REPORT OF THE VIRGINIA RETIREMENT SYSTEM

Cash Balance Retirement Plans

TO THE GENERAL ASSEMBLY OF VIRGINIA

HOUSE DOCUMENT NO. 12

COMMONWEALTH OF VIRGINIA
RICHMOND
2015

Virginia Retirement System

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Patricia S. Bishop
Director

November 1, 2015

The Honorable Terence R. McAuliffe
Governor of Virginia
Patrick Henry Building, 3rd Floor
1111 East Broad Street
Richmond, Virginia 23219

Virginia General Assembly
Members of the Virginia General Assembly
201 North Ninth Street
Richmond, Virginia 23219

Dear Governor McAuliffe and Members of the General Assembly:

House Bill 1969, passed by the 2015 General Assembly, requires the Virginia Retirement System to review cash balance retirement plans implemented in other statewide retirement systems and to develop and submit an analysis to the General Assembly including (i) a comparison of the long-term employer and employee costs of such cash balance plans to current VRS plan designs, (ii) an assessment of their financial risks to employers and employees, (iii) the administrative impact of such plans to VRS and its employers, (iv) the likely effect upon retirement benefits for employees, and (v) a recommended funding structure under which a cash balance plan could be funded by state and local employers while still meeting the funding requirements of existing VRS plans. The Virginia Retirement System's report is enclosed.

If you have questions or require additional information relative to this report, please contact me at (804) 771-7332.

Sincerely,

Patricia S. Bishop
Director

Enclosure

cc: The Honorable S. Chris Jones, Chair, House Appropriations Committee
The Honorable Charles J. Colgan, Sr., Co-Chair, Senate Finance Committee
The Honorable Walter A. Stosch, Co-Chair, Senate Finance Committee
Robert L. Greene, Chair, VRS Board of Trustees
Robert Vaughn, House Appropriations Committee
Michael Jay, House Appropriations Committee
Betsey Daley, Senate Finance Committee
Sarah Herzog, Senate Finance Committee
Harold E. Greer, Joint Legislative Audit and Review Commission
Kimberly Sarte, Joint Legislative Audit and Review Commission
Mark Gribbin, Joint Legislative Audit and Review Commission
The Honorable Richard Brown, Secretary of Finance
Neil Miller, Office of the Secretary of Finance
Dan Timberlake, Department of Planning and Budget
Brian Logwood, Department of Planning and Budget
Emily Grimes, Department of Planning and Budget
David Rosenberg, Division of Legislative Services

Cash Balance Retirement Plans

Report to the General Assembly of Virginia

11/1/15 Virginia Retirement System

TABLE OF CONTENTS

STUDY MANDATE

House Bill 1969 passed by the 2015 General Assembly requires the Virginia Retirement System to report to the General Assembly on cash balance retirement plans:

1. *§ 1. That the Virginia Retirement System (VRS) shall review cash balance retirement plans implemented in other statewide retirement systems and develop and submit a plan to the General Assembly no later than November 1, 2015. The analysis shall include: (i) a comparison of the long-term employer and employee costs of such cash balance plans to current VRS plan designs, (ii) an assessment of their financial risks to employers and employees, (iii) the administrative impact of such plans to VRS and its employers, (iv) the likely effect upon retirement benefits for employees, and (v) a recommended funding structure under which a cash balance plan could be funded by state and local employers while still meeting the funding requirements of existing VRS plans.*

In addition to the items expressly set forth in the study mandate, VRS has included several modifications to the current Hybrid Retirement Plan design for consideration.

EXECUTIVE SUMMARY

Cash Balance Plans Not Prevalent in Public Sector

The 2015 General Assembly tasked VRS with reviewing cash balance retirement plans implemented in other statewide retirement systems, analyzing the impacts of cash balance plan designs, and recommending a funding structure for a cash balance plan. Currently three states, Kansas, Kentucky, and Nebraska, administer a cash balance plan as the primary retirement plan for new members. A few other states offer cash balance plans, but these other state plans do not serve as the primary retirement plans for the respective states' employees.

Cash Balance Plan Designs Adopted by Other States Provide Lower Retirement Benefits Than Current VRS Plans

Generally, the cash balance plan designs used in other states result in a lesser retirement benefit when compared to those currently administered by VRS. However, the level of benefits provided under any given cash balance plan depends heavily on the design features (e.g., the amount of pay credit and interest credit guaranteed to a member). Therefore, the lesser benefit found in other states is not necessarily indicative of cash balance plans as a whole, but rather the design features selected in those particular states. In addition, benefits accrue differently in a cash balance versus a traditional defined benefit plan. This accrual results in different benefit levels being provided under the two plan structures based on the member's career stage.

Cash Balance Plans Reward Employees Differently Than Traditional Defined Benefit Plans

Whereas traditional defined benefit plans often back load benefits, which provides an incentive for participants to work longer by providing higher accruals to long term employees, cash balance plans often front load benefits, which provides more valuable accruals to newer short term employees with less provided to long term employees.

Depending on the plan design, specifically the interest crediting rate, and the annuity conversion provisions of the plan, a cash balance account will often fluctuate depending on the economic conditions that exist during a member's career. Since members would potentially be converting a lump sum of money into a lifetime annuity at retirement, members' benefits could also vary depending on the conversion rates adopted by the plan.

EXECUTIVE SUMMARY

Cash Balance Plans Distribute Risk Differently Than Current VRS Plan Designs

While both cash balance and traditional defined benefit plans are defined by the IRS as defined benefit plans, there are several differences. Traditional defined benefit plans such as VRS Plan 1 and Plan 2 were designed such that all of the financial risk will be borne by the employers. With the advent of the Hybrid Retirement Plan, approximately 30% of a hybrid plan member's benefit was moved to a defined contribution plan. As a result, hybrid plan members now bear all the risk for 30% of their benefit.

How cash balance plans compare with traditional defined benefit pensions depends on their design, in particular whether they have fixed or variable interest credits. In general, cash balance plans with fixed interest credits are more like traditional defined benefit pensions in that they provide participants with relatively secure benefits but expose employers to investment risk. Cash balance plans with variable interest credits tied to pension fund returns resemble defined contribution plans to the extent that they shift much of the investment risk onto participants, though the IRS requires that cash balance plans must at a minimum offer a zero percent floor on investment returns.

Therefore, with cash balance plans the employer will still bear many of the same risks associated with defined benefit plans, although there are some differences. Cash balance plans typically do not provide inflation protection to retirees. If a retiree wants a cost-of-living adjustment in retirement, he or she must pay for it through a reduced benefit during conversion to an annuity. Secondly, due to annuity conversion at retirement, the member takes on more longevity risk than in a traditional defined benefit plan design. Cash balance plans also introduce portability risk to the fund. If more members cash out their accounts at termination, this could impact the fund's investment horizon by introducing potential cash flow liquidity and long term rate of return issues.

Administrative Issues, Costs, and Timeline

Adding a new tier of benefits increases administrative complexity, which in turn results in corresponding additional costs to the plan. VRS estimates that implementing a cash balance plan would cost approximately $12 to $13 million. These costs are described later in more detail, but are an important factor to consider. In addition to the cost of implementation and maintenance of a new plan, VRS estimates that the earliest such a plan could be implemented is January of 2019. The agency's major information technology initiative (Modernization Program), which has been underway since 2009 and has been previously put on hold or delayed in order to implement various

components of pension reform, would incur an additional 18-month delay. Implementing a new plan will not only impact VRS, but also all of VRS' participating employers.

Funding Issues

When considering the implementation of a new plan design, it is important to not only consider what benefits will be offered going forward, but also how to deal with the existing unfunded liabilities facing the state and participating employers. Decision makers have increased focus on plan funding requirements and to that end have codified a plan (§51.1-145 of the *Code of Virginia*) to move to fully funding the board certified rates by Fiscal Year 2019. In addition, during the 2015 legislative session, the Governor and General Assembly infused additional funding into both the state and teacher plans.

Despite this demonstrated commitment and its positive impact on the plan, nearly two-thirds of the current employer contribution rates are made up of amortization payments to pay down the legacy unfunded liability associated with Plan 1 and Plan 2 members. As a result, regardless of the plan design used for future employees, the employer contribution rates will still mostly be made up of amortization payments to pay down the unfunded liability associated with prior benefits. Under the current funding policy, this legacy liability is scheduled to be funded over the next 28 years. With the exception of making changes to benefits for current or prior members, progress in paying down the legacy liability can generally be achieved only through direct contributions or excess fund returns above the actuarially assumed 7% long term investment rate of return.

Potential Adjustments to Current Hybrid Design

In lieu of developing a new retirement plan, consideration may be given to making several changes to the Hybrid Retirement Plan. Based on the percentage of the benefit that a VRS Plan 1 or VRS Plan 2 employee is currently paying, a change to the allocation of the member contribution between the defined benefit and defined contribution components of the Hybrid Retirement Plan may be worth exploring. Adding auto-enrollment in voluntary contributions and enhancing the auto-escalation feature would likely encourage greater savings in the defined contribution component of the hybrid plan. These potential changes result in a relatively modest impact on employer costs, but could provide more favorable outcomes for hybrid members. The estimated implementation cost of these potential changes ranges from approximately $35,000 to

$75,000, and they could be implemented within a fairly short time frame without delaying the Modernization Program.

GLOSSARY OF TERMS

Annuity – An “annuity" within a traditional defined benefit plan is a guaranteed lifetime benefit at retirement. For cash balance plans an employer must also offer the member a conversion of his or her account balance to a guaranteed lifetime monthly benefit. This benefit protects retirees from outliving their retirement savings and running out of money.

Annuity Conversion Rate – “Annuity conversion rate” relates to the lifetime annuity that a retiring member receives upon conversion of his or her account balance. At retirement, a cash balance plan member can apply for an annuity, which is calculated using a number of factors to determine the annuity conversion rate. These factors include mortality assumptions, age, and interest rate assumptions, among others. Under a cash balance plan, the annuity conversion rate needs to be set explicitly and can be set at a constant value or may be allowed to float more freely with interest rates.

Cash Balance Plan – A “cash balance plan” is a defined benefit plan that calculates benefits in a manner similar to defined contribution plans. It resembles a defined contribution plan in that each employee has a hypothetical account or "cash balance" to which contributions and interest payments are credited; however, since the actual funds are pooled, member directed investing is not available. As with other defined benefit plans, the employer bears both the risk and the benefits of investment performance

Dividend – See “upside sharing interest.”

Employer – “Employer” means the entity from which the employer contribution (or “pay credit”) is derived. Depending on a retirement plan member’s employment situation, the term “employer” can have various meanings. For example, the employer of an employee working in a Virginia state agency would be the Commonwealth of Virginia, since the state is treated as a single employer. However, the employer of an employee in a political subdivision or locality would be the political subdivision by which he or she is employed.

Interest Credit – “Interest credit” refers to the interest earned on the principal amount of a member’s account, which is made up of member contributions, pay credits, and prior interest credits. The interest crediting rate can be either a fixed or variable rate. Providing a fixed interest credit typically keeps the investment risk with the employer. A variable interest credit, such as the 30-year U.S. Treasury rate or the actual plan return rate, shifts some of the investment risk to the members of the plan.

GLOSSARY OF TERMS

Lump Sum Payout – A "lump sum payout" is analogous to VRS' existing plan feature of a partial lump sum payout (PLOP). At retirement, a cash balance plan member can sometimes choose between 1) conversion to an annuity based on his or her entire account balance, or 2) conversion to an annuity based on his or her account balance, less the amount of any lump sum payout. A lump sum payout can be designed to allow for a full or partial payout of one's account balance.

Member Contribution – "Member contribution" means the amount contributed by a member to his or her retirement plan. This amount is usually designated as a percentage of compensation.

Pay Credit – "Pay credit" is analogous to an employer contribution rate or the normal cost rate in a traditional defined benefit plan. In a cash balance plan, a pay credit is a defined amount from the employer credited to a member's account. The specific amount credited is typically a flat percentage of compensation across all membership. However, some cash balance plans have a graduated pay credit scale in which employees with longer service tenure receive a higher pay credit.

Retirement Age – "Retirement age" means the minimum age at which a member can apply for retirement benefits. In some cases, such as VRS, the term may depend on the context. For example, VRS defined benefit plans (i.e., Plan 1, Plan 2, and the defined benefit component of the Hybrid Retirement Plan) have a different retirement age depending on whether a member wants to apply for a reduced or unreduced retirement benefit. A reduced benefit retirement age is typically lower than that of an unreduced benefit.

Upside Sharing Interest – "Upside sharing interest," also known as a "dividend" in the context of a cash balance plan, refers to any excess return on a member's principal that exceeds the defined interest credit. The idea of upside sharing interest is that a plan's members share the benefits of excess returns with the plan during years that the plan's actual returns surpass the guaranteed interest credit. Upside sharing interest can be a guarantee in years of surplus returns, or it can be determined on an *ad hoc* basis. Furthermore, the amount of upside sharing interest can be a fixed formula (e.g., 50% of excess returns are shared with members), or the amount can be determined on an *ad hoc* basis.

Vesting – "Vesting" refers to the period of time that it takes for an employee to eliminate the potential for forfeiture of benefits upon separation from the retirement plan.

WHAT IS A CASH BALANCE PLAN?

Public sector employers generally provide retirement benefits within two primary structures: defined benefit plans and defined contribution plans. In general, defined benefit plans provide a specific benefit at retirement for each eligible employee, while defined contribution plans specify the amount of contributions to be made by the employer toward an employee's retirement account. In a defined contribution plan, the actual amount of retirement benefits provided to an employee depends on the amount of the contributions as well as the gains or losses of the account. The recently enacted Hybrid Retirement Plan has both a defined benefit component and a defined contribution component.

A cash balance plan is a retirement plan design that, because it is recognized as a "defined benefit plan" under the Internal Revenue Code, is subject to a number of requirements under 26 U.S.C §§ 411, 412, 415, 416, and 417, among others. Likewise, cash balance plans are subject to various IRS and Treasury regulations, the earliest of which date back to 1993.

A cash balance plan is a defined benefit plan that has plan feature characteristics that make it resemble a defined contribution plan, particularly from the participant's point of view. A cash balance plan provides a benefit that is communicated to participants as an account balance, even though no true account balance exists. Each participant in a cash balance plan has a hypothetical account, and that account grows by compensation credits and interest credits that appear to be the same as the contributions and investment earnings of a defined contribution plan. However, in the cash balance plan, unlike the defined contribution plan, the compensation credit and the interest credit are both guaranteed. Also, unlike a defined contribution plan, the assets in the hypothetical account are not managed by the participant, but instead are managed by the investment professionals of the fund.

How Do Cash Balance Plans Work?

A cash balance plan is a defined benefit plan that specifies both the contribution to be credited to each participant and the investment earnings to be credited based on those contributions. Each participant has a "hypothetical" account that resembles those in a 401(k) or profit sharing plan. The accounts are hypothetical because the assets are not actually segregated into individual accounts and the plan sponsor still invests the assets collectively like those of any other defined benefit plan.

WHAT IS A CASH BALANCE PLAN?

Participant accounts grow annually in two ways:

- The employer and employee contributions, typically a percentage of pay determined by a plan formula and;
- An annual interest credit. The rate can be defined as a flat rate, such as 4% per year, be tied to an index such as the yield on 30-year Treasury bonds, or can vary with the actual investment returns of the plan's assets. The interest credit is a guaranteed rate of return for the member.

The exhibit below (Exhibit 1-1) is an example of how a member's hypothetical account balance could operate under a cash balance design that requires a 5% member contribution, provides a flat 4% pay credit and a 4% guaranteed rate of return. As you can see, to the member it looks very similar to a defined contribution plan. In this example, salary is increased by 2% each year. As a result, the member contribution which is based on a percentage of salary, in this case 4%, also increases. In the same manner, the employer pay credit of 4% of salary also increases as salary is increased. Finally, the guaranteed rate of return (4%) is annually applied to the account balance of the member from the prior year, and the interest is added to the members account balance.

Exhibit 1-1

	Salary	Member Contribution	Pay Credit (Employer)	Interest Credit	Account Balance
Year 1	$ 40,000.00	$ 2,000.00	$ 1,600.00		$ 3,600.00
Year 2	$ 40,800.00	$ 2,040.00	$ 1,632.00	$ 144.00	$ 7,416.00
Year 3	$ 41,616.00	$ 2,080.80	$ 1,664.64	$ 296.64	$ 11,458.08

Even though the benefit looks like a lump sum of money to the member, cash balance plans are required to offer life annuities as the default payout option at retirement, though partial or full lump sum payouts are allowable and are common with this plan design.

In general, the benefits paid at retirement under a cash balance formula are typically less than the benefits paid under a traditional defined benefit plan because they are based on the employee's entire career earnings rather than a percentage of final average compensation. Traditional defined benefit plan designs are typically based on

the employee's final average earnings, often required to be consecutive and averaged over three-, five-, or ten-year periods, when the employee's salary is usually at its highest level.

A cash balance plan could provide career employees with benefits that are equivalent to those received by traditional defined benefit plans by providing higher pay credits or increased interest rates, but this tends to be more expensive than a traditional defined benefit plan since participants who terminate prior to retirement end up with higher account balances than in a traditional plan.

Key Considerations for Cash Balance Plan Design

There are several key components to a cash balance plan design that would need careful consideration during design:

- **Member Contribution –** Amount contributed by the member to the member's account each year.
- **Pay Credit** – Typically an amount as a percent of salary to add to a member's account each year. Amount can be a flat rate of pay for all employees, or can vary based on years of service. This is similar to an employer contribution or normal cost rate in a traditional defined benefit plan.
- **Interest Credit** – Interest credits are either a fixed percentage or can be a variable rate that is tied to an index, such as 30-year U.S. Treasury rates, or actual plan returns. Providing a flat interest credit typically keeps the investment risk with the employer, while using a variable interest crediting rate will shift some of the investment risk to the employees.

  The interest credit alone does not fully represent the investment risk borne by employers and taxpayers. As with traditional defined benefit plans, the investment risk of a cash balance plan is still closely associated with the assumed rate of return of the plan as well as the risk profile associated with the fund allocation. A relatively high pay credit can offset a relatively low interest credit, and a relatively low pay credit can offset a relatively high interest credit, so over any given time period the same outcome can be achieved with different combinations of the two variables. Nevertheless, the size of the pay credit versus the interest credit is important because this determines the distribution of retirement benefits between younger and older workers and between workers with relatively high wage growth and those with relatively low wage growth. All

else being equal, younger workers will fare better with a low pay credit and high interest credit, as will workers with relatively level earnings throughout their career due to the advantage of compounding interest throughout their career.

Though the size of a fixed interest credit determines the distribution of benefits between younger and older participants in a cash balance plan, not the investment risk borne by employers, it is possible to design a cash balance plan that reduces employer investment risk. But this is done by shifting much of this risk onto participants through a variable interest credit, not by specifying a low interest credit.

With respect to the pay credit and interest credit provided by employers, the actual amount that employers contribute is based on a normal cost rate and rate to amortize any unfunded liability that is developed by plan actuaries as part of an actuarial valuation. While to the member, it appears as if their individual account is receiving specific pay and interest credits, the actual employer contributions will be determined by the plan actuary just like any other defined benefit plan. Therefore, the employer using a cash balance plan design that provides a 4% pay credit and a 4% interest credit will not necessarily contribute the 4% pay credit and interest since the actual contribution could be more or less depending on plan experience.

- **Annuity Conversion Rate** – As required by the Internal Revenue Code, cash balance plans need to allow retiring members the opportunity to convert account balances to a lifetime annuity. Consideration must be given to the mortality and interest rate assumptions used to convert employee balances to a lifetime annuity. Under a cash balance plan, the annuity conversion rate needs to be set explicitly and can be set at a constant value or may be allowed to float more freely with interest rates.

- **Availability of Lump Sum Payout** – Cash balance plans encourage payment of single sum distributions. The design could allow for full or partial lump sums at retirement, or no lump sum at all. Because the participant shoulders all future risks upon receiving a lump sum, this form of payment may not be optimal for maintaining a consistent benefit. In addition, payment of single sum distributions will generally mean that plan assets are lower than if monthly benefits were paid. This means that the plan's payment of lump sums at fixed

income rates precludes the gains from long-term investing in a mix of stocks and bonds, resulting in potentially lower returns, lower assets and higher contributions over time for the employer.

- **How Terminated Employees' Account Balances Would Be Handled –** Decisions on how terminating members' account balances will be handled in terms of interest crediting is another area that needs consideration. Employers typically handle non-vested terminations differently from vested terminations for those who choose to leave balances with the employer.

  One of the differences between a cash balance plan and a traditional defined benefit plan is how accumulated benefits are handled when a member terminates prior to retirement. Under a traditional defined benefit plan the member's accrued benefit is frozen at the time of termination. Under a cash balance plan, a member could continue to earn interest credits from the date of termination until the date of retirement or withdrawal of funds.

- **Transitioning Employees From Current VRS Plans –** HB 1969 did not specify which employees would be eligible for such a plan. If consideration is given to allowing current VRS plan members to move to the cash balance plan, then the following transitional design issues should be considered:

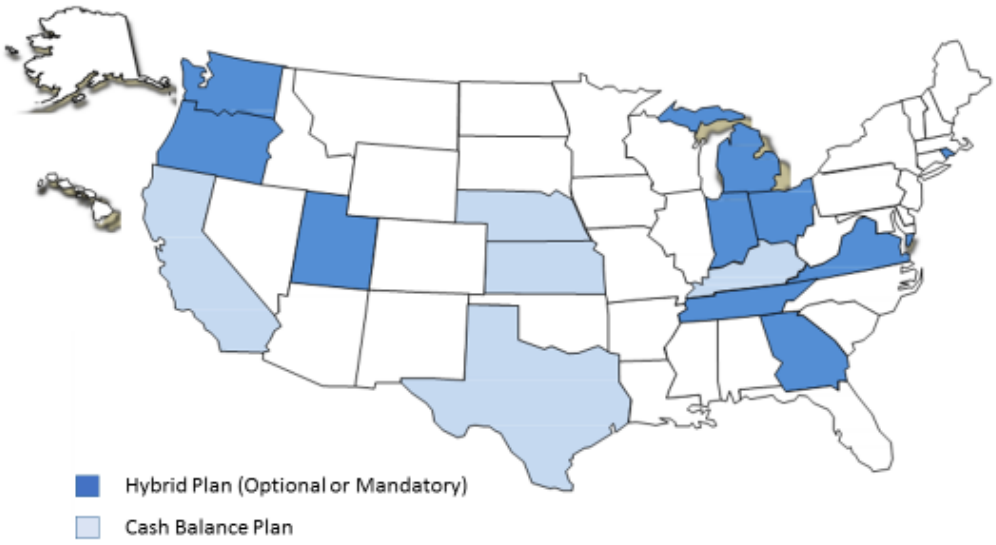
  - If members of the legacy plans (Plan 1, Plan 2 and Hybrid) will be allowed to transfer to a cash balance plan, consideration must be given to how the traditional benefit will be converted to a lump sum beginning account balance. The actuarial basis for the conversion of existing accrued benefits is important: the lower the interest rate basis for conversion, the higher the beginning account balance. Additional actuarial study and analysis would be needed to address this critical transition issue.
  - Time would be needed for additional programming and systems development to address the transition of existing members to the cash balance plan.
  - VRS would need enough time to prepare for a comprehensive communications effort with employers and employees.

- Personalized projection statements or an online calculator would be needed to provide members the ability to compare their current plan to the cash balance plan.

Comparing Public Sector State and Local Cash Balance Plans

Nearly every state has made changes in recent years to their retirement plans, mostly due to the economic crisis that occurred in 2008-2009. While the traditional defined benefit plan remains the most prevalent plan used in state systems, cash balance and combination defined benefit/defined contribution hybrid plans are also being used in some states. Figure 2-1 displays the states that offer hybrid and cash balance plans. As shown, there are currently 11 states offering a hybrid plan design and 5 states that offer a cash balance plan design, though only 3 of the cash balance plans are for state employees. Like defined benefit plans, cash balance and hybrid plans in the public sector vary from one jurisdiction to the next, and no single design will address the cost and risk factors of every state or local government.

Figure 2-1
States with Hybrid Plans and Cash Balance Plans



There are currently three states, Kansas, Kentucky, and Nebraska that have a cash balance plan as their primary retirement plan for new employees. The plan designs in

each of these states is discussed below. In addition, plan design features of the other states that offer cash balance plans are provided.

Nebraska Cash Balance Plan

In 2002, Nebraska became the first state to operate a cash balance plan to cover state and local workers. Nebraska previously offered state and local employees a defined contribution plan before switching to a cash balance plan design. Because Nebraska was moving from a defined contribution plan, it had no legacy unfunded liability to deal with when it switched to the cash balance design.

The Nebraska cash balance plan is for non-hazardous duty members hired on or after January 1, 2003. Table 2-1 shows the key plan provisions for the Nebraska cash balance plan.

Table 2-1
Nebraska Cash Balance Plan Provisions

Employee Contributions	• 4.8% of compensation
Pay credits	• Employees earn pay credits of 156% of the member contribution rate or 7.488%
Interest Credits	• Federal midterm rate* plus 1.5%, with a minimum rate of 5% • Interest is applied quarterly • Additional interest/dividends are ad hoc upon Board approval
Vesting	• 3 Years
Leaving Employment	• Non-vested employees can withdraw employee contributions and interest, but forfeit any pay credits and interest earned on those pay credits • Vested members can leave employee contributions and receive a benefit at retirement age, including pay credits
Retirement Age	• Age 55

Retirement Benefit	• Guaranteed lifetime benefit • Annuity based on account balance at retirement • Full or partial lump sum • Can use part of account balance to self-fund a COLA

*Federal Midterm rate is rate published by the IRS in accordance with section 127(d) of the Internal Revenue Code. The rate is determined from obligations with maturities of between 3 and 9 years.

Kansas and Kentucky recently passed legislation to adopt cash balance plans as the primary retirement savings vehicle for some portion of their public workforce beginning January 1, 2015 and January 1, 2014, respectively. While the two states chose the same basic plan structure, the plans vary in design specifics.

Kansas Cash Balance Plan

The Kansas cash balance plan is for non-hazardous duty members hired on or after January 1, 2015. Table 2-2 shows the key provisions for the Kansas cash balance plan.

Table 2-2
Kansas Cash Balance Plan Provisions

Employee Contributions	• 6% • Deposited into employee's contribution account • Contributions and interest can be withdrawn if leaving employment • Vested members can leave contributions in place and retire when eligible
Pay credits	• Employees earn pay credits quarterly based on service: 1-4 years = 3% of compensation 5-11 years = 4% 12-23 years = 5% 24+ years = 6% • Pay credits only available at retirement
Interest Credits	• Guaranteed: 4% interest credited quarterly on employee's contribution account and dollar value of pay credits • Additional interest is possible if 5 year average returns exceed 6%
Vesting	• 5 Years

Leaving Employment	• Employees can withdraw employee contributions, but forfeit pay credits • If not vested, and balance remains in plan, account will stop earning interest after 2 years • Vested members can leave employee contributions and receive a benefit at retirement age, including pay credits
Retirement Age	• Age 65 w/5 years of service • Age 60 w/30 years of service • Age 55 w/ 10 years of service
Retirement Benefit	• Guaranteed lifetime benefit with survivor options • Annuity based on account balance at retirement • Partial lump sum of up to 30% with full retirement • Can use part of account balance to self-fund a COLA

The Kansas design is structured to encourage members to leave funds in the plan when terminating rather than cashing out. If a member terminates prior to retirement and takes a refund, he or she forfeits the employer pay credits and interest and only receives the member contributions and interest. This refund structure would be the same as current VRS members have today under our current plan designs.

Kentucky Cash Balance Plan

The Kentucky cash balance plan is for all members hired on or after January 1, 2014, including hazardous duty members. The employee contributions and pay credits are slightly different for the two groups, but other provisions are universal. Table 2-3 shows the key provisions of the Kentucky cash balance plan.

Table 2-3
Kentucky Cash Balance Plan Provisions

Employee Contributions	• Non-hazardous duty members - 5% of creditable compensation • Hazardous duty members – 8% of creditable compensation
Pay credits	• Employees earn pay credits monthly: • Non-hazardous duty members – 4% of compensation • Hazardous duty members – 7.5% of compensation
Interest Credits	• Guaranteed: 4% interest credited annually

	• Interest is credited each June 30th, based on the member's account balance from the preceding June 30th • Additional interest is possible if 5 year average returns exceed 4% - upside interest sharing
Vesting	• 5 Years
Leaving Employment	• Employees can keep their account with KRS and continue to earn 4% interest on the accumulated balance, but will no longer receive any upside interest sharing. • Employees can withdraw their account balance: o Non-vested: members can withdraw employee contributions and interest on employee contributions but forfeit any employer pay credits and interest on those pay credits o Vested: members can withdraw their entire accumulated account including pay credits and interest
Retirement Age	Non-hazardous duty members • Age 65 w/5 years of service • Rule of 87, Age 57 w/30 or more years of service Hazardous duty members • Age 60 w/5 years of service • 25 or more years of service
Retirement Benefit	• Guaranteed lifetime benefit • Annuity based on account balance at retirement

The interest crediting rate used by both the Kansas and Kentucky designs offers a minimum guaranteed rate of 4%, but offers upside sharing in the interest credited if the five year average return exceeds a certain threshold, which is 4% for the Kentucky plan and 6% for the Kansas plan.

In addition to the three statewide pension systems (Nebraska, Kansas, and Kentucky), Texas operates two long standing multiple employer cash balance plans for counties and municipalities, and California offers a cash balance plan for part-time teachers.

Texas has two plans, one that offers benefits to counties and another that offers benefits to municipalities. Each employer has the flexibility to set benefit levels; employers can set their own rules for employee and employer contributions, retirement eligibility, and vesting schedules.

California's cash balance program provides benefits to part-time or temporary workers employed by school districts or community colleges.

The main provisions of these plans are summarized below.

Table 2-4
Other State Cash Balance Plan Provisions

Plan	Employee Group Covered	Employee Contribution	Pay Credit (Employer)	Interest (Guaranteed Return)	Upside sharing of Interest over Guaranteed Return	Vesting Schedule	Leaving Employment	Retirement Age	Retirement Benefit
Texas County and District Retirement System	Employer Elected	4.0% to 7.0% Depending on Employer Election	Between 100% and 250% of member's contribution	7.0%	None	5, 8, or 10 depending on employer election	Can withdraw employee contributions, but forfeit employer pay credits	Eligibility Set by Employer	Guaranteed lifetime benefit
Texas Municipal Retirement System	Employer Elected	4.0% to 7.0% Depending on Employer Election	Between 100% and 200% of member's contribution	Member contributions earn 5.0%; employer contributions earn the annual return on assets	Ad-hoc upon Board approval	5, 8, or 10 depending on employer election	Can withdraw employee contributions, but forfeit employer pay credits	Eligibility Set by Employer	Guaranteed lifetime benefit
California State Teachers' Retirement Cash Balance Benefit Program	Part-Time Teachers (Less than 50% of full-time position)	4.0%	4.0%	Based on average of 30-year U.S. Treasury bonds	Granted when the plan funding ratio is more than 100%; exact rule depends on 30-year U.S. Treasury bond rates.	Immediate	Can withdraw total account after 6 consecutive months following date of termination	Age 55	Lump sum of account or if balance is greater than $3,500 may choose a lifetime annuity

In addition to the plans outlined above, other states have looked at cash balance plan designs. In 2013, Louisiana passed a bill that created a cash balance plan for new employees. The plan has never been implemented, because it was subsequently ruled to be unconstitutional due to the fact that the 68 votes it received in the Louisiana House of Representatives to move the bill to the Louisiana Senate were deemed not sufficient under the Louisiana Constitution. More recently, the State of New Jersey released a report in February 2015 that proposed freezing the existing pension plans and starting a new cash balance plan. New Jersey's proposal differs from other state cash balance plans in that the New Jersey Governor has proposed that all current members also move into the cash balance plan design.

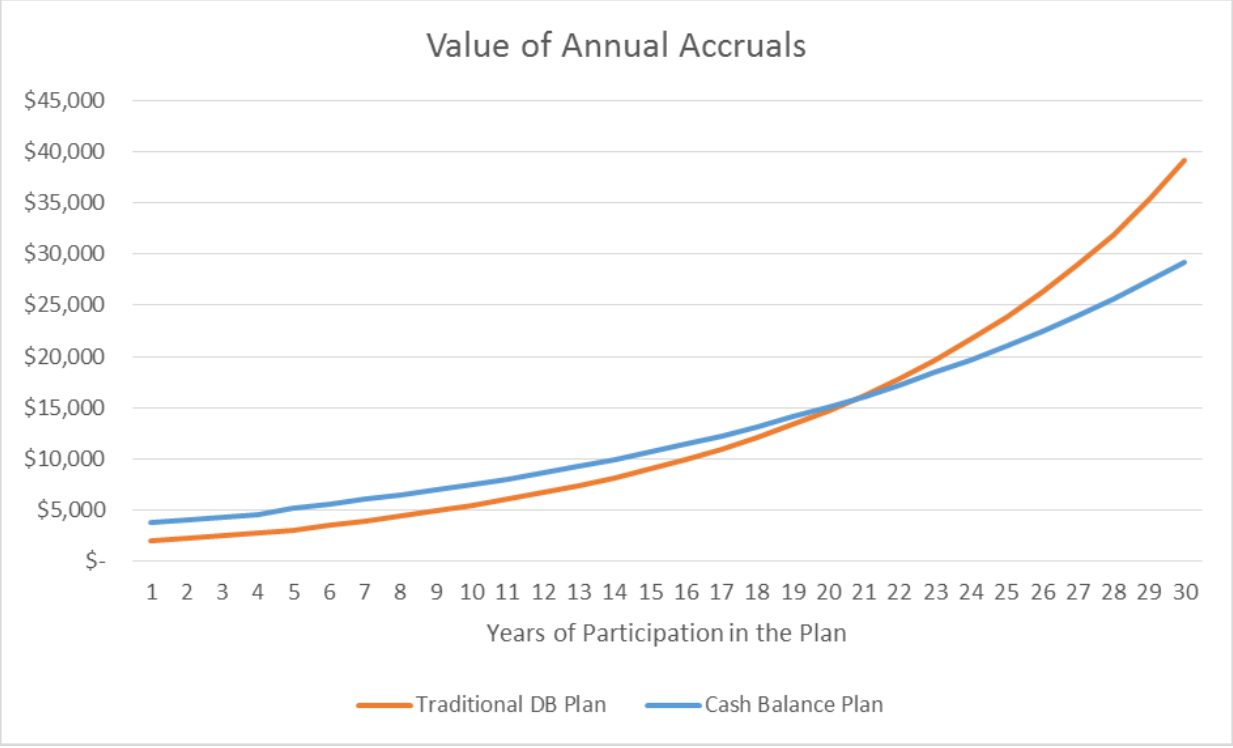
IMPACT ON BENEFIT LEVELS

The study mandate requested that the report include the likely impact of a cash balance plan on retirement benefits for employees. The analysis below will provide a comparison of expected benefits under the current VRS plan designs as well as the three state cash balance plan designs being used in Nebraska, Kansas, and Kentucky.

Impact on Employee Benefit Levels

Final-average-salary defined benefit pensions are typically designed to provide larger benefits to longer tenured employees. They encourage employee retention by "back-loading" benefits. Cash balance plans, on the other hand, provide a more even accrual of plan benefits because members receive a percentage of salary each year. As compared to a traditional defined benefit plan, cash balance plans provide more value to younger shorter-term workers and slightly less to longer-tenured employees. The exhibit below (Exhibit 3-1) illustrates how the value of the cash benefit plan accrual in a member's early years is greater than in a traditional defined benefit plan, but in later years the traditional plan accrual far exceeds the cash balance accruals.

Exhibit 3-1

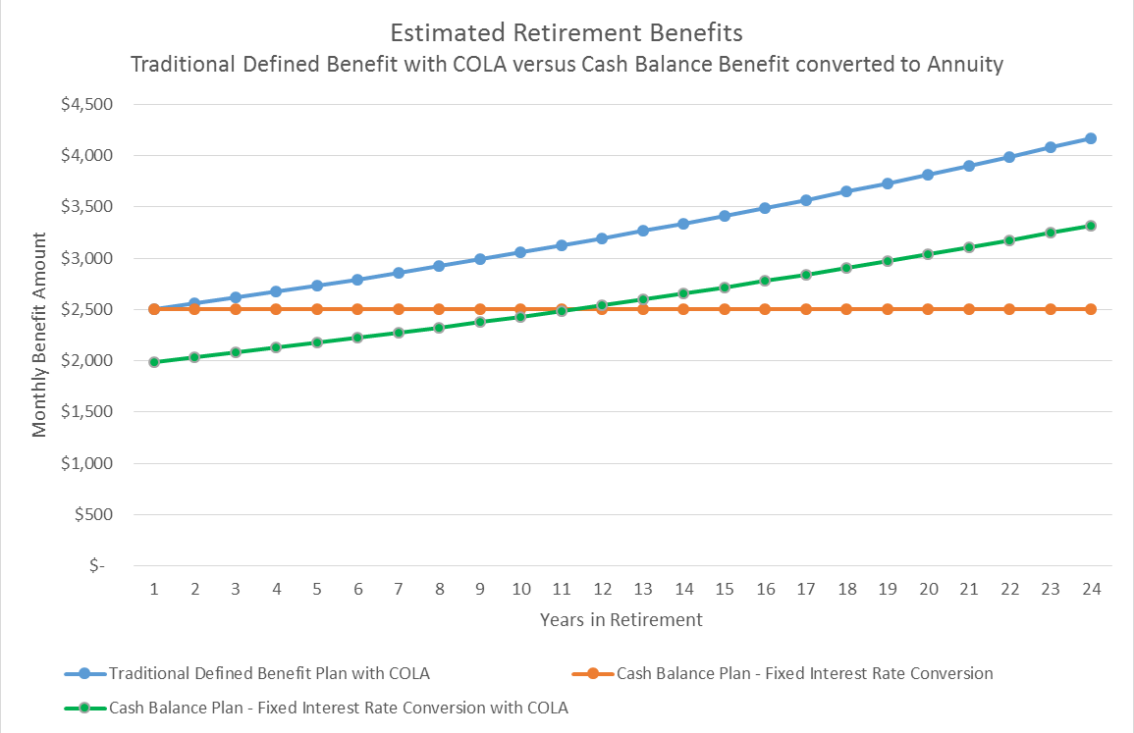


IMPACT ON BENEFIT LEVELS

It also important to note that annuity conversion of a cash balance plan can have an impact on the level of benefit that an employee receives in retirement. As we noted earlier, under a cash balance plan, the annuity conversion rate needs to be set explicitly and can be set at a constant value or may be allowed to float more freely with interest rates. It is also worth noting that cash balance plans typically do not provide for cost-of-living increases, though this feature may be offered at an additional cost to the member.

As an example, Exhibit 3-2 below compares the expected monthly benefit from a traditional defined benefit plan including a cost-of-living-increase to a cash balance plan with and without a cost-of-living feature. In this example the beginning retirement benefit for the traditional defined benefit plan is $2,500 per month, and we assume that the cash balance plan is designed to provide a similar initial level of benefit.

Exhibit 3-2



Without the cost-of-living adjustment, a member's cash balance benefit, even though it was the same at retirement, quickly falls behind the traditional defined benefit plan benefit over time. The cost of allowing the member to convert the cash balance to an

annuity with a cost-of-living adjustment would be paid by the member by accepting a lower initial benefit to allow for increases in the future.

If the cash balance conversion rate was a variable rate rather than a fixed rate, then cash balance members' lifetime benefits could fluctuate depending on the economic conditions at the time of retirement. As an example, if the conversion annuity rate were tied to an economic index such as the Moody's AAA Bond Index plus 1% then a cash balance member could convert a cash balance account of $320,000 at age 65 to $2,196 per month if he or she retired in 2014, assuming the bond index was at 4.5%. If a another plan member had the same account balance of $320,000 in 2015, the bond index would have dropped to 3.5% and that member would have a monthly annuity in the amount of $2,004 based on a 4.5% conversion rate. This equates to almost a 9% difference in benefit level for a member with the same account balance at retirement.

In order to compare benefits provided under different plan designs, replacement ratios will be used as a common measure of the effectiveness of the plan design from the employees' perspective. Replacement rates are computed as the value of the benefit expected at retirement divided by the employee's pre-retirement compensation. Even though 80% has become an industry standard for necessary replacement income at retirement, in reality, there is no "correct" single replacement rate for all individuals. An "adequate" replacement rate varies by individual and depends dramatically on the level of post-retirement expenditures, retirement age, gender, asset allocation, as well as several other variables.

In addition to comparing replacement ratios at retirement, there are also exhibits comparing the lump sum payout available at termination date, as well as a comparison of the estimated annual benefit expected if a member leaves funds in the plan after terminating and instead takes a lifetime annuity at age 65.

In order to compare the VRS lifetime annuities provided in Plan 1, Plan 2, and the Hybrid defined benefit component with the cash balance account type plans, the cash balance account balances, as well as the hybrid defined contribution account balance, have been converted to an annuity at age 65 using an annuity factor that provides for a 2.25% cost of living increase similar to that which is included in the VRS defined benefit plans.

Under the current VRS Plan 1 and Plan 2 designs, as well as the defined benefit component of the hybrid plan, members who terminate have their current accrued benefit frozen as of the termination date. However, their member contributions continue

to earn interest at 4% per year compounded annually, and they have the option to elect a payout of the member contributions rather than electing a deferred annuity. In the defined contribution component of the Hybrid Retirement Plan, the member account would continue to accumulate interest based on the member's asset allocation.

In a cash balance plan, members who are vested may be able to withdraw the full value of both the member contributions and the employer pay credits. The three state plans, Kentucky, Kansas, and Nebraska, treat plan terminations differently. Kansas allows terminating employees to withdraw employee contributions and interest, but in doing so they forfeit the employer pay credits. In contrast, Kentucky and Nebraska allow vested members to withdraw the entire account balance, including employer contributions and applicable interest.

The following examples illustrate differences in the outcomes of the various plan designs (Plan 1, Plan 2, Hybrid, and cash balance plans). Exhibit 3-3 contains the assumptions used in all of the benefit comparison illustrations.

Exhibit 3-3

Assumption Used in Benefit Comparisons

Age at Hire	35
Starting Salary	$35,000
Future Salary Increases	3.0%

VRS Hybrid - DC Component

	Minimum	Maximum
Employee Contribution	1.0%	5.0%
Employer Contribution	1.0%	3.5%
Investment Rate of Return	6.0%	6.0%

Cash Balance Plans

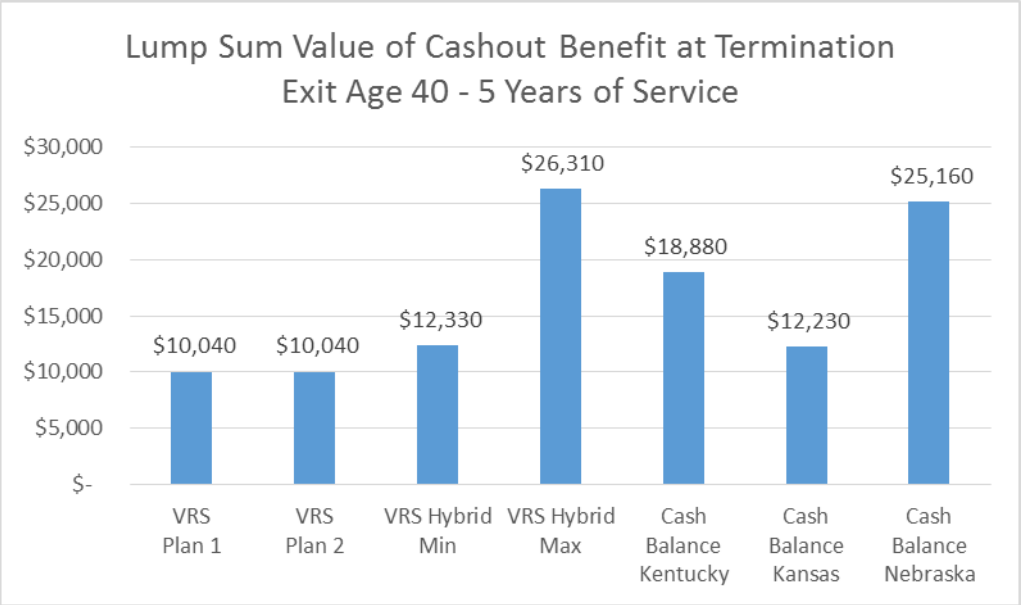
	Kansas	Kentucky	Nebraska
Member Contribution	6.0%	5.0%	4.80%
Pay Credit	3.0% - Yrs 1-4 4.0% - Yrs 5-11 5.0% - Yrs 12-23 6.0% - 24+ Yrs	4.0%	7.50%
Interest Credit	4.0%	4.0%	5.0%
Dividend	0.75%	2.25%	None

Annuity Conversion — RP 2000 Mortality Table 50/50 Blend with 5% discount rate and 2.25% COLA

Terminates After 5 Years of Employment

Exhibit 3-4 provides an example of an employee who begins work at age 35 and leaves employment at age 40. If the member decides to cash out of the plan at termination, below are the estimated lump sum payments under the various plans.

Exhibit 3-4



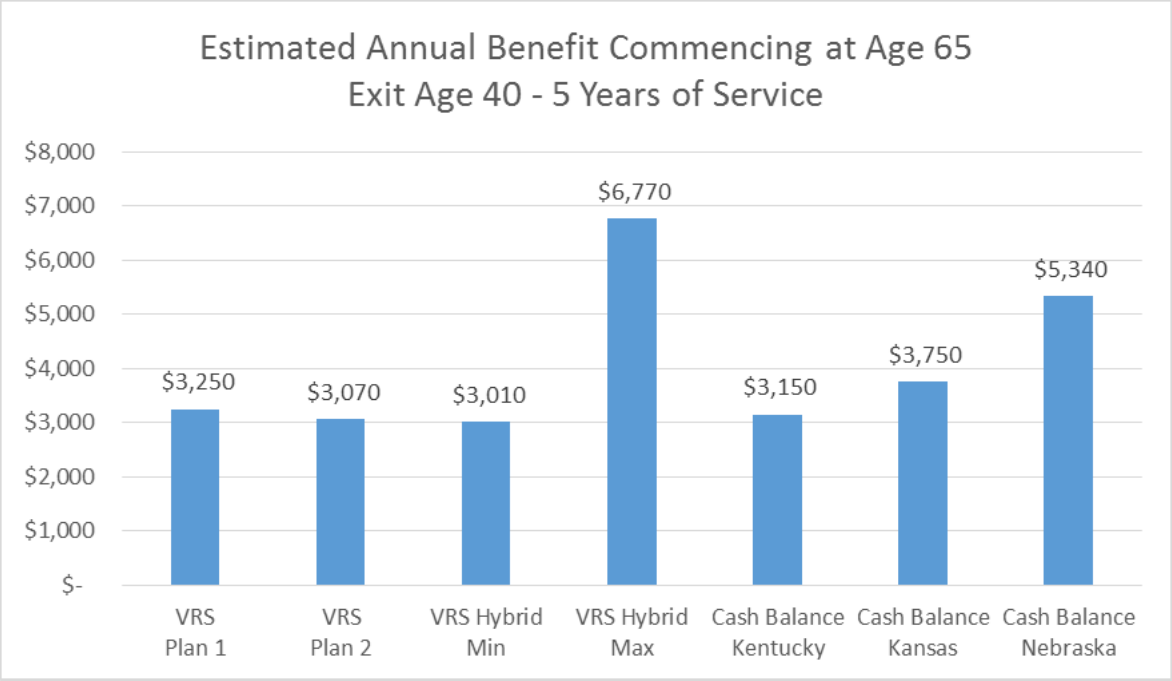
The exhibit above (Exhibit 3-4) shows that for members who work for five years and decide to cash out of the plan, the cash balance and hybrid plans will provide a larger payout than the traditional defined benefit plan, which offers the return of member contributions with interest under the VRS designs.

From a defined benefit plan perspective, those who cash out early in their careers provide an actuarial gain to the plan because the value of their deferred benefit at age 65 is often more valuable than their accumulated contributions with interest. For cash balance plans, employees who cash out early often create an actuarial loss, since benefit accruals are more "front loaded" and the actuarial accrued liability is often less than the value of their hypothetical account early in their career.

If the member leaves his or her money in the plan and defers commencement of a benefit to age 65, the estimated annual benefit payable from each plan is shown below in Exhibit 3-5. Under the cash balance design, and also in the defined contribution component of the Hybrid Retirement Plan, if members who terminate keep their contributions in the plan, they continue to earn interest on the account until they either retire or cash out of the plan. In the Kansas cash balance design, the member's cash balance account would continue to earn interest at 4%, and also could receive additional interest credits if average 5 year returns exceeded 6%. Under the Kentucky plan design, the member's cash

balance account would continue to earn interest at 4%, but would not receive any upside sharing of returns over 4%, while the Nebraska plan would continue to credit interest to deferred members using the federal mid-term rate plus 1.5% with a minimum rate of 5%. And as stated above, the defined contribution component of the Hybrid Retirement Plan would continue to accumulate interest based on the member's asset allocation and fund returns.

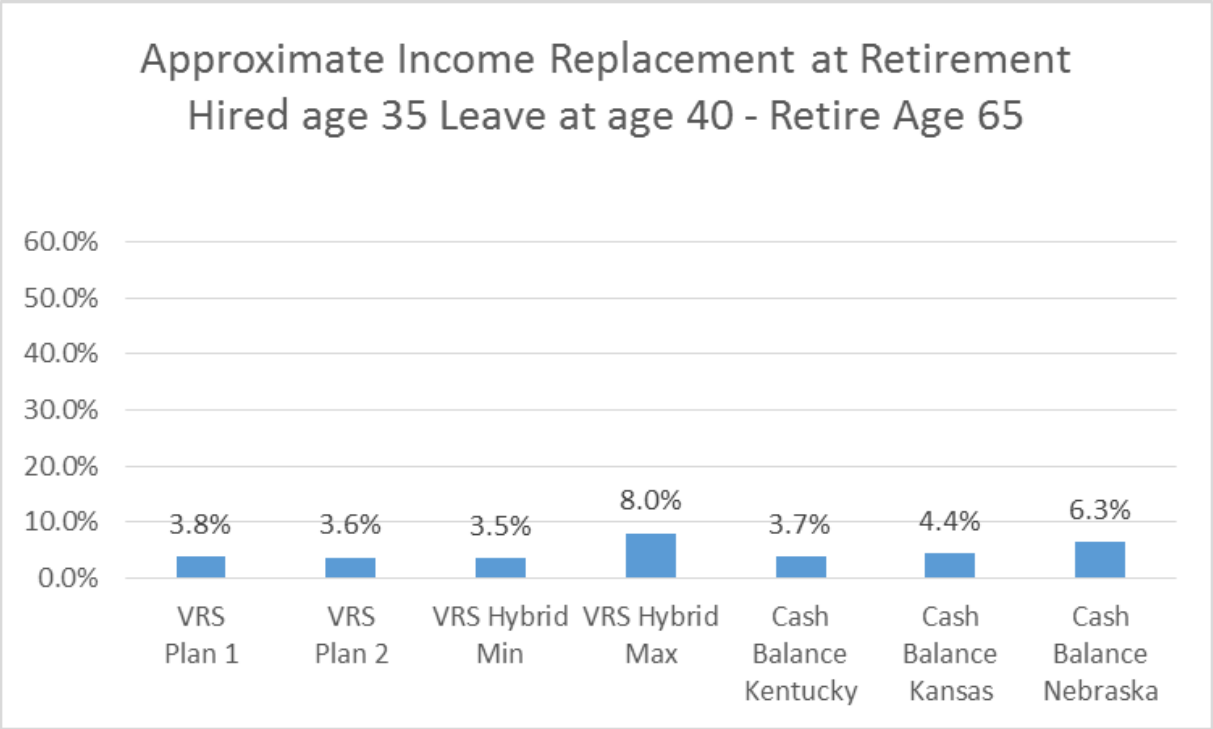
Exhibit 3-5



With the exception of the Hybrid Retirement Plan with the maximum voluntary contribution and the Nebraska cash balance plan, which has a more robust benefit and higher interest crediting rate, the VRS plans and Kentucky and Kansas designs provide a very similar benefit level for employees who work only 5 years and then defer receipt of their benefit until age 65.

The replacement ratio of the benefit at age 65 assuming the member's pay level increased with inflation after termination is seen in Exhibit 3-6 below. As expected, participants who work only 5 years receive a relatively low replacement ratio under any plan design.

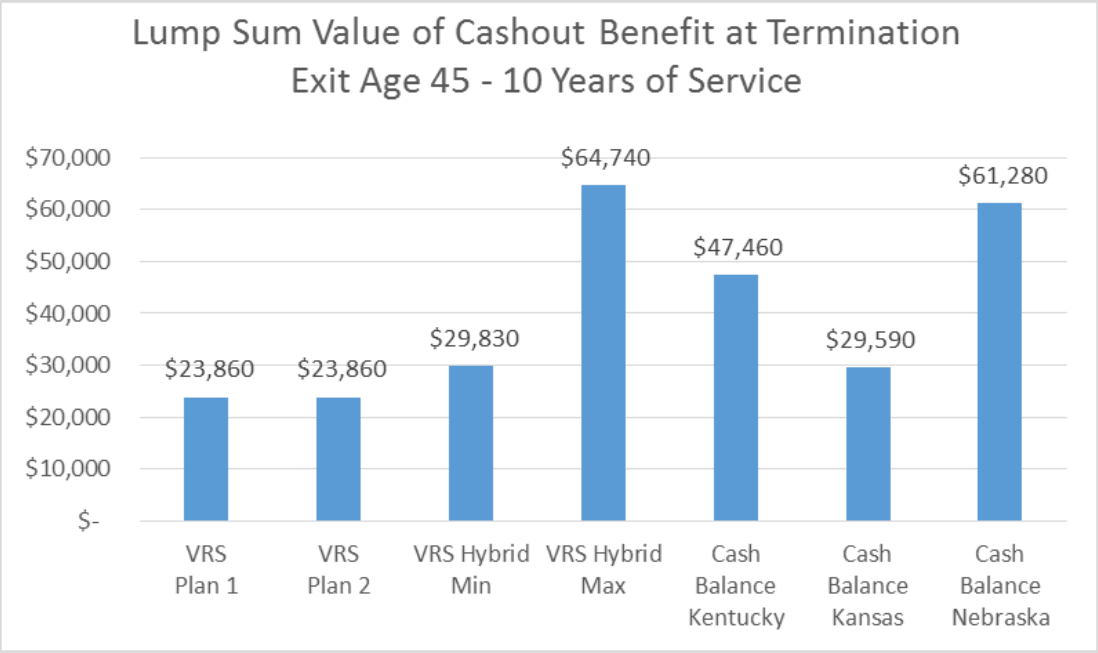
Exhibit 3-6



Terminates After 10 Years of Employment

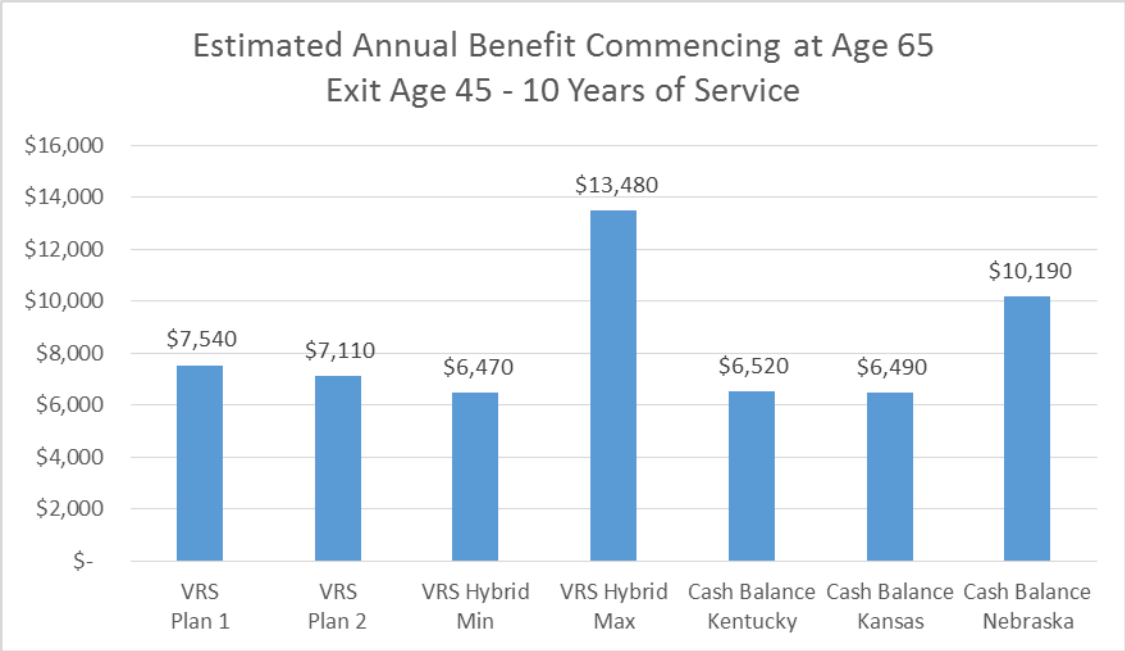
In this example, the employee begins work at age 35 and leaves employment at age 45. If the member decides to cash out of the plan at termination, below in Exhibit 3-7 are the estimated lump sum payments under the various plans.

Exhibit 3-7



If the member leaves his or her money in the plan and defers commencement of a benefit to age 65 and the benefit is converted to a life annuity, the estimated annual benefit payable from each plan is shown below (Exhibit 3-8).

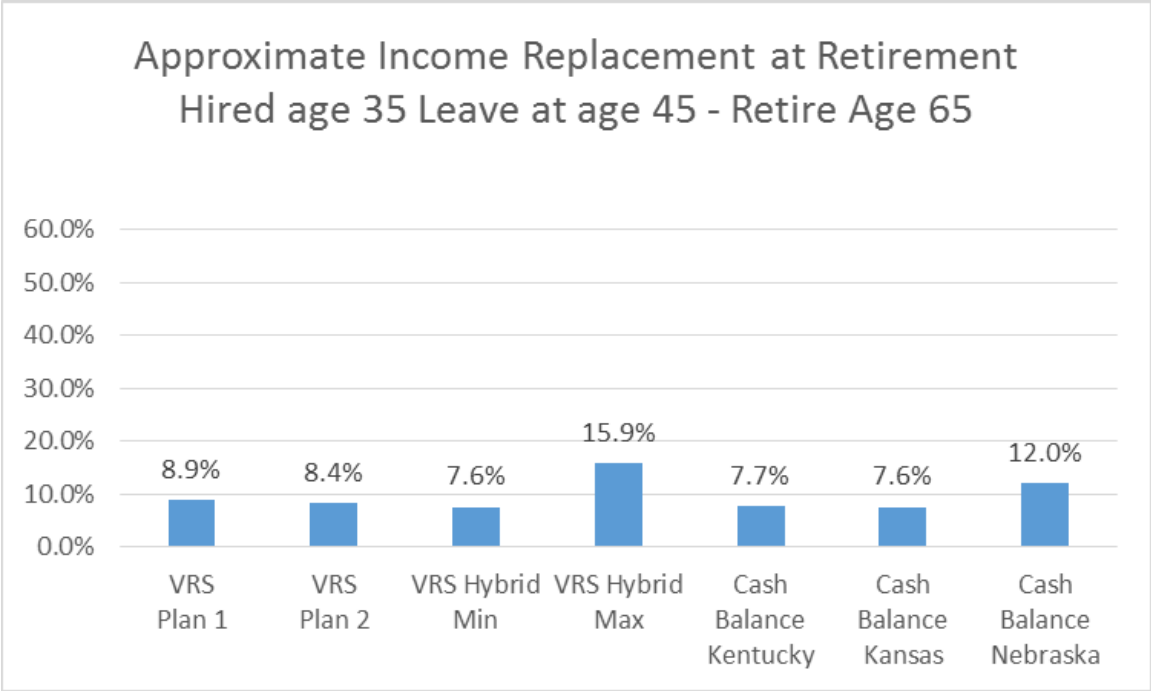
Exhibit 3-8



You can begin to see that after 10 years of employment, the cash balance lump sum payout is considerably higher than the traditional defined benefit plans, but the retirement benefit at age 65 is beginning to show more value under the traditional defined benefit designs.

The replacement ratio of the benefit at age 65 assuming the member's pay level increased with inflation after termination is seen in the chart below. Similar to that which we saw above, even after 10 years of employment the replacement ratio, as shown in Exhibit 3-9, is still relatively low under any plan design.

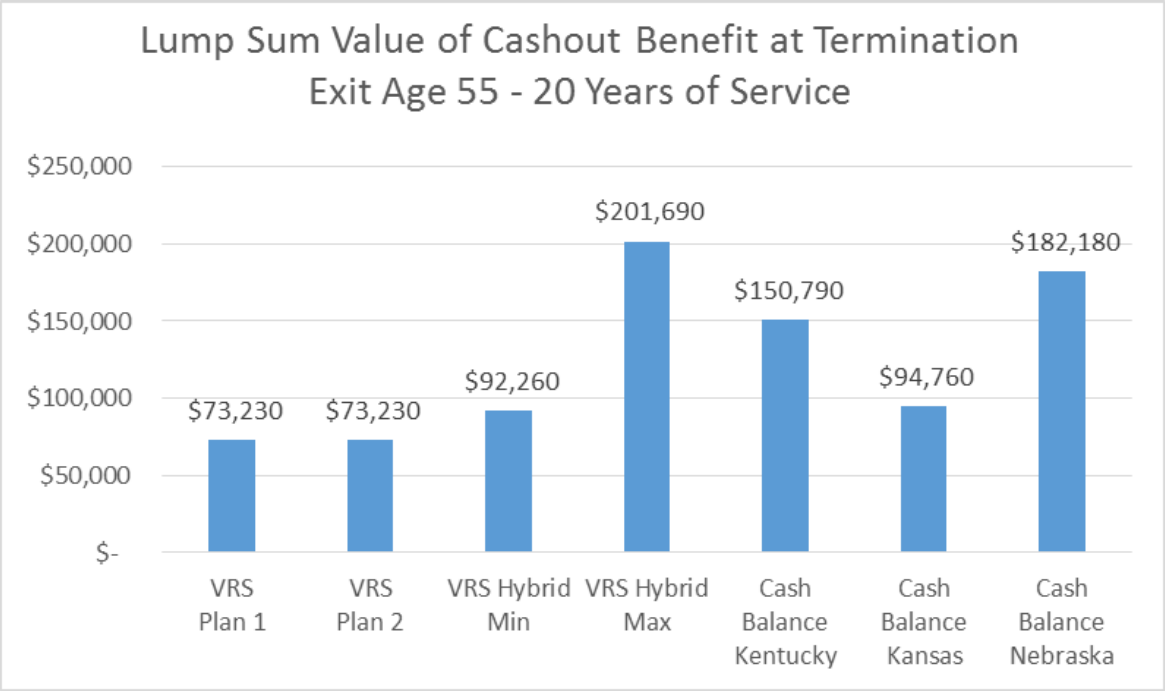
Exhibit 3-9



Terminates After 20 Years of Employment

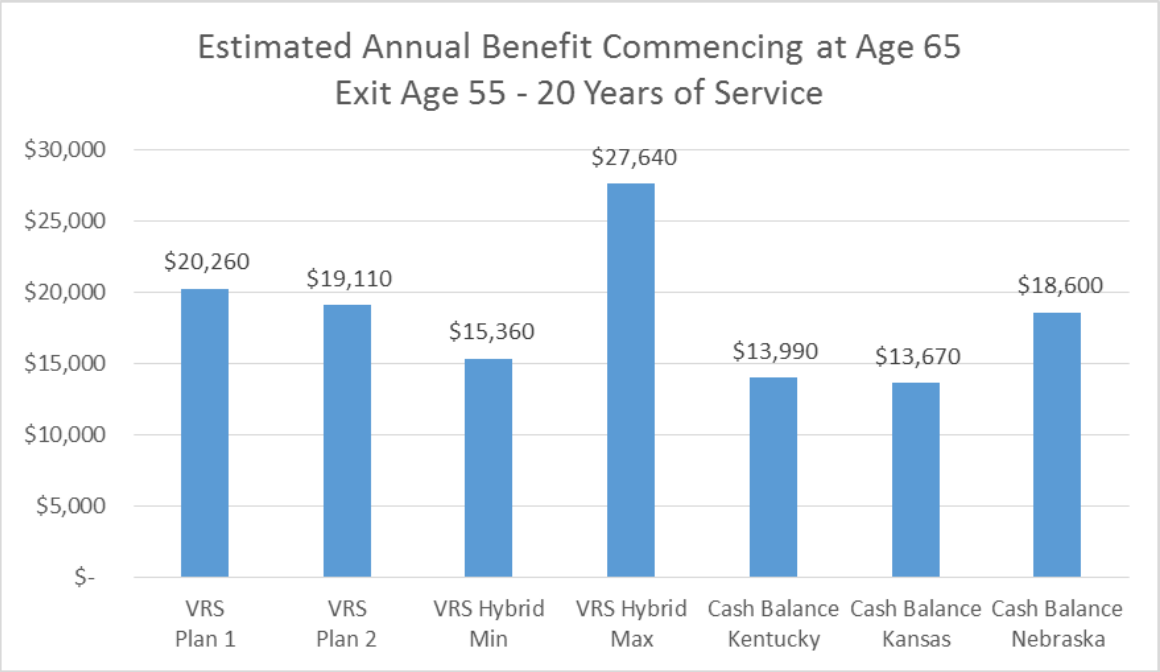
In this example, the employee begins work at age 35 and leaves employment at age 55. If the member decides to cash out of the plan at termination, below in Exhibit 3-10 are the estimated lump sum payments under the various plans.

Exhibit 3-10



If the member leaves his or her money in the plan and defers commencement of a benefit to age 65 and the benefit is converted to a life annuity, the estimated annual benefit payable from each plan is shown below in Exhibit 3-11.

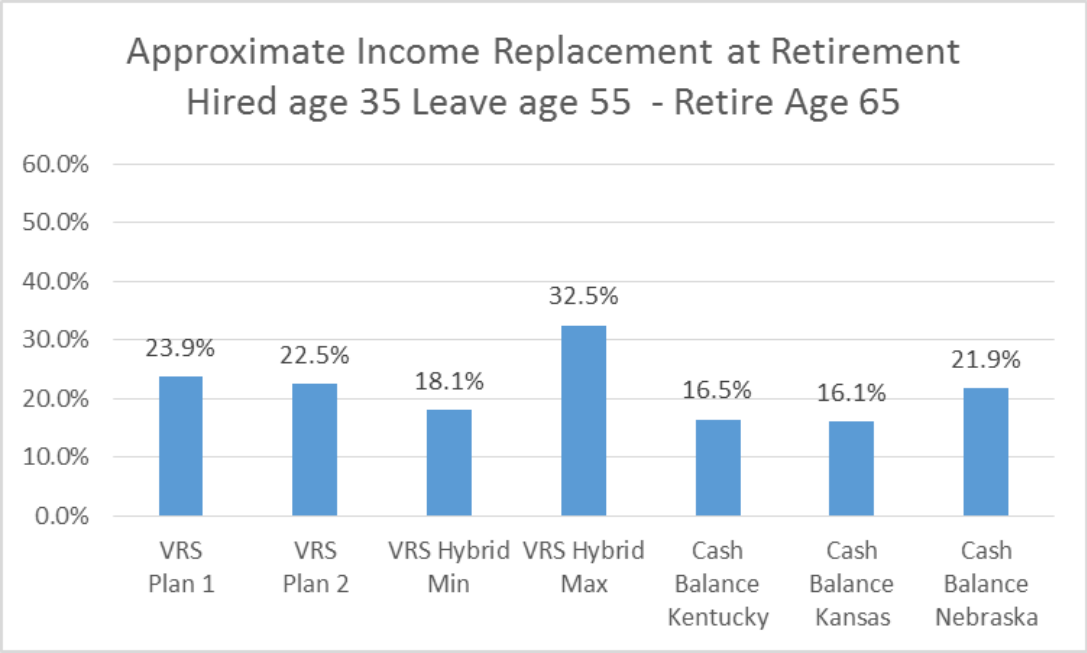
Exhibit 3-11



After 20 years of employment, the value of the retirement benefit at age 65 is beginning to show even more value at separation under the traditional defined benefit designs.

The replacement ratio of the benefit at age 65 assuming the member's pay level increased with inflation after termination is seen in the chart below (Exhibit 3-12).

Exhibit 3-12

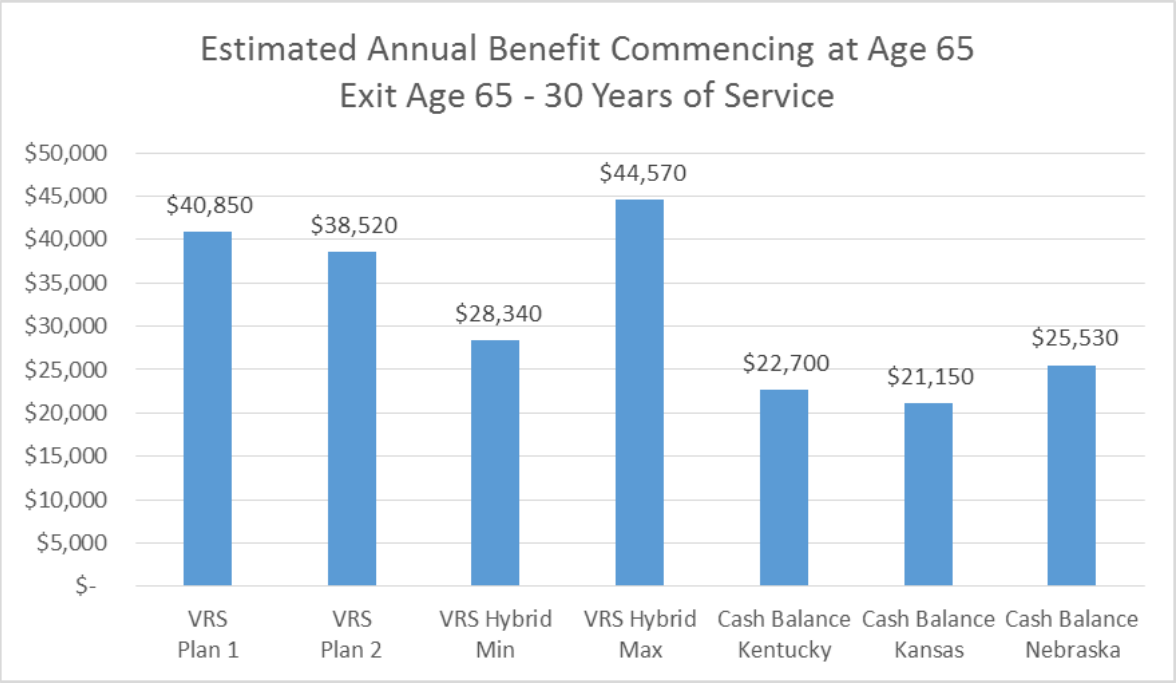


Retires After 30 Years of Employment

In these examples, the employee begins work at age 35 and retires at age 65. Lump sums at retirement would be a design consideration under a cash balance design. For the three state systems included in this report, Nebraska allows a full lump sum cash out, Kansas allows up to 30% of the account balance to be paid as a lump sum and Kentucky provides only an annuity at retirement with no lump sum cash out. Under the Hybrid Retirement Plan, the member would have the option to purchase an annuity with the defined contribution account balance, take monthly payouts or take a lump sum of the balance.

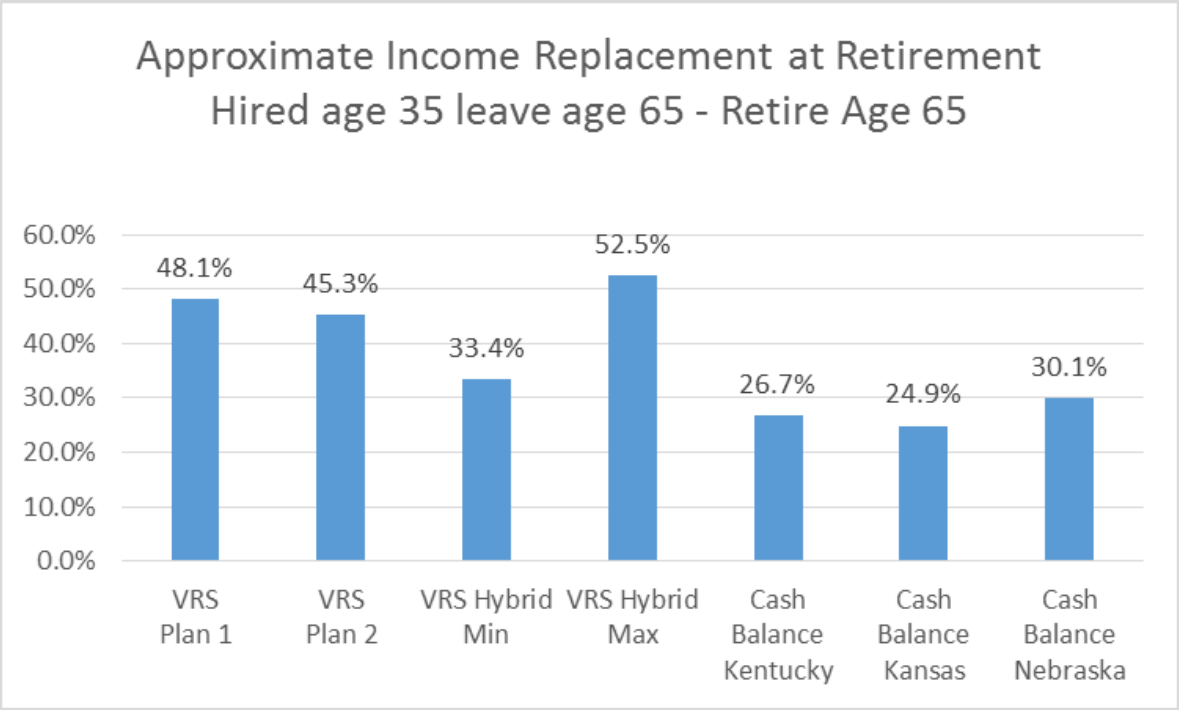
The estimated annual benefit payable from each plan is shown below in Exhibit 3-13.

Exhibit 3-13



The replacement ratio of the benefit at retirement is seen in Exhibit 3-14 below. After 30 years of service the traditional defined benefit designs provide a lifetime benefit nearly twice as large as the cash balance designs.

Exhibit 3-14



In the illustrations above, the VRS plans provided member benefits at or near the current designs used in Kentucky, Kansas, and Nebraska.

Looking at a wider array of plan members, the illustration Exhibit 3-15 compares the value of the benefits under the Kentucky cash balance design to the value of benefits provided in the Hybrid Retirement Plan assuming minimum contributions to the hybrid. Similar to the charts above, this analysis looks at a variety of potential members by age and years of service at termination, as well as those who defer receipt of their benefit to age 65. If a cell is red that implies the Kentucky cash balance plan benefit would be more favorable than the Hybrid Retirement Plan benefit at the selected age and service of the member, if the cell is green the Hybrid Retirement Plan benefit would be more favorable.

Lighter shades of green imply the Hybrid Retirement Plan benefit is between 0-15% higher than the Kentucky cash balance plan benefit and the darker shades of green imply the Hybrid Retirement Plan is at least 15% greater than the Kentucky cash balance plan benefit. Similarly, the darker shades of red imply the Kentucky cash balance plan is 15% better than the VRS Hybrid Retirement Plan and lighter shades of red imply that the

IMPACT ON BENEFIT LEVELS

Kentucky cash balance plan is between 0-15% greater than the Hybrid Retirement Plan benefit. What this shows is that the current hybrid plan design even with no voluntary contributions would actually provide a higher benefit for most members, with the exception of those employees hired below age 30, unless they work a long career, or those hired between ages 30-35 who work less than 10 years. The average entry-age of State employees is approximately age 35.6 and the average service at retirement is approximately 23 years.

Exhibit 3-15

VRS Hybrid Plan at Minimum Required Contribution Level (No Voluntary Contributions) as a Percentage of Kentucky Cash Balance Plan

	Years of Service with Employer							
Age at Hire	5	10	15	20	25	30	35	40
25	84%	85%	86%	89%	92%	96%	101%	107%
30	89%	91%	94%	98%	103%	109%	116%	
35	96%	99%	104%	110%	117%	125%		
40	105%	111%	117%	125%	135%			
45	118%	125%	134%	145%				
50	134%	144%	156%					
55	154%	168%						
60	180%							

The Kansas cash balance plan design yields very similar results.

Exhibit 3-16

VRS Hybrid Plan at Minimum Required Contribution Level (No Voluntary Contributions) as a Percentage of Kansas Cash Balance Plan

	Years of Service with Employer							
Age at Hire	5	10	15	20	25	30	35	40
25	85%	85%	87%	91%	96%	103%	112%	123%
30	89%	91%	94%	100%	107%	116%	128%	
35	96%	100%	105%	112%	122%	134%		
40	106%	111%	118%	128%	141%			
45	118%	126%	135%	148%				
50	135%	145%	157%					
55	155%	168%						
60	181%							

IMPACT ON BENEFIT LEVELS

Cash Balance Design Comparable to Current VRS Designs

A retirement benefit can be designed to provide any level of benefit under either a traditional defined benefit, cash balance plan, or a combination defined benefit/defined contribution hybrid design.

Employers must strike a balance between providing an appropriate benefit level for their members with the cost to deliver the benefit. In addition to the absolute cost, the difference in the designs really comes down to how much risk employers want to share with employees when it comes to the delivery of the benefit.

COST COMPARISONS TO CURRENT VRS PLAN DESIGNS

How the cost of cash balance plans compares with traditional defined benefit pension plans depends on their design, in particular on whether they have fixed or variable interest credits. In general, cash balance plans with fixed interest credits are more like traditional defined benefit pension plans in that they provide participants with relatively secure benefits but expose employers to investment risk. Cash balance plans with variable interest credits tied to pension fund returns resemble defined contribution plans to the extent that they shift much of the investment risk onto participants, though they must at a minimum offer a zero percent floor on investment returns as required by 26 U.S.C. § 411(b)(5)(B), shielding participants from investment losses.

Cash balance plans with fixed interest credits offer a more secure retirement benefit than those with variable interest credits, but tend to have higher costs or offer fewer protections than traditional defined benefit pensions. In theory, cash balance plans can provide career workers with retirement benefits that approach those of traditional defined benefit pensions while increasing the retirement benefits earned by some shorter-term workers. However, the cost will typically be slightly higher than defined benefit plans due to the shifting of greater benefits to younger workers and participants cashing out at younger ages with higher benefits than under the traditional defined benefit plan design.

The costs and risks of cash balance plans associated with the pay credit and interest credit are often misunderstood. A cash balance plan with a relatively large pay credit and a relatively low interest credit is not necessarily more generous or less risky to the employer than one with a low pay credit and high interest credit. The normal cost of a cash balance plan must be actuarially determined, just as it is in a traditional defined benefit plan.

The fact that the assumed rate of return on fund assets is typically set higher than the interest crediting rate is one reason why the employer normal cost will typically differ from the pay and interest credit provided in cash balance plan designs. If the plan achieves the assumed rate of return, the additional investment earnings help to offset employer costs since the amount credited to the member's account is less than what is earned. Conversely, if the investment return achieved is less than the interest crediting rate provided to the member's account an unfunded liability is generated that would generate an unfunded amortization rate similar to a traditional defined benefit plan.

As an example, we modeled the cash balance plan provisions of the current Kansas and Kentucky cash balance plans alongside the current VRS plan designs. As we saw earlier in this report, the Kentucky and Kansas cash balance designs typically provide a lesser benefit than any of the VRS plan designs currently in place. The Kentucky plan provides a 4% pay credit along with a 4% interest credit plus upside sharing in returns that exceed 4%. When we modeled the Kentucky plan design based on future hires only (Exhibit 4-1), the analysis resulted in an employer normal cost rate of approximately 1.63% of covered payroll. Similarly, the Kansas design, which provides a tiered pay credit to members of 3% - 6% based on years of service plus an interest crediting rate of 4% with upside sharing of investment returns over 6%, we calculated an employer normal cost rate of approximately 1.27% if all actuarial assumptions are met.

Exhibit 4-1

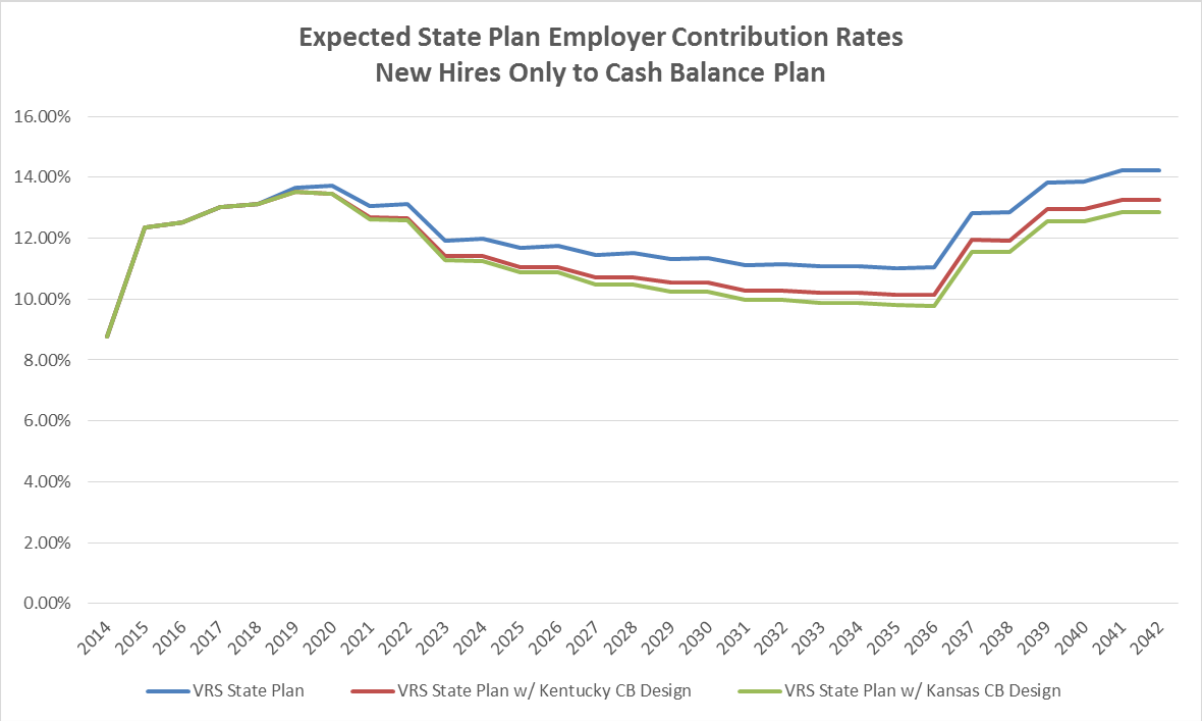
	VRS State Retirement Plan			Cash Balance Designs	
	VRS Plan 1	VRS Plan 2	Hybrid	Kansas	Kentucky
Total Defined Benefit Normal Cost	9.64%	8.95%	5.17%	6.27%	6.63%
Member Contribution Rate	5.00%	5.00%	4.00%	5.00%	5.00%
Employer Normal Cost Rate	4.64%	3.95%	1.17%	1.27%	1.63%
Employer Match to Hybrid DC Plan	0.0%	0.0%	1.21%	0.0%	0.0%
Total Employer Rate without Unfunded Amortization Cost	4.64%	3.95%	2.38%	1.27%	1.63%

VRS normal cost rates are based on demographics from the June 30, 2015 actuarial valuation. Chart does not reflect VRS Hybrid employee 1% mandatory contribution to the defined contribution component.

Analysis of Long-Term Cost Impacts on State Plan

House Bill 1969 requested VRS to compare long-term employer and member cost impacts of a cash balance design. Since the legislation did not specify which employees would be impacted by such a design, provided below is an analysis of long-term cost impacts on the State plan assuming a cash balance plan design similar to that used by Kansas or Kentucky were adopted for new hires. The State plan costs shown are the blended employer rates for Plan 1, Plan 2, and Hybrid Retirement Plan members. Exhibit 4-2 below assumes that current VRS members would remain in their respective plan while all new employees would enter a new cash balance plan tier effective July 1, 2018.

Exhibit 4-2



As expected, since the value of the benefits provided by the Kansas or Kentucky cash balance designs are typically lower than those provided by the current VRS plans, long term costs would trend lower as new members entered the cash balance tier.

If implemented, the June 30, 2019 valuation of the State pension plan would likely be the first valuation with cash balance plan members. The contribution rates to the State defined benefit pension plan for the fiscal year ending June 30, 2021 (based on the June 30, 2019 valuation) would be the first defined benefit contribution rates impacted by the cash balance plan. These projections are based on the June 30, 2014 valuation and assume that the phase-in of Board certified rates in the 2015 Appropriation Act will be followed.

Impact of Investment Risk on Plan Design

Because the current State plan costs are impacted by the legacy unfunded liability, perhaps a more meaningful analysis would be to show the impact of the plan design for a new employee with no legacy unfunded liability.

As discussed earlier in the report, any benefit level can be provided through any of the designs discussed in this report. By modeling a benefit design based on VRS Plan 2, and replicating the Plan 2 benefit under a cash balance design and the VRS Hybrid design, the associated risks to the employer and employee may be better analyzed by varying the economic scenarios under which a benefit would accrue.

The following analysis assumes an employee works for 30 years and retires with a final average compensation of approximately $61,000. This member could expect to receive a monthly benefit of approximately $2,500 if he or she were covered under the provisions of a Plan 2 VRS member, which would include future cost-of-living increases in retirement which are assumed to be 2.25% each year of retirement. Below in Exhibit 4-3 are the plan designs that could provide a similar level of benefit under the Hybrid Retirement Plan, and two cash balance designs (one with a variable interest crediting rate, and one with a fixed interest crediting rate).

Exhibit 4-3

Traditional Defined Benefit Plan- VRS Plan 2

	Defined Benefit				
Plan Design	Member Contribution	Multiplier	Average Final Compensation	Years of Service	Estimated Monthly Benefit
Defined Benefit	5.00%	1.65%	$ 61,000	30	$ 2,500

Hybrid Plan - Defined Benefit / Defined Contribution - VRS Hybrid

Plan Design	Member Contribution	Multiplier	Average Final Compensation	Years of Service	Estimated Monthly Benefit
Defined Benefit	4.00%	1.00%	$ 61,000	30	$ 1,500

Plan Design	Member Mandatory Rate	Member Voluntary Contribution	Employer Match	Defined Contribution Balance @ Age 65	Estimated Monthly Benefit Provided by Account Balance @ Age 65
Defined Contribution	1.00%	2.00%	2.50%	$ 194,000	$ 1,000

Total Hybrid		$ 2,500

Cash Balance Plan - Variable Interest Crediting Rate

Plan	Member Contribution	Pay Credit (Employer)	Interest Credit	Dividend / Upside Sharing	Cash Balance Account @ Age 65	Estimated Monthly Benefit Provided by Account Balance @ Age 65
Cash Balance	5.00%	8.25%	4.00%	75% of Returns over 4.0%	$ 472,100	$ 2,500

Cash Balance Plan - Fixed Interest Crediting Rate

Plan	Member Contribution	Pay Credit (Employer)	Interest Credit	Dividend / Upside Sharing	Cash Balance Account @ Age 65	Estimated Monthly Benefit Provided by Account Balance @ Age 65
Cash Balance	5.00%	10.50%	5.25%	None	$ 472,400	$ 2,500

In order to provide a similar benefit under the VRS Hybrid Retirement Plan, the member would need to contribute 2% of salary in voluntary contributions to the defined contribution component of the hybrid. We will assume that the member will achieve an investment return in the defined contribution plan that is 1% less than the investment return achieved by the fund in the various economic scenarios. The defined contribution plan balance will be used to purchase an increasing annuity to go along with their expected $1,500 a month defined benefit.

A cash balance plan with provisions similar to the Kentucky cash balance design would need to provide a pay credit of approximately 8.25% from the employer along with a 4% interest credit and upside sharing of investment returns similar to the Kentucky plan, which credits 75% of 5 year average returns in excess of 4%. This design could provide enough of a cash balance at retirement to convert to a $2,500 a month lifetime annuity with future cost-of-living increases similar to Plan 2 if assumptions are all met.

A cash balance design that provided a fixed interest crediting rate of 5.25% would need to provide an employer pay credit of 10.50% to accumulate a balance large enough to convert to a $2,500 a month lifetime annuity.

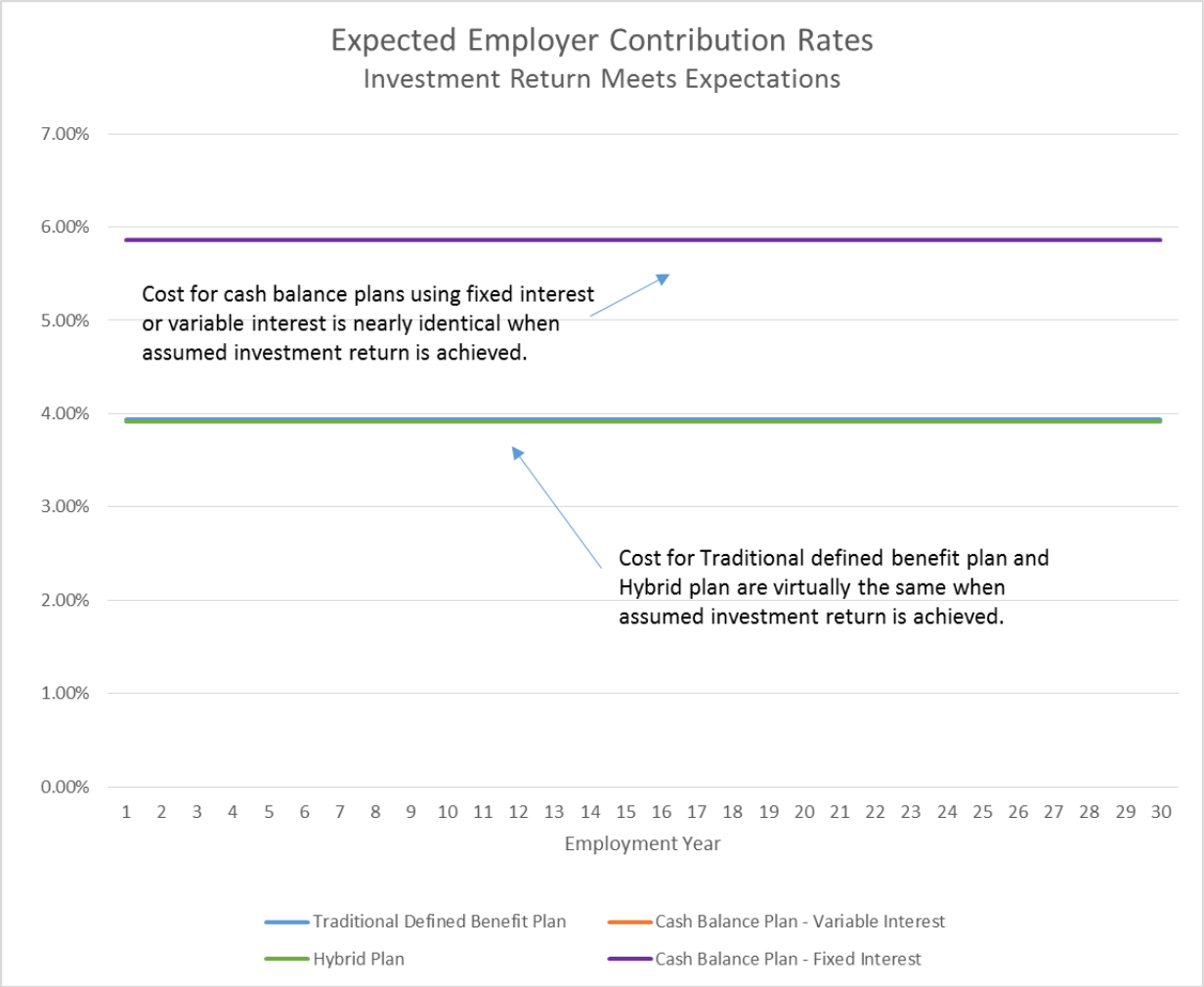
The above scenarios assume that the account type plans are converted to an increasing annuity at age 65 using the VRS mortality tables and an interest conversion rate of 5% and a cost-of-living adjustment of 2.25% per year.

Below we will provide an analysis of how these plan designs react under different economic scenarios and what the results mean for employer funding and the employee's benefit. The costs associated with these designs are for illustrative purposes only and assume no decrements other than retirement at age 65. The purpose of the illustrations is to show the relative magnitude of how costs would change under the different plan designs when investment assumptions differ from the assumed long term rate of return of 7%, and subsequently how a member's benefit could be impacted.

Base Case Scenario - Investment Return Matches Assumption

The exhibit below (Exhibit 4-4) shows what the expected employer costs would be assuming that all assumptions are met including achieving an investment return of 7% each year.

Exhibit 4-4



The costs and benefits provided in the above cash balance plan designs would be approximately the same for both the employer and employee under this base case scenario where all assumptions are assumed to be met.

The hybrid plan costs are slightly less for the employer than the traditional defined benefit plan, but the employee would be required to contribute 7% of payroll to achieve a similar level of benefit, 4% to the defined benefit plan plus 1% mandatory and 2% voluntary to the defined contribution plan. Therefore, the employee is paying about 64% of the entire cost of the benefit in the hybrid plan versus approximately 56% of the cost

for the traditional defined benefit plan and 46% of the cost in the cash balance plan designs.

Note also, that in this example, the employer costs for the cash balance designs are greater than those for the traditional defined benefit plan and Hybrid Retirement Plan. This is mostly due to the inclusion of a cost-of-living adjustment on the cash balance plans so that the benefits structures are similar to the traditional defined benefit and hybrid plan benefits. Most cash balance plans do not automatically include a cost-of-living provision in the plan design. Cost-of-living adjustments would be offered at time of retirement and the member would pay for the feature by accepting a lower monthly benefit to start. Another reason that the cash balance costs are higher than the traditional defined benefit and hybrid is that the conversion factor that is used at retirement to convert to a lifetime annuity is typically based on a lower investment rate than the plan's long term rate of return. A lower conversion rate is used to avoid some of the investment risk borne by the plan by converting the cash balance account to a lifetime annuity. In these examples, the conversion rate is 5%, versus the long term rate of return of 7% being used in these illustrations.

Exhibit 4-5 shows the estimated cost that the employer and employee would theoretically pay for the benefits shown above over the employee's working career. In this first example, where all assumptions are met, the Hybrid Retirement Plan would be least expensive to the employer and most expensive to the employee.

Exhibit 4-5

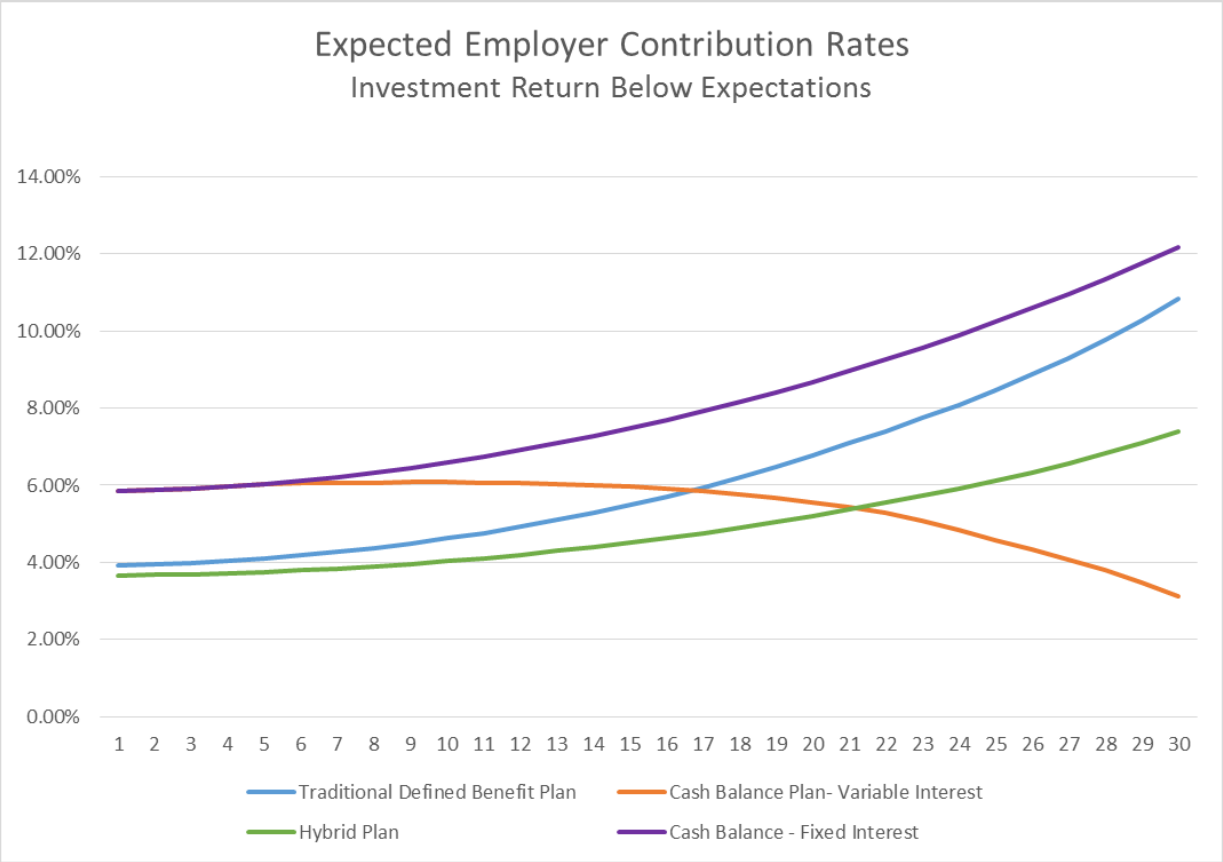
Plan Type	Estimated Employer Contributions over 30 Year Career	Estimated Member Contributions over 30 Year Career	Estimated Monthly Benefit at Retirement *
Traditional Defined Benefit Plan	$55,900	$71,000	$2,500
Hybrid Plan	$55,600	$99,400	$2,500
Cash Balance Plan - Variable Interest	$83,100	$71,000	$2,500
Cash Balance Plan- Fixed Interest	$83,100	$71,000	$2,500

* In order to compare the VRS lifetime annuities provided in VRS Plans with the account type plans, the cash balance plan and the hybrid defined contribution account balance are converted to an annuity at age 65 using an annuity factor that provides for a 2.25% cost of living increase similar to that embedded in the VRS defined benefit plans.

Investment Return Below Expectations

The exhibit below (Exhibit 4-6) shows what the expected employer costs and employee benefits would be assuming that investment returns consistently fall below the assumed rate of return of 7% and average 5% per year instead.

Exhibit 4-6



Under this scenario you see increasing costs for the traditional defined benefit plan and the cash balance plan with fixed interest crediting rate. The hybrid cash balance cost increases, but to a lesser extent. The Hybrid Retirement Plan tempers investment risk by providing a lower benefit multiplier and sharing risk in the defined contribution component of the hybrid. The cash balance plan with variable interest actually decreases over time, because this design shares risk with the employee by lowering the benefit when investments do not perform as expected by reducing the interest crediting amount, but never dropping it below 4%.

As a result, even though the employer cost does not increase, the employee's cash balance account does not receive the same upside returns and therefore the monthly benefit is reduced from $2,500 a month to $1,900 a month at retirement. Similarly, the benefit level of the Hybrid Retirement Plan would also be reduced due to expected lower

returns on the defined contribution component of the hybrid providing an expected benefit of $2,200 a month, $1,500 a month from the defined benefit component and $700 a month from the balance in the defined contribution component. The VRS Plan 2 benefit and the cash balance plan with fixed interest would still provide a benefit of $2,500 a month.

Exhibit 4-7 shows how the employer cost would change under the various plan designs when investment returns are below expectations. For the two plans that had no change in the employee benefit, the costs increased considerably for the employers. The employer cost also increased for the Hybrid Retirement Plan, but to a lesser extent since only the defined benefit portion of the benefit was maintained. The hybrid defined contribution benefit was assumed to drop due to lower returns, so the overall reduction in benefit was estimated at 12%. The employer cost under the cash balance plan with variable interest actually decreased for the employer since they were not having to share any upside returns with the member, but the member's benefit decreased an estimated 24%.

Exhibit 4-7

Plan Type	Estimated Employer Contributions over 30 Year Career	Change in Employer Contributions when Investment Returns less than Assumed Rate	Estimated Member Contributions over 30 Year Career	Estimated Monthly Benefit at Retirement *	Change in Estimated Monthly Benefit when Investment Returns Less than Assumed Rate
Traditional Defined Benefit Plan	$101,300	Up 81%	$71,000	$2,500	No Change
Hybrid Plan	$72,200	Up 30%	$92,300	$2,200	Down 12%
Cash Balance Plan - Variable Interest	$75,300	Down 10%	$71,000	$1,900	Down 24%
Cash Balance Plan- Fixed Interest	$119,400	Up 44%	$71,000	$2,500	No Change

* In order to compare the VRS lifetime annuities provided in VRS Plans with the account type plans, the cash balance plan and the hybrid defined contribution account balance are converted to an annuity at age 65 using an annuity factor that provides for a 2.25% cost of living increase similar to that embedded in the VRS defined benefit plans.

Investment Return Above Expectations

The exhibit below (Exhibit 4-8) shows what the expected employer costs and employee benefits would be assuming that investment returns consistently exceeded the assumed rate of return of 7% and averaged 8% per year.

Exhibit 4-8

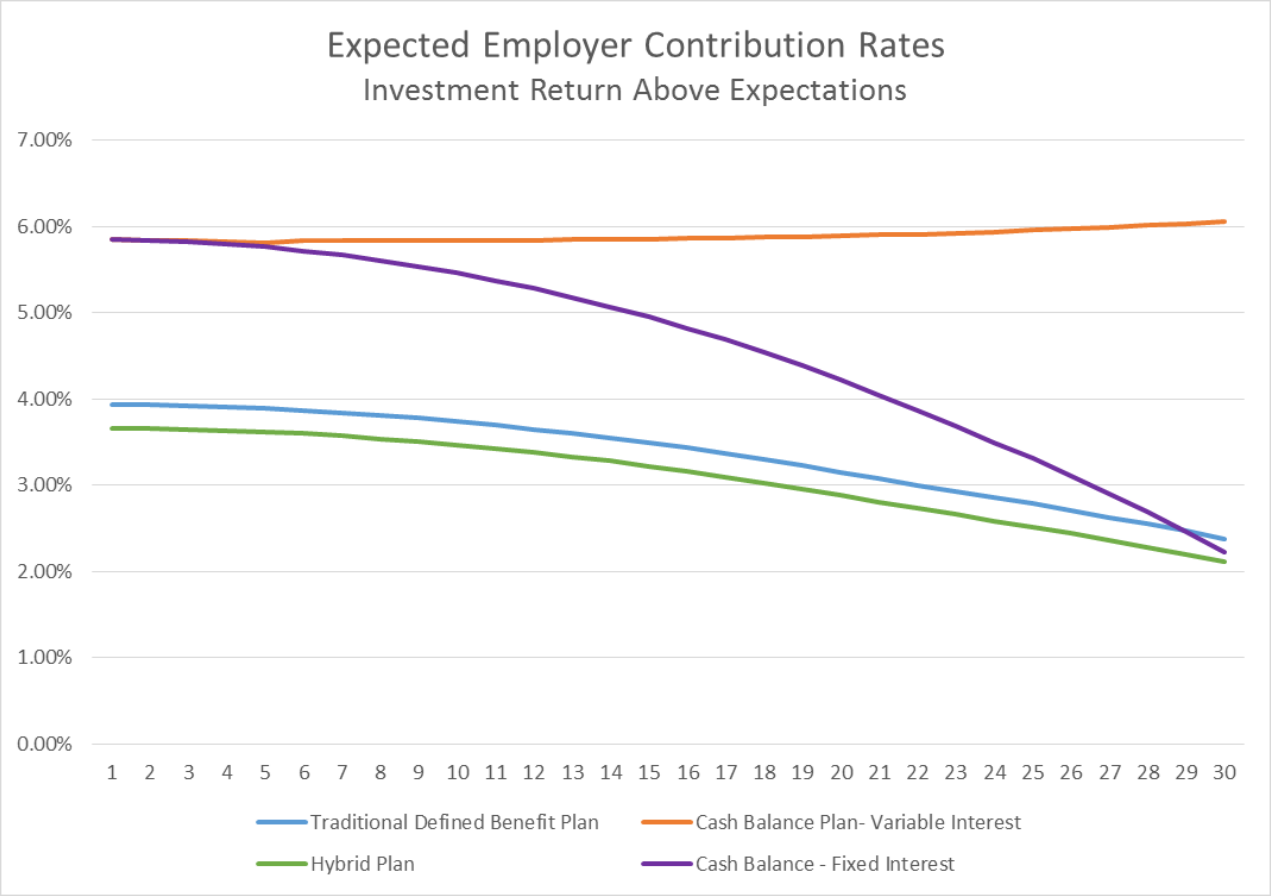


Exhibit 4-9 shows how the employer cost would change under the various plan designs when investment returns exceed expectations. With the exception of the cash balance plan with variable interest rate crediting, the employer cost decreased 25-30% for all plans. The cash balance plan with variable interest crediting shows slightly increasing costs since the employee is sharing in the excess returns. Both the Hybrid Retirement Plan and the cash balance plan with variable interest crediting also would expect to have

increases in the employee's benefits, up 8% for the hybrid plan and 12% for the cash balance plan.

Exhibit 4-9

Plan Type	Estimated Employer Contributions over 30 Year Career	Change in Employer Contributions when Investment Returns Exceed Assumed Rate	Estimated Member Contributions over 30 Year Career	Estimated Monthly Benefit at Retirement *	Change in Estimated Monthly Benefit when Investment Returns Exceed Assumed Rate
Traditional Defined Benefit Plan	$38,700	Down 31%	$71,000	$2,500	No Change
Hybrid Plan	$42,500	Down 24%	$92,300	$2,700	Up 8%
Cash Balance Plan - Variable Interest	$83,800	Up 1%	$71,000	$2,800	Up 12%
Cash Balance Plan - Fixed Interest	$62,300	Down 25%	$71,000	$2,500	No Change

* In order to compare the VRS lifetime annuities provided in VRS Plans with the account type plans, the cash balance plan and the hybrid defined contribution account balance are converted to an annuity at age 65 using an annuity factor that provides for a 2.25% cost of living increase similar to that embedded in the VRS defined benefit plans.

As the above illustrations show, all the plan designs we have discussed throughout this report could be designed to provide a certain level of benefit to employees. Both the hybrid and cash balance designs show that this can also be achieved by sharing some of the risk with employees, but under certain circumstances benefit levels may not meet members' expectations The Hybrid Retirement Plan shares investment risk by moving a portion of the benefit to a defined contribution plan managed by the employee and also reducing risk in the defined benefit plan by reducing liability exposure with a lesser benefit multiplier. Much like defined contribution plans, cash balance plans can also share risk by introducing variable interest crediting rates, and variable annuity conversion rates that allow employees' benefits to react to the economic markets and adjust upward or downward as indicators suggest.

ASSESSMENT OF FINANCIAL RISKS

Different retirement plan designs apportion risks and rewards differently between employers and employees. With the advent of defined contribution plans, and the recent emergence of hybrid plans, some employers are shifting a portion of the inherent risks in retirement plans to employees. Exhibit 5-1 shows some of the risks that employers and employees may share in a retirement plan.

Exhibit 5-1
Types of Risk

Investment	Risk that actual returns on assets set aside to fund accrued benefits may fall short of expectations. Also encompasses market, credit, and other types of risk that arise from investing plan assets.
Credit Risk	Risk of default on debt stemming from borrower's failure meet a contractual obligation.
Inflation	Risk of benefit not keeping pace with general price level of goods and services.
Longevity	Risk that members will live longer, on average, than originally expected, increasing the time period for paying the benefits.
Market Timing	Risk that assets fall short of what is required to meet obligation at the time of an employee's retirement.
Portability / Accrual	Risk of loss of value of current accruals if benefits are not considered portable, or transferable when leaving. Since traditional DB plans tend to reward long-tenured employees with much of the benefit accruing in the final years before retirement, this risk also encompasses loss of future accruals, which will result in accrued benefits actually falling far short of a worker's expectations.
Vesting	Risk of leaving employment and forfeiting any accrued pension benefit.

VRS Traditional Defined Benefit Plan (DB)

In the VRS defined benefit pension plans the employer bears the risk of providing the employee with a pension benefit that is typically expressed as a specific replacement rate of pre-retirement gross earnings.

Investments

In managing the overall financial risk associated with a defined benefit pension plan the employer bears "investment" risk which is the risk that actual returns on the assets set aside to fund accrued pension benefits may fall short of expectations. This could force employers to raise contribution rates if poor asset returns result in the pension plan being sufficiently underfunded. Note that the term investment risk encompasses market, credit and other types of risk that might arise from investing plan assets. Employers can hedge market risk by investing in fixed income securities that match the duration or cash flows of their accrued liabilities; and if they use highly-rated fixed income securities they can also limit credit risk. In practice, the majority of defined benefit plans are heavily invested in publicly-traded equities (one-half to two-thirds of assets). By investing in publicly traded equities and accepting the exposure to market risk, the equity premium serves as compensation and holds down expected pension contributions.

Inflation

The VRS defined benefit plans include provisions for providing automatic cost of living increases (COLA). Even though the COLAs are capped at 5% for Plan1 employees and 3% for Plan 2 and Hybrid employees, employees are shielded from the brunt of inflation risk because the benefits are essentially indexed with the consumer price index.

Longevity

In defined benefit plans, employers also bear "longevity" risk because they are generally obligated to offer defined benefits as deferred life annuities. Longevity risk is the risk that plan members will live longer, on average, than originally expected, increasing the time period for paying the benefit.

Market Timing

The employer also bears market timing risk, in that defined benefit plan assets may fall short of what is required to meet this obligation at the time of the employee's retirement. Through pooling of plan contributions across a number of employees, not all of whom will retire at the same time, the employer is able to manage market timing risk much better than an individual would be able to.

Portability / Accrual

Accrual or portability risk, reflects the fact that benefits have traditionally been loaded toward long-tenured employment relationships. Since benefit payments are often computed as the product of earnings and tenure (both of which tend to increase each year) the accrual pattern is nonlinear in dollar terms (and in present value), with much of the final benefit accruing in the final years before retirement. Therefore, any changes affecting benefit payments that may occur toward the final years of work – including changes to the benefit formula, or an employment separation – can result in accrued benefits actually falling far short of a member's expectations. Unless the defined benefit pension plan is portable, which is uncommon in public sector plans, the accrual risk caused by back loading of defined benefit plan benefits is significant for employees who change employers during their working career.

Vesting

Accrual risks are also a concern for short-term employees due to vesting periods during which workers typically forfeit their defined benefit if their relationship with the employer is severed. VRS plans provide for the return of members' contributions with interest if they terminate without vesting.

Exhibit 5-2
Risk Distribution in a Defined Benefit Pension Plan

Risk	Employer	Employee
Investment	X	
Inflation	X	
Longevity	X	
Market Timing	X	
Portability / Accrual		X
Vesting		X

VRS Hybrid Retirement Plan

The Hybrid Retirement Plan is made up of a defined benefit component combined with a defined contribution component. The defined benefit component would have the same risks as defined above for the VRS traditional defined benefit plan. The risks for the defined contribution component are different and are outlined below.

In a defined contribution pension plan, members accrue funds in individual accounts administered by the plan sponsor. The contributions of employees are typically deducted directly from their pay and frequently some portion of these contributions is matched by the employer. Since contributions to defined contribution plans are generally a fixed percentage of earnings, assets build at a fairly steady rate over time, avoiding the back loading of accrued benefits that was discussed above. So in contrast to a defined benefit plan, it is the contributions rather than the benefit that is fixed in a defined contribution pension plan so the retirement income that will be provided is unknown in advance. The total benefit accumulated during the employee's working career will depend on the contributions made while working and the investment returns, net of fees and expenses, earned on the plan balances.

Investments

Employees bear the total investment risk, from selecting the proper asset allocation to actual market returns.

Inflation

Since defined contribution plans accumulate a fund of money and not an annuity, they do not typically provide any form of indexing or cost of living increase. A member may purchase an annuity at retirement that would include a cost of living component, but will receive a lower initial benefit, or have to pay a premium to pay for this feature.

Longevity

In defined contribution plans members bear all longevity risk and must manage withdrawals or purchase an annuity to achieve lifelong benefits.

Market Timing

Given that there is typically no mechanism for pooling investment risk in defined contribution plans, the employee is also exposed to market timing risk at the point of retirement; this applies not only to the amount of the account balance available at retirement but also to the amount of the annuity that can be purchased with this sum. A market downturn at the time of retirement could substantially erode the account balance in a defined contribution plan. For example, defined contribution plan members who retired during the market downturn in 2009 would likely have retired with a much smaller account balance than individuals who retired during the stock market boom of the late 1990s. Likewise the level of interest rates at the time of retirement influences the amount of the retirement benefit a member could afford if he or she decided to purchase an annuity.

Portability / Accrual

Defined contribution plan assets belong to the employee, meaning that previous contributions, if vested, are portable across employers. In a defined contribution plan this generally means that the defined contribution plan assets are controlled by the employee him or herself. An employee may be able to leave the plan assets under the administration of a previous employer, transfer the assets to a new employer's plan, or transfer the assets to an individual retirement savings account.

Vesting

Similar to defined benefit plans, employer contributions to defined contribution plans must be vested. If a member is terminated prior to the vesting date, only employee contributions and interest are returned.

Exhibit 5-3
Risk Distribution in a Defined Contribution Pension Plan

Risk	Employer	Employee
Investment		X
Inflation		X
Longevity		X
Market Timing		X
Portability / Accrual		
Vesting		X

Cash Balance Plans

How cash balance plans compare with traditional defined benefit pensions depends on their design, in particular whether they have fixed or variable interest credits. In general, cash balance plans with fixed interest credits are more like traditional defined benefit pensions in that they provide participants with relatively secure benefits but expose employers to investment risk. Cash balance plans with variable interest credits tied to pension fund returns resemble defined contribution plans to the extent that they shift much of the investment risk onto participants, though cash balance plans must at a minimum offer a zero percent floor on investment returns, as required by 26 U.S.C. § 411(b)(5)(B).

Both Kentucky and Kansas have used a fixed interest rate of 4%, with upside sharing of returns of a certain percentage. Nebraska uses a variable rate that provides 1.5% of the federal mid-term rate, with a minimum guaranteed rate of 5%.

Therefore, with cash balance plans the employer will still bear many of the same risks associated with the defined benefit plans, however there are some slight differences as outlined below.

Investments

The relative risks depend on the level of interest credits provided in the plan and the extent to which they vary with investment returns. Since cash balance plans are considered defined benefit plans, the employer would still be responsible for making up any shortfalls in the fund. The big difference is that the minimum crediting rate

guarantee of the cash balance plan is often far lower than the discount rate typically used in traditional defined benefit plans.

With respect to investment risk, the only difference between a cash balance plan with a fixed interest credit and a final-average-salary defined benefit plan is that cash balance plans may be required to hold more liquid investments due to employee turnover and lump sum cash-outs. This is a potential disadvantage, not advantage, of these types of plans.

Inflation

Cash balance plans must offer life annuities as the default payout option, though participants usually have the option of taking a partial or total lump sum, and many participants tend to take a lump sum if it is offered. Annuitization takes place at retirement; therefore, members are typically given the option of a lifetime benefit with or without a COLA. Basically, if a member wants inflation protection, he or she pays for it by receiving a lesser benefit at retirement upon conversion. This shifts most of the inflation risk to the employee rather than the employer.

Longevity

Both cash balance plans and traditional defined benefit plans use risk pooling to insure individuals against the risk of living longer than the average participant and thereby outliving their savings by providing retirement benefits in the form of a steady income stream. However, if a lump sum option is available and the member elects to take the lump sum payment in lieu of a lifetime benefit, the longevity risk shifts to the employee.

Market Timing

The employer bears market timing risk, in that cash balance plan assets may fall short of what is required to meet the obligation at the time of the employee's retirement. Having a lump sum feature, along with the portability provision inherent in cash balance plans, also raises a risk to the fund that ample liquid assets will be on hand to handle turnover.

When annuities are optional and many participants take lump sums, this may introduce what is known as an adverse selection problem, since participants who opt for annuities are likely to have longer-than-average life expectancies. There is not a great deal of research on this issue in the context of public-sector cash balance plans. However,

adverse selection would likely drive up costs for plan sponsors, reduce benefits to participants who annuitize, or both, relative to traditional defined benefit pensions whose participants usually receive lifetime payments rather than lump sums.

Portability / Accrual

Pension benefits in cash balance plans typically accrue much more evenly over time compared with back-loaded traditional defined benefit plans. Thus, like defined contribution plans, cash balance plans allow workers to avoid the "accrual risk" associated with traditional defined benefit plans, thereby providing more value to workers who might anticipate changing employers or moving in and out of the labor force over their careers. From a traditional defined benefit plan perspective, those who cash out early in their careers provide an actuarial gain to the plan because the value of their deferred benefit at age 65 is often more valuable than their accumulated contributions with interest. For cash balance plans, cashing out early often creates an actuarial loss, since benefit accruals are more "front loaded" and the actuarial accrued liability is often less than the value of their hypothetical account early in their career.

Vesting

Similar to other plan designs, cash balance plan benefits must be vested. If a member is terminated prior to the vesting date, only employee contributions and interest are returned.

Exhibit 5-4
Risk Distribution in a Cash Balance Pension Plan

Risk	Employer	Employee
Investment	X	
Inflation		X
Longevity	X	X
Market Timing	X	
Portability / Accrual	X	
Vesting		X

Cash balance plans can enable risk sharing between employers and employees through variable annuity conversion rates and interest credits. When annuity conversion rates are tied to cohort life expectancy at retirement, the cost of unforeseen increases in life expectancy during a participant's working career is passed on to participants in the form

of lower monthly benefits. Though variable annuity conversion rates reduce longevity risks for employers, they increase longevity risks for employees, who may place a much lower value on uncertain benefits.

Similarly, cash balance plans with variable interest credits are designed to shift investment risk onto participants. Though on average participants may receive similar benefits, some will retire in bull markets and fare better, while some participants will retire in bear markets and fare worse.

ADMINISTRATIVE IMPACT

Cash Balance Plan Administrative Issues

The administrative impact of a new cash balance plan could materialize in different ways depending on whether the new plan replaced or supplemented the Hybrid Retirement Plan.

Since 2010, the General Assembly has enacted a number of reforms to the plans administered by VRS. For example, Plan 2 was enacted in 2010. One year later, the General Assembly enacted reforms that required Plan 1 state employees to pay a five percent member contribution towards retirement, which was offset by a five percent salary increase. In 2012, the General Assembly initiated a phase-in of a five percent member contribution for local employees and enacted legislation that transferred "Plan 1 non-vested" members to Plan 2. The 2012 General Assembly also created the Hybrid Retirement Plan, to become effective January 1, 2014.

Unlike some other state pension plans, benefit administration is not fully centralized in Virginia. Instead, in addition to the VRS staff, the system relies on its participating employers to assist with the administration of benefits through disseminating educational materials developed by VRS, assisting with the counseling of their employees, as well as submitting the necessary information on a timely basis to allow VRS to document and provide benefits to its members. Recent changes to VRS plan designs have resulted in additional complexity, which has resulted in additional responsibilities for employers. Based on feedback received by VRS from employers in a variety of forums, a number of participating employers have noted that due to budgetary constraints they must meet these new challenges without the benefit of additional resources. Of note, public pension plan cost analyses developed by CEM, an independent leader in benchmarking services for the industry, closely tie plan administrative costs with the complexity of plan design.

During the same time period that pension reform was being implemented in the fall of 2013, VRS introduced Phase 3 of its computer modernization plan. This change, while providing greater functionality and enhanced reporting capabilities, required employers to learn a new system and for the first time to begin uploading information on their employees directly into the VRS system.

With the most recent change related to pension reform, which introduced the Hybrid Retirement Plan, employers underwent training on this new retirement option and, for localities and school divisions, the associated managed disabilities program, the Virginia

Local Disability Program (VLDP). Local employers were required to make a choice between the VLDP and offering their own managed disabilities program, which by Code must provide benefits comparable to VLDP. In addition, during the statutory election window, all employers assisted their existing Plan 1 and Plan 2 employees in deciding whether to opt into the Hybrid Retirement Plan. Many employers were accomplishing all of this while also working to implement other new programs, such as the Affordable Care Act.

VRS also undertook an overhaul of its Purchase of Prior Service (PPS) program during the 2015 legislative session. Upon passage of the legislation, VRS began developing educational materials for employers so that they could learn about these important new benefit changes, which will go into effect in January of 2017.

Currently, VRS is in the process of completing the major information technology initiative to modernize systems and enhance delivery of benefits to members that was begun in 2009. Due to the implementation requirements associated with standing up the new Hybrid Retirement Plan and VLDP, VRS had to pause its modernization efforts after the on-line employer capabilities went into effect. The goal for the current phase of modernization is to move from the legacy mainframe system (RIMS) that has been in use for three decades to an online environment. As noted above, the project began with enhancing online employer reporting capabilities and the next phase will focus on improving the member experience by allowing online transactional capabilities, education, and counseling. Any new initiatives that would cause a pause or delay could jeopardize the deliverables and impact the overall cost of this major technology infrastructure project.

In order to implement a new retirement plan, which would take a minimum of 24 months, VRS staff must first create content for material that will be published online and in other publications, such as a plan handbook. Creating the content is a significant undertaking in addition to the daily operations of administering VRS' other benefits and would likely require additional personnel. After creating the content, VRS would conduct a communication campaign to educate its employers and members about the impact of the new plan and distinguish it from Plan 1, Plan 2, and the Hybrid Retirement Plan to the extent necessary. Staff in the VRS call center would also require additional training to become familiar with the new plan's design so that they could properly communicate with and counsel VRS members, beneficiaries, and employers.

ADMINISTRATIVE IMPACT

As with the implementation of the Hybrid Plan, a new cash balance plan would necessitate additional time and resources, most significantly related to systems and programming, in order to accommodate the new plan on VRS' internal systems. Such reallocation of resources would impact VRS' ongoing information technology modernization efforts.

A new pension plan would involve considerable additional costs, some of which would be one-time implementation costs and others of which would be ongoing, such as those for new staff members. Significant systems development and information technology costs as well as other administrative costs are discussed below.

Estimated Non-System Costs to Implement and Maintain a Cash Balance Plan

VRS estimates that costs other than those related to information systems and related technology costs would be between $331,000 and $447,000, depending on a number of factors and plan design elements.

These implementation costs would include communications (printing, webinars, website content, member handbooks, employer manuals, forms, etc.), legal review of the plan design and development and amendment of plan documents for ancillary benefits. Because the cash balance plan design is so different from the other types of pension plans that VRS administers, Title 51.1 would need to be substantially amended to address the extensive changes. Ongoing costs would include those related to new positions created to support the new plan.

VRS currently administers Plan 1, Plan 2, and the defined benefit component of the hybrid plan internally, and uses a third-party administrator for the defined contribution component of the hybrid. With the exception of Nebraska, which uses a third party administrator to maintain the cash balance accounts, other states that have cash balance plans currently administer them internally. If VRS were to follow this pattern and administer a cash balance plan in-house, it would require hiring additional staff. If a determination were made to use a third-party administrator, VRS would need to undertake an RFP process, hire a TPA and negotiate pricing.

In addition, when VRS hired the TPA for the hybrid plan, the pricing was based on most new employees coming into the hybrid. If the implementation of a cash balance plan changes these assumptions so that new employees would not go into the hybrid, then the contract with the TPA would need to be renegotiated and the per-participant charge

would likely be higher given the smaller than anticipated population. If, on the other hand, the cash balance plan were to replace the hybrid and the members were moved out of the hybrid, this would have a large impact on the current TPA contract.

VRS has begun using customer contact representatives who specialize in certain areas. If a new plan were implemented, VRS would need to either train new employees or cross-train existing customer contact center employees on the cash balance plan.

VRS' employers would likely need to make changes to their payroll systems to allow for the different contribution mechanism that would be required for a cash balance system. Depending on whether the cash balance plan replaces or is in addition to the hybrid plan, this would potentially mean that within only a few years employers would have had to make changes to their payroll systems twice in order to accommodate new VRS plans. It is unclear how long this process would take as VRS employers use a wide range of payroll systems.

Impact on Systems Development, Estimated Costs and Timeline

VRS is in the final two years of a business process and systems Modernization Program (Modernization or Modernization Program), which entails extensive changes to business processes and the replacement of technology systems. In December 2017, when Phase 4 of the Modernization Program is scheduled to conclude, VRS will complete the transition from a legacy mainframe system (RIMS), which has been in use for three decades, to a new client server system.

For purposes of this discussion, VRS is making the following assumptions:

• The level of effort to implement a cash balance plan would be generally equivalent to the level of effort that was required to implement the 2012 Pension Reform program, which included changes to Plan 2 and implementation of the Hybrid Retirement Plan.

• As a result of the expiration of certain contractual provisions, VRS will not have the advantage of the special negotiated rates that were available for IT contractors during hybrid implementation.

• It is not feasible to implement a complex new pension plan, such as the cash balance plan, in the legacy technology system since the infrastructure is not adaptable and knowledgeable technology staff cannot be obtained to make the changes.

• In addition, the cost would be significantly higher as a result of having to make the changes in two systems, and the risk to the system would be high.

• Another delay in VRS' Modernization program means VRS staff will continue to encounter the difficulties and inefficiencies associated with working in two systems (the legacy system and the new system) for an extended period of time. New services planned for members and retirees would be delayed, and VRS would continue to operate with the current paper-based processes longer than currently envisioned.

• Any delay to decommissioning the current legacy system increases the risk of losing the remaining legacy development staff to retirement and extends the cost of running/maintaining an obsolete legacy system.

The most practical approach to implementing a cash balance plan at this time is to incorporate the requirements for the new pension plan into the existing Modernization Program. A number of components of the new system have already been implemented. Those components (enrollment, contribution confirmation, refunds, etc.) would have to be modified to support the new cash balance plan. For software components that have not yet been built, requirements would be developed and included in the future software design and build. The schedule for the remainder of the Modernization Program would be modified and extended to incorporate all phases of a cash balance implementation, beginning with detailed analysis of the legislative provisions, program design, and ultimately software design, build and test.

In considering when such a plan could be implemented, VRS envisions that the Modernization Program components necessary to support a cash balance plan would be implemented first, with a full cash balance plan program implementation in January 2019. Modernization components not necessary for cash balance would be implemented between January 2019 and July 2019, at which time Modernization would conclude. This would result in additional delay in completion of the Modernization Program, from the currently scheduled December 2017 to the projected January – July 2019 if the Cash Balance plan were implemented.

Information technology costs associated with the implementation of the cash balance plan include three elements: 1) extending the Modernization Program by 18 months; 2) extending the contract for data conversion services; and 3) incurring additional VITA mainframe charges for an extra 18 months. The software development cost of this approach (without taking into account any detailed plan design requirements) is

estimated at approximately $9.0 million. This is essentially the cost to extend Modernization by eighteen months in order to accommodate the provisions for cash balance. In addition, VRS has a contract in place with a vendor for data conversion services. That contract would also need to be modified to incorporate an extended schedule. At this time, costs associated with this extension have not yet been determined. The delay in completing the Modernization Program would also require VRS to incur VITA mainframe charges for eighteen months longer than planned, at a cost of approximately $2.7 million. Funding associated with VITA mainframe charges was essentially earmarked to support the maintenance and eventual replacement of hardware implemented in Phase 3 of Modernization.

These estimates are preliminary but provide a realistic projection of the likely costs that would be incurred in implementing a new pension plan, as well as the impact on the Modernization Program that has been ongoing since 2009.

Other Considerations in Creating a Cash Balance Plan

In addition to the physical administration and record keeping requirements associated with cash balance plans, implementing a new plan may present employers with a variety of challenges and those potential impacts should be considered.

Employee Retention – Traditional defined benefit plans are more restrictive in terms of portability and are designed to encourage employees to remain in their jobs until retirement eligibility. Advocates state that efficiency comes with higher employee retention since the cost of turnover is high in training costs and loss of productivity. Cash balance plans tend to provide relatively higher benefits to shorter term employees and do not provide an incentive for employees to remain over a long career. By front-loading accruals, and particularly by eliminating the large accruals that typically come late in an employee's career under a traditional defined benefit plan, cash balance plans typically do not have the same power to retain employees as traditional pensions. This could have the adverse effect of increasing an employer's costs through having to offer higher wages or spending more to train new workers because turnover will likely increase. Cash balance plans could also have the unintended effect of inducing older workers to remain employed as they may be insecure about their ability to bear longevity risk.

VRS members tend to work in careers that promote longevity (e.g., public safety, education, and general government) so designing a plan that includes incentives to

remain over a long career may be more advantageous. As an example, Kansas included a feature in its cash balance design that required an employee to be eligible for retirement before employer pay credits would be vested and payable to the member.

Turnover – Traditional defined benefit plans provide employers with orderly turnover in retirement behavior. Predictable benefits lead to predictable behavior. Thus, defined benefit plans tend to transition workers out of the workforce in a consistent fashion, regardless of economic trends. Plans that provide unpredictable benefits, such as defined contribution plans and many cash balance designs, can lead to workers sticking around longer during recessions (until investment markets rebound) or leaving early as their account balances grow and more job opportunities come available during boom markets. Also, as stated above, older workers may also remain employed as they may be insecure about their ability to bear longevity risk.

Early Retirement Incentives – Under the cash balance plan design, subsidized early retirement benefits are no longer available; in other words, the cash balance benefit is an actuarially equivalent benefit replacing the subsidized benefit. Where under a traditional defined benefit plan once there may have been encouragement to retire early, under a cash balance plan there is now neither encouragement nor discouragement.

Work Force Transition Act (WTA) – The current WTA benefit would likely need adjustments due to the nature of the cash balance benefit being an account balance.

Purchase of Prior Service (PPS) – The current PPS rules would likely have to be modified to work with a cash balance design. Rather than purchasing months of service, the employee would have to be providing contributions to his or her own account, which again might be less beneficial to employees than historical PPS provisions. However, PPS programs are generally not completely cost neutral in most defined benefit plans.

FUNDING STRUCTURE

To understand the funding structure, it is important to understand how pension plans calculate their annual recommended contributions. First, they estimate how much it costs to pay for benefits earned each year, which is the normal cost. Then, they identify a cost that will help pay off any existing unfunded liabilities over a set period of time. Effective June 30, 2013, the unfunded legacy liabilities of the VRS plan were set to be amortized over a closed 30-year period ending in 2043. Any new unfunded liabilities after June 30, 2013 are amortized separately over 20 year closed periods. The pension actuaries then add the normal cost and the amortization of the unfunded liabilities together and come up with a recommended contribution. Due to historical underfunding combined with the impact of recent economic crises, the VRS plans collectively still have more than $20 billion in unfunded liabilities as of June 30, 2015.

Pre-funding pension obligations by making the recommended contributions is important for three main reasons. It is important for intergenerational fairness as taxpayers are paying for the services they are getting, rather than pushing those costs to future taxpayers. It helps smooth out costs over time rather than making costs go up and down based on demographic and economic bumps. And, by setting the money aside to pay for future benefits, the fund can invest that money and use those returns to help pay retiree benefits. It is important to note that approximately two-thirds of benefits are paid by investment income.

After the financial crisis in 2008, states were left with additional unfunded liabilities that they were immediately unable to reduce through additional contributions. Many states turned to reforming pension plans in an effort to share some of the financial risk associated with the pension funding. However, often, like in Virginia, due to legal and other considerations, these plan design changes were made only for future hires, which do little in the short term to correct the immediate issue of the unfunded liabilities for current participants.

Over the next 28 years, the largest cost associated with the pension funding will be associated with paying down the legacy unfunded liability. If one looks at the recommended contributions for the state-wide systems today, nearly two-thirds of the employer recommended contribution rates are associated with the legacy unfunded liability. To that end, the Governor and General Assembly have demonstrated commitment to funding VRS, and the *Code of Virginia* sets forth a plan to move to fully funding the board certified rates by Fiscal Year 2019. In addition, the Governor and General Assembly during the 2015 legislative session infused additional funding into

both the state and teacher plans. While this commitment is positive for the fund, it should be noted that regardless of whether a new plan is introduced, these legacy liabilities remain and must continue to be addressed via a funding plan.

New Plan or New Tier of Benefits

During the development of the Hybrid Retirement Plan it was noted that in order to continue to spread the unfunded liability over the entire population, the hybrid plan would have to be considered a new tier of benefits rather than a new stand-alone plan.

Closing the current plans to new employees and creating a new stand-alone cash balance plan could have implications of both shortening the period over which the legacy unfunded could be paid off and creating a declining payroll base over which to a spread those costs. A closed group could require amortizing the remaining unfunded over the expected future working lifetime of the closed group, which would be considerably less than the current 28 years over which the legacy unfunded is being amortized.

In addition to the impacts on costs, having a closed plan would lead to progressively increased negative cash flow in future years due to fewer contributions flowing into a closed plan and an increasing number of retirees who would still be drawing benefits for decades.

If a new design is considered, VRS would recommend following the same logic and assuming that any new plan would be considered a new-tier of benefits and unfunded liabilities would continue to be paid as a percentage of the total population.

Implications of a Cash Balance Plan

Due to the potential portability available through some cash balance designs, switching to a cash balance plan would likely increase employee turnover and cash-outs. Over the long term this could reduce the fund's investment horizon and possibly the expected long-term rate of return assumption as more employees became covered under the cash balance design. Solid evidence on this is somewhat limited at this point as few public-sector cash balance plans have been in operation for significant lengths of time.

Cash balance plan accruals are very different from those of traditional defined benefit plans. Cash balance accruals tend to be more front loaded, while traditional defined benefit plans are more back loaded. This tends to shift the emphasis of cost from normal retirement age to earlier termination of employment. Since the cash balance interest

credit is often less than the investment return assumption, the normal cost and accrued liability in a cash balance plan tend to be less than the actual cash balance account at all ages until retirement. Under a traditional defined benefit plan, early termination often leads to an actuarial gain for the plan, however cash balance plans often have the opposite effect because the benefit is more valuable at earlier ages, thus the plan will likely see actuarial losses for early terminations rather than actuarial gains.

Cash balance plans also encourage payment of lump sum distributions. Payment of lump sum distributions could mean that plan assets would be lower than if monthly benefits were paid due to larger cash outflows. Payment of lump sums would also preclude potential gains from long-term investing in a mix of stocks and bonds, resulting in lower returns, lower assets and potentially higher contributions over time. Payment of lump sums also shifts longevity and inflation risk to the participant, which could benefit the plan, but may not be optimal for maintaining adequate income replacement.

VRS HYBRID RETIREMENT PLAN

The Hybrid Retirement Plan was created during the 2012 legislative session and went into effect January 1, 2017. The Hybrid Retirement Plan has two components, a traditional defined benefit component and a defined contribution component, that provide coordinated retirement coverage through a lifetime annuity and an individual retirement account. In lieu of developing a new retirement plan, consideration may also be given to making several changes to the recently enacted Hybrid Retirement Plan.

The plan began January 1, 2014 and as of September 30, 2015 has approximately 32,000 members. The provisions of the plan require members to contribute 4% of creditable compensation to the defined benefit component and 1% of creditable compensation to the defined contribution component. The employer matches the mandatory 1% contribution to the defined contribution account. Employees have the option to voluntarily contribute up to an additional 4% of creditable compensation to their defined contribution account and the employer would provide matching contributions of up to 2.5% of an employee's pay to the member's account.

Currently, there are eleven other state retirement systems that offer a Hybrid Retirement Plan with a defined benefit/defined contribution design. The defined benefit component for each of the plans is relatively similar with most plans using a 1% multiplier and offering a cost-of-living adjustment on the benefits. Where the Hybrid Retirement Plan differs in plan design is in the defined contribution component and the mandatory contribution required from both the employee and employer. Below (Exhibit 8-1) is a summary of contribution provisions for the current hybrid public sector plans operated on a statewide basis.

Exhibit 8-1

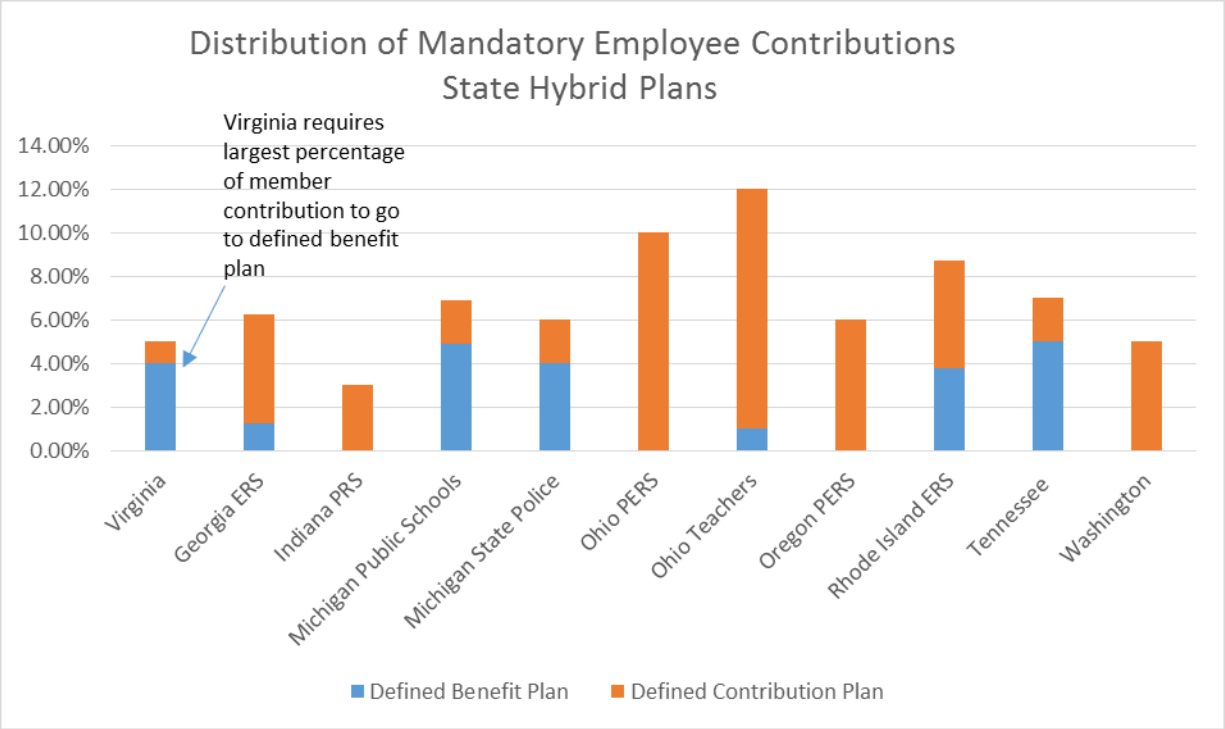
State	Defined Benefit			Defined Contribution			Total Employee Default Contribution
	Benefit Multiplier	COLA	Employee Contribution	Employee Default Contribution	Employer Default Contribution	Total Default Contributions	
Virginia	1.00%	Yes	4.00%	1.00%	1.00%	2.00%	5.00%
Georgia ERS	1.00%	None	1.25%	5.00%	3.00%	8.00%	6.25%
Indiana PRS	1.10%	AdHoc	0.00%	3.00%	0.00%	3.00%	3.00%
Michigan Public Schools	1.50%	None	4.90%	2.00%	1.00%	3.00%	6.90%
Michigan State Police	2.00%	None	4.00%	2.00%	1.00%	3.00%	6.00%
Ohio PERS	1.00%	Yes	0.00%	10.00%	0.00%	10.00%	10.00%
Ohio Teachers	1.00%	None	1.00%	11.00%	0.00%	11.00%	12.00%
Oregon PERS	1.50%	Yes	0.00%	6.00%	0.00%	6.00%	6.00%
Rhode Island ERS	1.00%	AdHoc	3.75%	5.00%	1.00%	6.00%	8.75%
Tennessee	1.00%	Yes	5.00%	2.00%	5.00%	7.00%	7.00%
Utah	1.50%	Yes	Only if DB Costs Exceeds 10.0%	0.00%	Difference between 10.0% and DB Cost	Difference between 10.0% and DB Cost	Only if DB Costs Exceeds 10.0%
Washington	1.00%	Yes	0.00%	5.00%	0.00%	5.00%	5.00%

If we exclude the Utah plan, since it provides for a variable contribution, we see that Virginia's total required member contribution is below the average of the other states when a member participates at the minimal required level, 5% versus the average of 6.9%.

However, when we look at the allocation of the member contribution between the defined benefit component and the defined contribution component we see that Virginia requires the highest portion of the required employee contribution to go to the defined benefit component. Four of the ten plans require no defined benefit contribution from

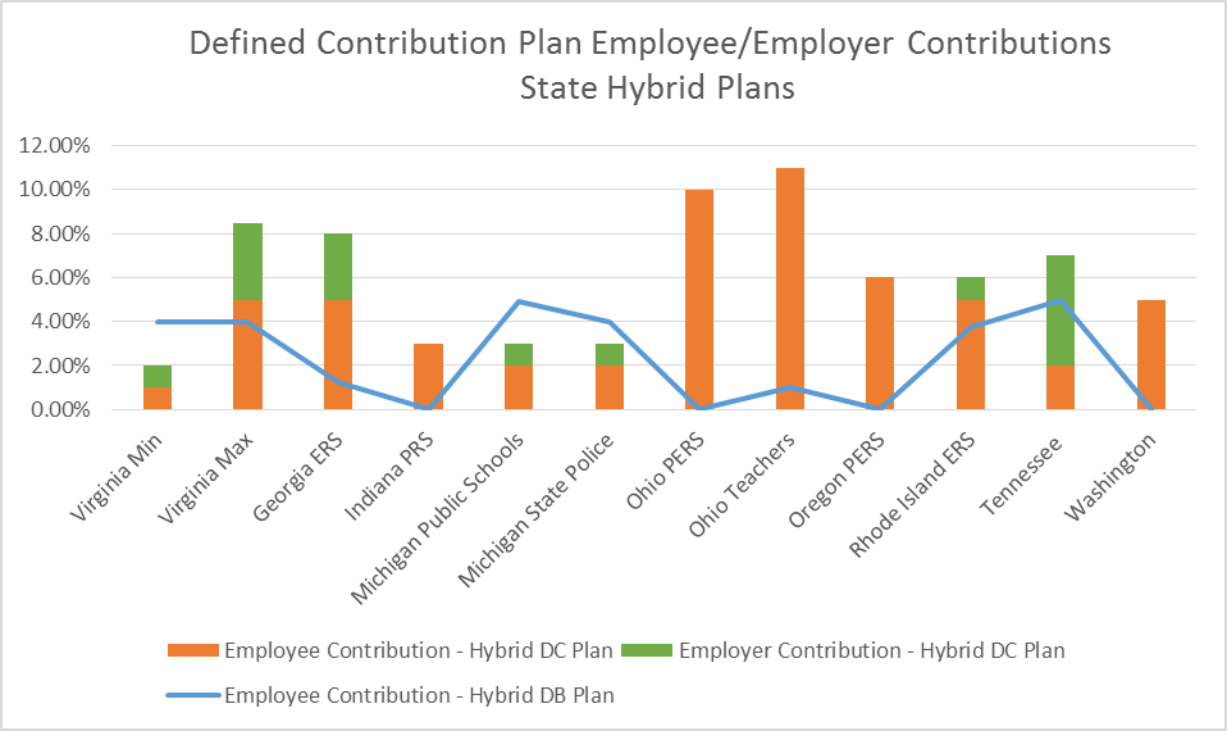
the member with the average defined benefit contribution for the 10 states being 2.17% of pay as compared to Virginia's 4% requirement. This means less money going into the member's defined contribution account.

Exhibit 8-2



Another observation is that Virginia is the only plan design that requires a mandatory minimum participation level, but then offers additional matching contributions if a member voluntarily contributes additional funds. All of the other state hybrid designs basically require a mandatory level of participation in the defined contribution plan with many plans providing a flat contribution to supplement employee's contribution. The exhibit below (Exhibit 8-3) shows the employee and employer contributions going to the defined contribution component of the hybrid plan with the Hybrid Retirement Plan shown under both minimum participation and maximum participation.

Exhibit 8-3



When looking at the normal cost associated with the VRS defined benefit plans and further analyzing the employee/employer split in paying for the plan benefit, the exhibit below (Exhibit 8-4) shows that hybrid members are paying a higher percentage of defined benefit plan costs as compared to Plan 1 or Plan 2 members.

Exhibit 8-4

State	Plan 1	Plan 2	Hybrid Plan
Total Normal Cost	9.64%	8.95%	5.17%
Member Contribution	5.00%	5.00%	4.00%
Percentage of Normal Cost Funded by Member	51.87%	55.87%	77.37%

Teachers	Plan 1	Plan 2	Hybrid Plan
Total Normal Cost	11.23%	9.70%	5.68%
Member Contribution	5.00%	5.00%	4.00%
Percentage of Normal Cost Funded by Member	44.52%	51.55%	70.42%

Total normal cost rates shown above are based on results from the June 30, 2015 actuarial valuation reports.

Based on the prior allocation of plan normal cost shared between the employer and employee, a member contribution of 3% may have provided an employer/employee split in the normal cost rate that was more in line with what the current Plan 2 members are paying for the level of benefit received from the defined benefit component of the hybrid plan. Exhibit 8-5 depicts the percentage of normal cost funded by the member if the member contribution for the defined benefit component of the Hybrid Retirement Plan was 3% versus the current rate of 4%.

Exhibit 8-5

State	Plan 1	Plan 2	Hybrid Plan
Total Normal Cost	9.64%	8.95%	5.17%
Member Contribution	5.00%	5.00%	3.00%
Percentage of Normal Cost Funded by Member	51.87%	55.87%	58.03%

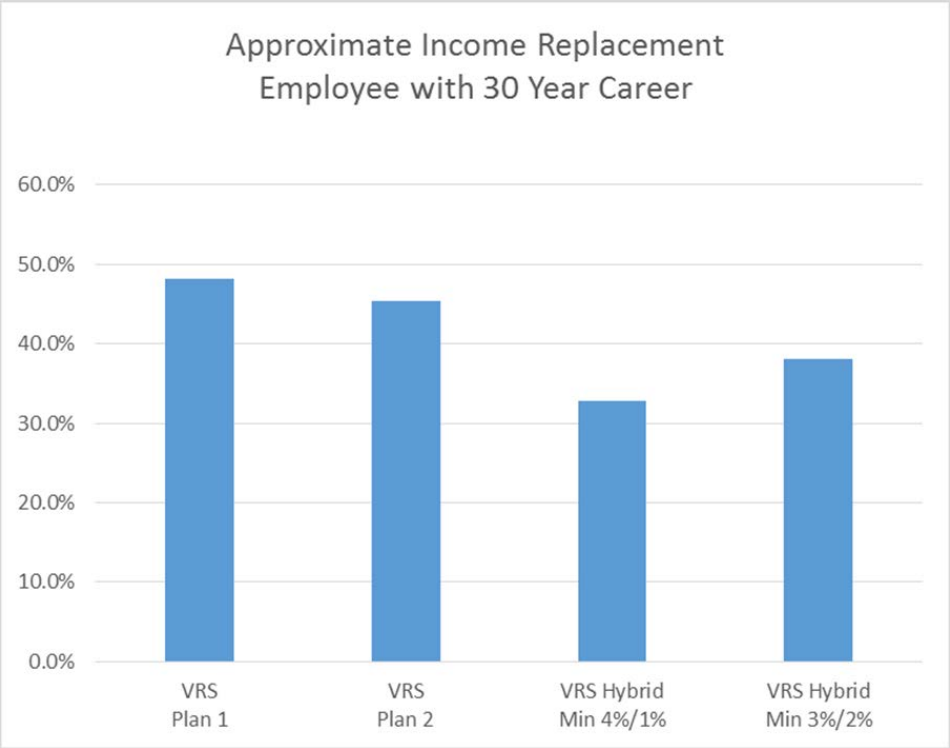
Teachers	Plan 1	Plan 2	Hybrid Plan
Total Normal Cost	11.23%	9.70%	5.68%
Member Contribution	5.00%	5.00%	3.00%
Percentage of Normal Cost Funded by Member	44.52%	51.55%	52.82%

Total normal cost rates shown above are based on results from the June 30, 2015 actuarial valuation reports.

If the contribution allocation were adjusted to 3% to the defined benefit component and 2% to the defined contribution component, it would require the employer to essentially pick up an extra 2% of plan costs under the current provisions, 1% for the defined benefit cost and 1% for the match on the defined contribution component. This would make the employer normal cost for the hybrid approximately the same as the cost of the current VRS Plan 2 benefit. However, approximately 30% of the hybrid benefit would not have any future risk to the employer since it would be in the defined contribution component of the hybrid.

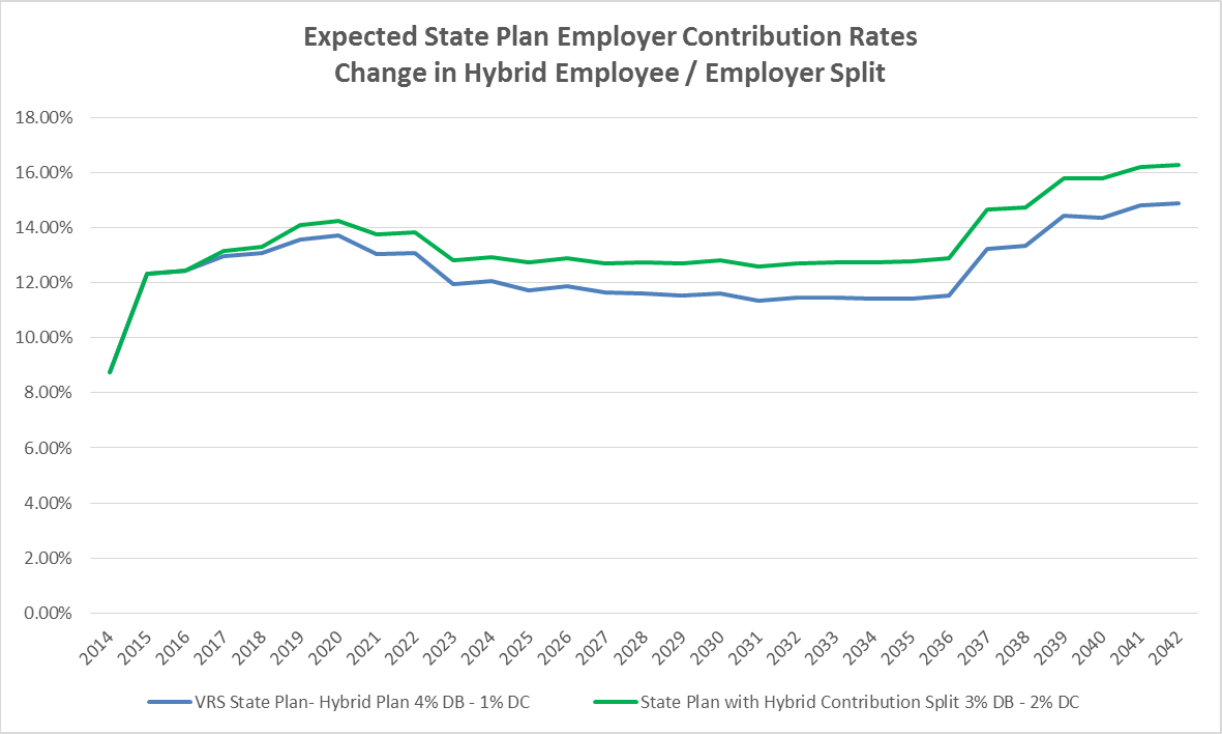
The exhibit below (Exhibit 8-6) compares the VRS plan benefits with the current minimum hybrid benefit, as well as the hybrid minimum with a shift in the employee contribution from 4% to the defined benefit plan and 1% to the defined contribution plan to 3% to the defined benefit plan and 2% to the defined contribution plan. The shift increases the replacement ratio at retirement by 6% and puts the employee cost more in line with the other VRS plans.

Exhibit 8-6



The estimated impact would initially be 0.17% of payroll with an ultimate cost impact for the State plan of 1.40% of covered payroll in 25 years to change the allocation of the member contributions to the Hybrid Retirement Plan. We would expect that the longer term cost impact for employers would approach 2% of covered payroll when the plan is fully implemented.

Exhibit 8-7



Auto-Escalation

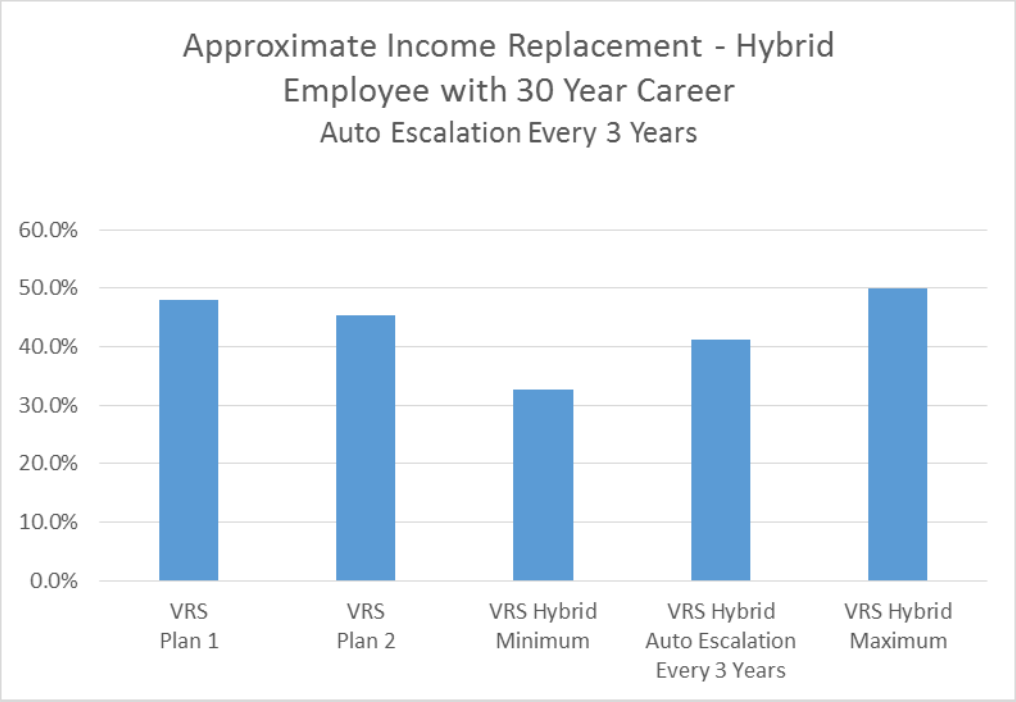
During the first 18 months since the Hybrid Retirement Plan has been effective (Exhibit 8-7), plan experience indicates that although the percentage is steadily increasing, only about 9% of plan members are contributing any voluntary contributions to the defined contribution component of the hybrid. However, of those who contribute to the voluntary portion of the plan, 83% are contributing the maximum allowable voluntary contribution.

The hybrid plan currently has an auto-escalation feature that automatically increases an employee's voluntary savings every three years by 0.5% of payroll. Industry leaders suggest that auto-escalation is the most effective way to increase deferrals and to help members keep up with inflation.

The auto-escalation feature in the Hybrid Retirement Plan has an original effective date of January 1, 2017. On that date, members currently in the plan who are not contributing the maximum amount will see their voluntary contributions automatically increased by

0.5%. Every three years thereafter the voluntary contribution will increase at 0.5% until the employee is contributing the maximum 4%. Members would be able to opt-out of the increased contribution, but if a hybrid member took advantage of the auto-escalation over a 30 year career their estimated replacement ratio at retirement could increase approximately 8.5% above the minimum participation level (Exhibit 8-8).

Exhibit 8-8



However, based on the current plan design, it would still take a member 24 years to achieve the maximum savings level. The exhibit below (Exhibit 8-9) shows that a member hired on January 1, 2014 who opted not to contribute any voluntary contributions at date of hire would need until 2038 to get to the maximum savings level under the current plan provisions assuming they would not elect to opt-out of the auto-escalations.

Exhibit 8-9

Current Auto-Escalation Provision

Date	Auto-Escalation Amount	Voluntary Rate
1/1/2014	0.0%	0.0%
1/1/2017	0.5%	0.5%
1/1/2020	0.5%	1.0%
1/1/2023	0.5%	1.5%
1/1/2026	0.5%	2.0%
1/1/2029	0.5%	2.5%
1/1/2032	0.5%	3.0%
1/1/2035	0.5%	3.5%
1/1/2038	0.5%	4.0%

As seen throughout this report, in order for a hybrid member to receive a benefit that replaces an adequate amount of a member's pre-retirement income, he or she needs to take advantage of the matching contributions provided on voluntary contributions and the compounding interest on such savings. Therefore, members need to save earlier in their careers so that they will have a more secure retirement.

One way to possibly increase member savings is to adjust the auto-escalation feature to step up voluntary contributions more quickly than under the current provisions.

Proposed Modifications to Hybrid Auto-Escalation Feature

Outlined below are some potential changes that would enhance the auto-escalation feature and possibly make the provision more effective in helping members save for retirement.

Change Auto-Escalation to Every Two Years

If the auto-escalation feature was modified to increase every two years rather than every three years, as shown in Exhibit 8-10 the time to get to the maximum 4% voluntary contribution could be reduced by 8 years.

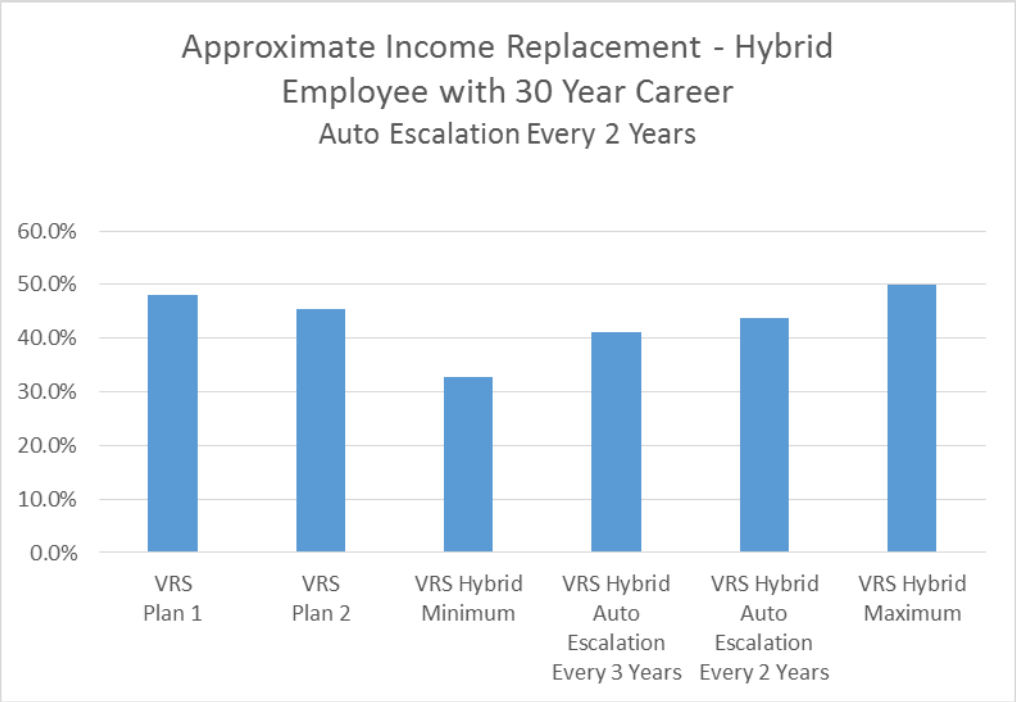
Exhibit 8-10

Auto-Escalation Every Two Years

Date	Auto-Escalation Amount	Voluntary Rate
1/1/2014	0.0%	0.0%
1/1/2016	0.5%	0.5%
1/1/2018	0.5%	1.0%
1/1/2020	0.5%	1.5%
1/1/2022	0.5%	2.0%
1/1/2024	0.5%	2.5%
1/1/2026	0.5%	3.0%
1/1/2028	0.5%	3.5%
1/1/2030	0.5%	4.0%

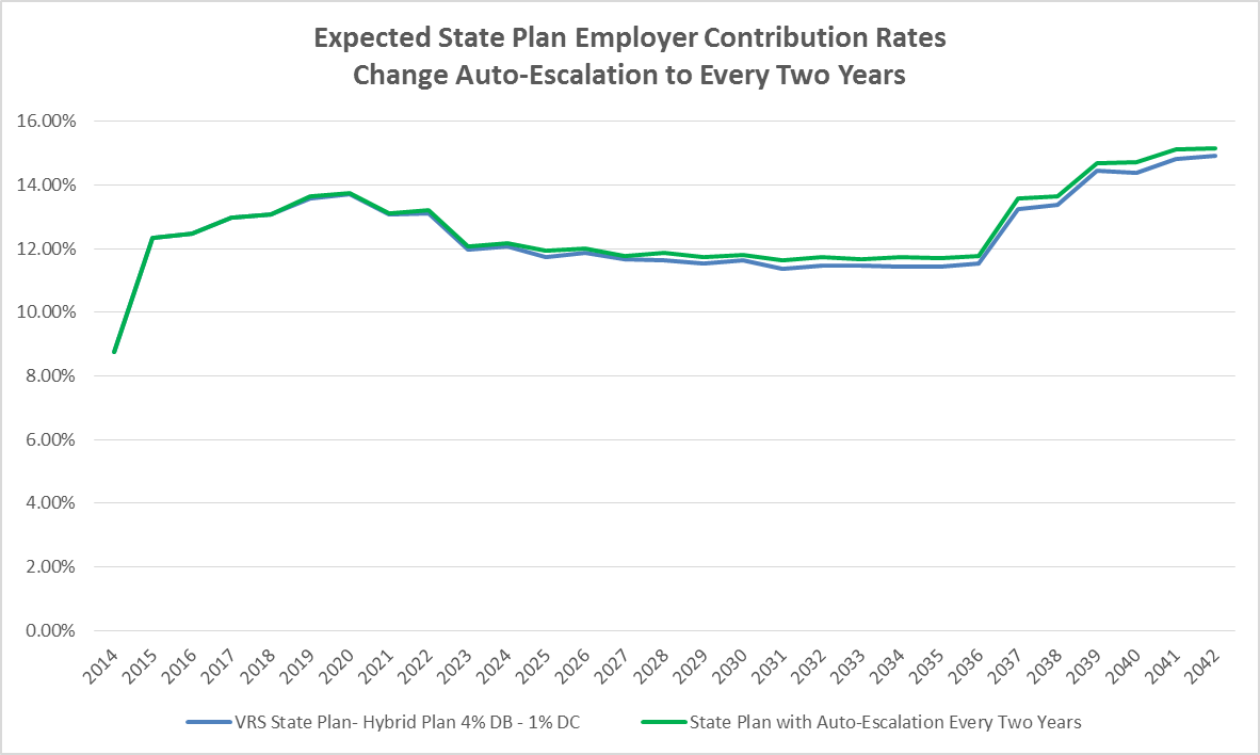
As shown in Exhibit 8-11 below, this could increase the estimated replacement ratio an additional 2.5% over the current auto-escalation policy and approximately 11% over the minimum participation level.

Exhibit 8-11



The estimated impact of these changes would initially be 0.09% of payroll with an ultimate cost impact for the State plan of 0.23% of covered payroll to reduce the auto-escalation to every two years versus every three years (Exhibit 8-12).

Exhibit 8-12



Change Default Enrollment to 1% Mandatory Contribution and 0.5% Voluntary Contribution with Auto-Escalation Every Two Years Thereafter

In 2008 the Commonwealth of Virginia 457 Deferred Compensation plan for State employees added the automatic enrollment feature to the plan, which required a new employee to "opt-out" of voluntary contributions rather than having to "opt-in." The 457 plan is considered a supplemental plan. Actual experience showed that only about 5% of new employees chose to "opt-out" of automatic enrollment in the plan.

By making the default voluntary contribution 0.5% at hire and increasing 0.5% every two years, a member could get to the maximum 4% voluntary contribution in 14 years, 10 years earlier than under the current provision, again assuming that the employee did not opt out of the automatic enrollment or automatic increases. Exhibit 8-13 below displays auto-escalation very two years combined with a voluntary default or auto-enrollment of 0.5% at hire.

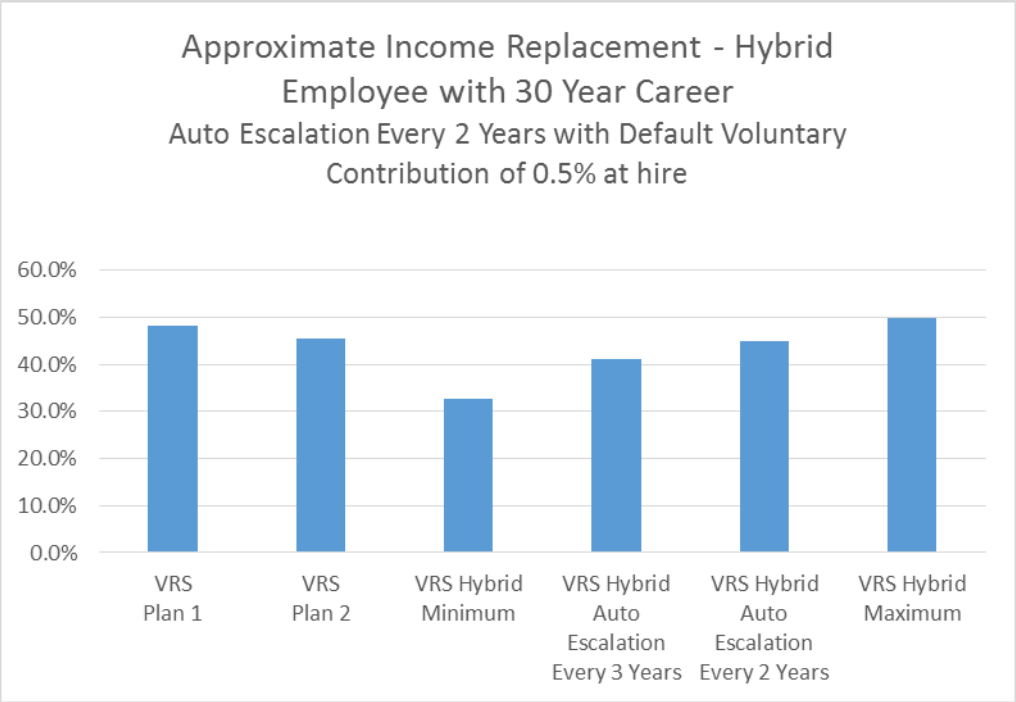
Exhibit 8-13

Auto-Escalation Every Two Years
with voluntary default rate of 0.5% at hire

Date	Auto-Escalation Amount	Voluntary Rate
1/1/2014	0.0%	0.5%
1/1/2016	0.5%	1.0%
1/1/2018	0.5%	1.5%
1/1/2020	0.5%	2.0%
1/1/2022	0.5%	2.5%
1/1/2024	0.5%	3.0%
1/1/2026	0.5%	3.5%
1/1/2028	0.5%	4.0%

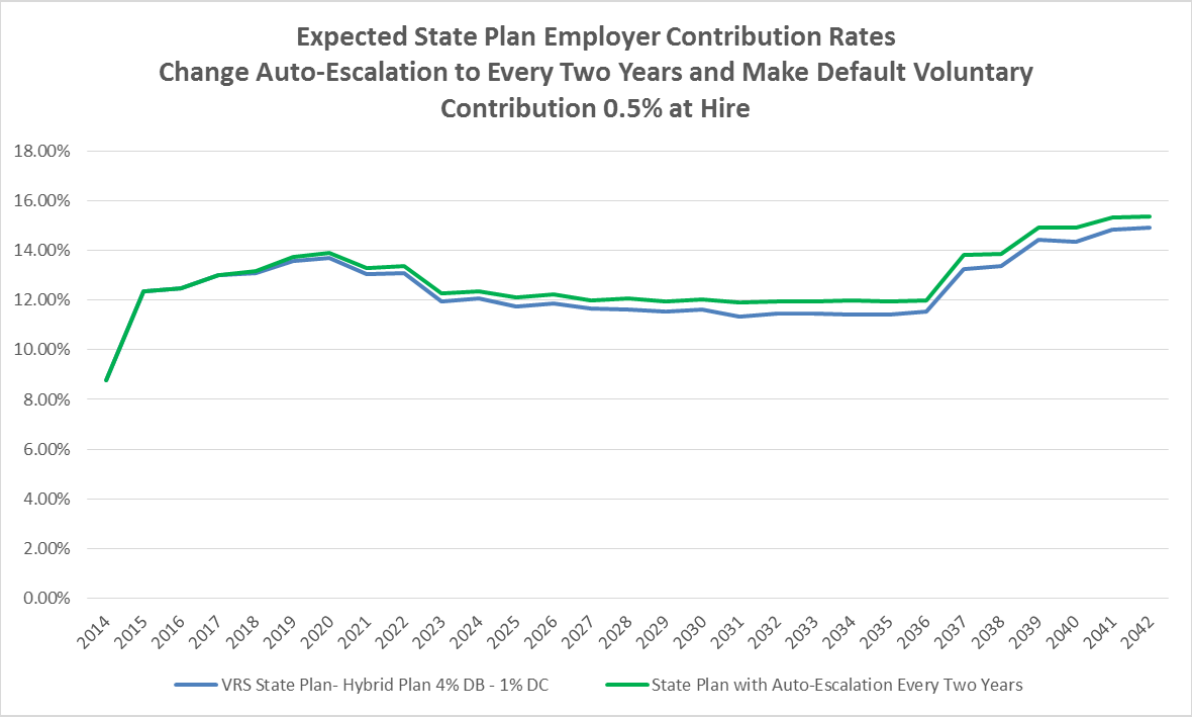
As shown in Exhibit 8-14 below, this could increase the estimated replacement ratio at retirement to 45%, which is what the current Plan 2 benefit provides at retirement over a 30-year career.

Exhibit 8-14



The estimated impact would initially be 0.20% of payroll with an ultimate cost impact for the State plan of 0.47% of covered payroll to add auto enrollment for voluntary contributions at an initial amount of 0.50% of payroll and to reduce the auto-escalation to every two years versus every three.

Exhibit 8-15


Expected State Plan Employer Contribution Rates
Change Auto-Escalation to Every Two Years and Make Default Voluntary Contribution 0.5% at Hire
18.00%
16.00%
14.00%
12.00%
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
2014
2015
2016
2017
2018
2019
2020
2021
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2024
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2027
2028
2029
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2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
2042
VRS State Plan- Hybrid Plan 4% DB - 1% DC
State Plan with Auto-Escalation Every Two Years