH and TRS. Report #2 indicated it is not uncommon for mature systems to operate with negative cash flows and rely on investment earnings, but the size of the negative cash flow, reliance on investment earnings relative to the size of the investment earnings assumption, and level of assets to sustain in years where the earnings assumption is missed, are all concerns.

In addition, one of the potential drawbacks noted earlier of implementing a DC plan is the shift of employee contributions away from the legacy DB plan, which has potential negative implications on cash flows.

The tables below illustrate that the recommended actuarial assumptions and revised baseline for the systems significantly improve cash flows in the next ten years, particularly for the most stressed plans. Although the introduction of a DC plan for future service or new hires partially offsets this improvement, for most of the plans, with the partial exception of CERS-NH as illustrated below, the estimated cash flows incorporating recommendations are favorable to the estimates overall based on the plan benefits and valuation assumptions as of June 30, 2016.

KERS-NH Pension Fund Projected Cash Flows
Employer + Employee Contributions - Benefits - Expenses
($ in 000s)

Year	Published Actuarial Assumptions	Revised Baseline 5.1% Discount Rate, 0% Payroll Growth	Scenario KERS NH 3: Freeze Accruals; DC for Future Service and New Hires	Scenario KERS NH-8: Revised Baseline with Combined Reform Initiatives
FY2019	(230,090)	300,136	108,947	47,704
FY2020	(223,532)	327,315	125,603	62,647
FY2021	(173,440)	319,875	118,733	49,224
FY2022	(159,966)	350,433	141,069	70,003
FY2023	(126,582)	282,896	84,447	26,876
FY2024	(109,920)	315,432	110,939	51,436
FY2025	(83,076)	238,806	47,764	3,323
FY2026	(62,444)	273,779	78,937	30,872
FY2027	(35,031)	194,869	15,587	(17,938)
FY2028	(9,625)	229,731	49,142	11,541
FY2029	19,716	145,857	(15,831)	(38,503)

Source: Cavanaugh Macdonald estimates

KERS-H Pension Fund Projected Cash Flows Employer + Employee Contributions - Benefits - Expenses ($ in 000s)			
Year	Published Actuarial Assumptions	Revised Baseline 6.0% Discount Rate, 0% Payroll Growth	Scenario KERS H 9: Revised Baseline with Combined Reform Initiatives
FY2019	(18,748)	10,850	108,947
FY2020	(19,607)	10,819	125,603
FY2021	(19,132)	10,549	118,733
FY2022	(20,194)	10,324	141,069
FY2023	(20,680)	5,450	84,447
FY2024	(21,702)	5,221	110,939
FY2025	(22,659)	(871)	47,764
FY2026	(23,951)	(1,483)	78,937
FY2027	(26,222)	(9,186)	15,587
FY2028	(27,837)	(10,280)	49,142
FY2029	(29,473)	(17,538)	(15,831)

Source: Cavanaugh Macdonald estimates

SPRS Pension Fund Projected Cash Flows Employer + Employee Contributions - Benefits - Expenses ($ in 000s)			
Year	Published Actuarial Assumptions	Revised Baseline 5.1% Discount Rate, 0% Payroll Growth	Scenario KERS H 9: Revised Baseline with Combined Reform Initiatives
FY2019	(18,027)	7,699	5,878
FY2020	(17,743)	8,537	7,082
FY2021	(15,808)	8,738	7,466
FY2022	(15,289)	9,842	9,382
FY2023	(13,373)	7,242	7,706
FY2024	(12,696)	8,448	9,656
FY2025	(11,236)	4,660	6,837
FY2026	(10,616)	5,684	8,563
FY2027	(8,907)	1,870	5,700
FY2028	(7,465)	3,656	7,330
FY2029	(5,397)	(90)	4,384

Source: Cavanaugh Macdonald estimates

The CERS-NH are significantly favorable with the revised assumptions. The application of the DC plan for future service in isolation results in favorable cash flows for the first six years, and modestly unfavorable cash flows compared to the baseline thereafter. The application of the combined reform initiatives is estimated to result in favorable cash flows compared to the baseline in the first three years, and modestly unfavorable (less than 10% more negative) cash flows thereafter.

CERS-NH Pension Fund Projected Cash Flows Employer + Employee Contributions - Benefits - Expenses ($ in 000s)				
Year	Published Actuarial Assumptions	Revised Baseline 6.0% Discount Rate, 0% Payroll Growth	Scenario CERS NH 3: Freeze Service Accruals in Plan, Future Service and New Hires in DC Plan	Scenario CERS NH-8: Revised Baseline with Combined Reform Initiatives
FY2019	(262,586)	31,444	(208,279)	(249,125)
FY2020	(269,835)	24,731	(211,357)	(259,553)
FY2021	(272,036)	15,066	(223,221)	(268,152)
FY2022	(279,677)	2,493	(243,022)	(283,446)
FY2023	(294,996)	(10,056)	(271,445)	(307,183)
FY2024	(310,807)	(22,560)	(299,883)	(330,342)
FY2025	(325,892)	(34,660)	(326,607)	(351,587)
FY2026	(341,181)	(46,921)	(351,189)	(371,069)
FY2027	(357,055)	(59,406)	(374,650)	(390,248)
FY2028	(374,620)	(71,591)	(396,549)	(408,113)
FY2029	(390,277)	(82,877)	(415,803)	(423,560)

Source: Cavanaugh Macdonald estimates

CERS-H Pension Fund Projected Cash Flows Employer + Employee Contributions - Benefits - Expenses ($ in 000s)			
Year	Published Actuarial Assumptions	Revised Baseline 6.0% Discount Rate, 0% Payroll Growth	Scenario KERS H 9: Revised Baseline with Combined Reform Initiatives
FY2019	(82,024)	31,444	(10,093)
FY2020	(83,716)	24,731	(12,245)
FY2021	(87,539)	15,066	(15,895)
FY2022	(93,606)	2,493	(21,403)
FY2023	(99,580)	(10,056)	(25,871)
FY2024	(105,682)	(22,560)	(30,373)
FY2025	(110,420)	(34,660)	(34,458)
FY2026	(115,827)	(46,921)	(38,752)
FY2027	(121,307)	(59,406)	(44,152)
FY2028	(125,920)	(71,591)	(49,851)
FY2029	(129,871)	(82,877)	(56,192)

Source: Cavanaugh Macdonald estimates

TRS Pension Fund Projected Cash Flows Employer + Employee Contributions - Benefits - Expenses ($ in 000s)			
Year	Revised Baseline 6.0% Discount Rate, 0% Payroll Growth	Scenario KTRS 4: Freeze Accruals; DC - Future Service and New Hires	Scenario KTRS 10a: Revised Baseline with Combined Reform Initiatives
FY2019	182,684	155,358	(659,014)
FY2020	110,434	82,303	(678,583)
FY2021	39,244	10,572	(689,367)
FY2022	(60,361)	(89,288)	(728,502)
FY2023	(110,890)	(140,257)	(706,442)
FY2024	(185,009)	(214,705)	(709,041)
FY2025	(262,379)	(292,290)	(711,836)
FY2026	(341,604)	(371,601)	(714,217)
FY2027	(425,111)	(455,077)	(722,923)
FY2028	(505,445)	(535,326)	(732,267)
FY2029	(581,905)	(611,412)	(746,767)

Source: Cavanaugh Macdonald estimates with adjustments to 0% payroll growth by PRM

In addition to the fiscal impacts illustrated above, the enrollment of teacher new hires in Social Security is estimated to have gradually building financial impacts on local School Board employers. The estimated Social Security employer tax paid by School Boards in total is approximately $11 million in the initial year, increasing by roughly $10 million per year for the first ten years thereafter. The estimated contribution paid by School Boards in FY2029 is $136 million, further increasing to $201 million by FY2034.

Voluntary Buyouts

As discussed previously in Chapter IV. Funding, Recommendation 7, the Commonwealth could offer to buy out or convert accrued service of active employees and roll it over to a deferred compensation plan, in conjunction with the proposal to offer defined contribution plans for new service/new hires. A voluntary buyout program was modeled for KERS-NH and CERS-NH active employees. The program could similarly be offered to the other plans that would potentially have future service frozen, TRS University, JRP, and LRP, but the amounts involved would be relatively small.

The voluntary buyout would allow employees that would prefer to manage their own assets in a DC plan to convert their benefit from the fixed DB plan to a lump sum beginning account balance in the DC plan, on a tax-exempt basis. Since the conversion would be voluntary on an employee-by-employee basis, rights under the inviolable contract provisions would not be abridged. This conversion would remove the liability from the retirement system, value the employee's accrued service as of the date of the conversion – without applying future pay increases to the frozen portion of the benefit – improve the funded ratio and reduce risk to the plan.

The estimates were prepared based on accrued liability figures as of June 30, 2016 provided by Cavanaugh Macdonald. Our team adjusted those figures to revise the estimated liability to reflect the revised baseline actuarial assumptions, and to reduce the accrued liability for each employee to reflect assumed final compensation at the time of the buyout and rollover, rather than estimated final compensation. This was combined with estimated pricing as of July 1, 2017 for a taxable POB issued by the Commonwealth, in order to fund the full value of the benefit to be rolled over for employees to the DC plan.

The analysis assumed a 30% participation rate in the buyout as an upper bound to identify the potential size of the bond. The analysis illustrated below also assumed that the full actuarial value of the accrued benefit at the time of the buyout is offered to the employee. Other alternatives could be pursued that would:

- Potentially result in less participation and benefit to the employee but greater savings to the Commonwealth, such as discounting the value of the accrued benefit, or offering the buyout based on the employee's account balance of accumulated employee contributions to date.

- Provide an additional incentive to participate such as a match from the Commonwealth. However, considering the impact of the more conservative actuarial assumptions adopted by the KRS board, these incentives are unlikely to generate significant savings for the Commonwealth when compared to the cost of borrowing for a POB.

The 30% assumed rate is likely on the high end of the range of potential participation, based on the experience of Florida and Ohio with voluntary conversions to optional DC programs. The savings estimates are relatively linear other than fixed costs of borrowing for a POB, and smaller buyout participation rates would have corresponding reductions in the savings estimates below.

	KERS-NH Total	CERS-NH Total
Unadjusted Liability: Active Employees	2,655.2	4,287.2
Adjusted Outstanding Liability: Active Employees	1,615.3	2,829.8
Buyout Percentage	30.0%	30.0%
Buyout Cost to Fund	484.6	849.0
Unadjusted/Reported Liability Relief to Plan	796.6	1,286.1
Required Employer Contribution: Revised Baseline	55.0	97.4
Estimated Debt Service	30.2	52.9
Estimated Annual Savings	**24.7**	**44.4**
Estimated Annual General Fund Savings	**14.5**	n/a
Funded Ratio Benefit	**1%**	**5%**

Source: Cavanaugh Macdonald estimated liability figures; PRM estimated adjusted liability figures; PFM estimated other figures

Appendix A: Glossary

Accrued Benefit – the amount of the member's benefit that has been earned based on service since hire up to today. The amount is generally determined based on the member's current final average salary and benefit multiplier based on current service.

Accrued Value – the amount of money that has accumulated in an employee's account due to employee and employer contributions and investment earnings on the contributions.

ADC – Actuarially Determined Contribution. A target or recommended contribution to a defined benefit pension plan for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted. This term was adopted in GASB Statements No. 67 and 68 and replaced Annual Required Contribution (ARC) as defined by GASB No. 25, effective FY2015 for plan sponsors.

ADEC – Actuarially Determined Employer Contribution. The portion of the ADC that is the employer's obligation to fund.

Amortization period – Period of time used in determining the amortization payment to discharge or fund and unfunded liability (similar to the number of years of a home mortgage). A closed amortization period reduces the remaining period by one year in the subsequent measurement (similar to a 30-year home mortgage reducing to 29 years remaining at the end of the first year). An "open" or "rolling amortization period" maintains the original period (similar to refinancing a 30-year home mortgage with a new 30-year mortgage each year).

ARC – Actuarially Required Contribution. The sum of the Normal Cost and the chosen amortization of the UAAL, adjusted with interest to the end of the reporting year. Historical information prior to FY2015 was calculated based on the definition of ARC rather than the ADC.

DB – Defined Benefit. A retirement plan design that determines the monthly benefit after employment based on the employee's years of service and salary during employment. Upon retirement, the benefit can be paid in one of several options (e.g. lifetime annuity, joint and survivor annuity, life annuity with period certain).

DC – Defined Contribution. A retirement plan design that develops an individual account. Upon retirement, the amount in the account can be paid out in a number of ways (e.g. lump sum, annuity, etc.).

CERS-H – County Employees Retirement System – Hazardous.

CERS-NH – County Employees Retirement System – Non-Hazardous.

CES – Consumer Expenditure Survey.

COLA – cost of living adjustment.

DCA – Deferred Compensation Authority.

Early Retirement Age – the age at which a person can retire from service and begin to draw a pension immediately; the amount of the benefit is reduced to account for the longer period of time over which payments are expected to be paid.

Freeze – to pause the benefit multiplier and the employee's years of service at their current levels on the freeze date while still allowing salary used in benefit calculation to increase.

FY – Fiscal Year.

GASB – Governmental Accounting Standards Board.

KERS-H – Kentucky Employees Retirement System – Hazardous.

KERS-NH – Kentucky Employees Retirement System – Non-Hazardous.

KJFRS – Kentucky Judicial Form Retirement System.

KJRP – Kentucky Judicial Retirement Plan.

KLRP – Kentucky Legislators Retirement Plan.

KRS – Kentucky Retirement System.

Level dollar amortization – a method of spreading payments to discharge an obligation in which payments are determined as fixed dollar amounts for each year over the amortization period.

Level percent of payroll amortization – a method of spreading payments to discharge an obligation in which payments are calculated as a fixed percentage of projected payroll over the amortization period.

OPEB – Other Post-Employment Benefits.

Past Service Cost – The liability assigned under the actuarial funding method to benefits accrued based on past employee service rendered prior to the measurement date.

POB – Pension Obligation Bond.

Normal Retirement Age – the age at which a person can retire with full (i.e. unreduced) benefits; employee is not required to retire at this age.

SPRS – State Police Retirement System.

TRS – Teachers Retirement System.