

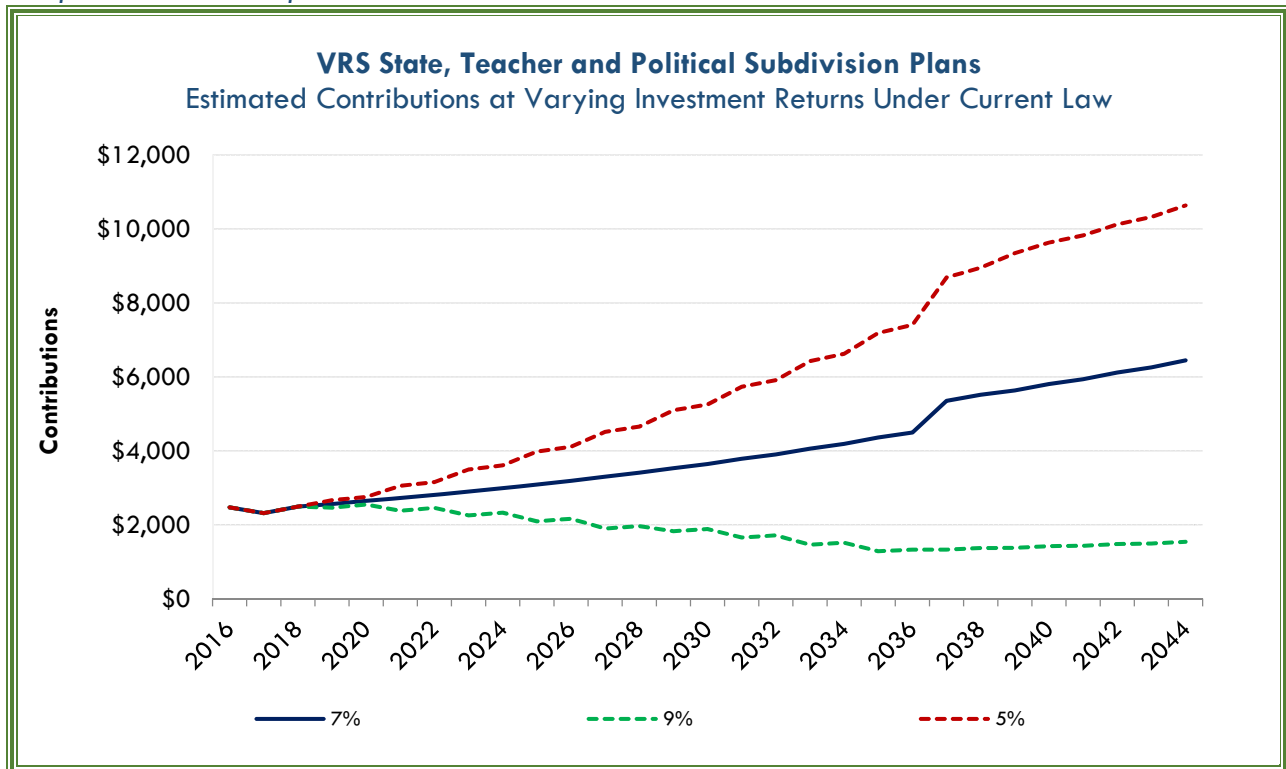
Retirement Working Group Recommendations

1. Adopt a Formal Stress Testing Policy

The Virginia Retirement Systems (VRS) should adopt a policy to develop and report sensitivity and stress test analysis on a regular basis, including projections of pension costs, liabilities and debt reduction under different economic and investment scenarios.

Rationale: Sensitivity and stress test analysis as outlined in the appendix would build on existing VRS practice and inform policymakers on benefit costs and fiscal impacts using different investment return assumptions, help policymakers to plan for uncertainty, and underscore the importance of fully funding pension promises.

Sample Stress Test Output*



Note: These results only contain estimates for the Virginia State Employees, Teachers, and Political Subdivision plans. State Police (SPORS), Virginia Law Officers (VaLORS), and the Judicial (JRS) plans are all excluded, as these plans comprise only 4% of VRS' total liability.

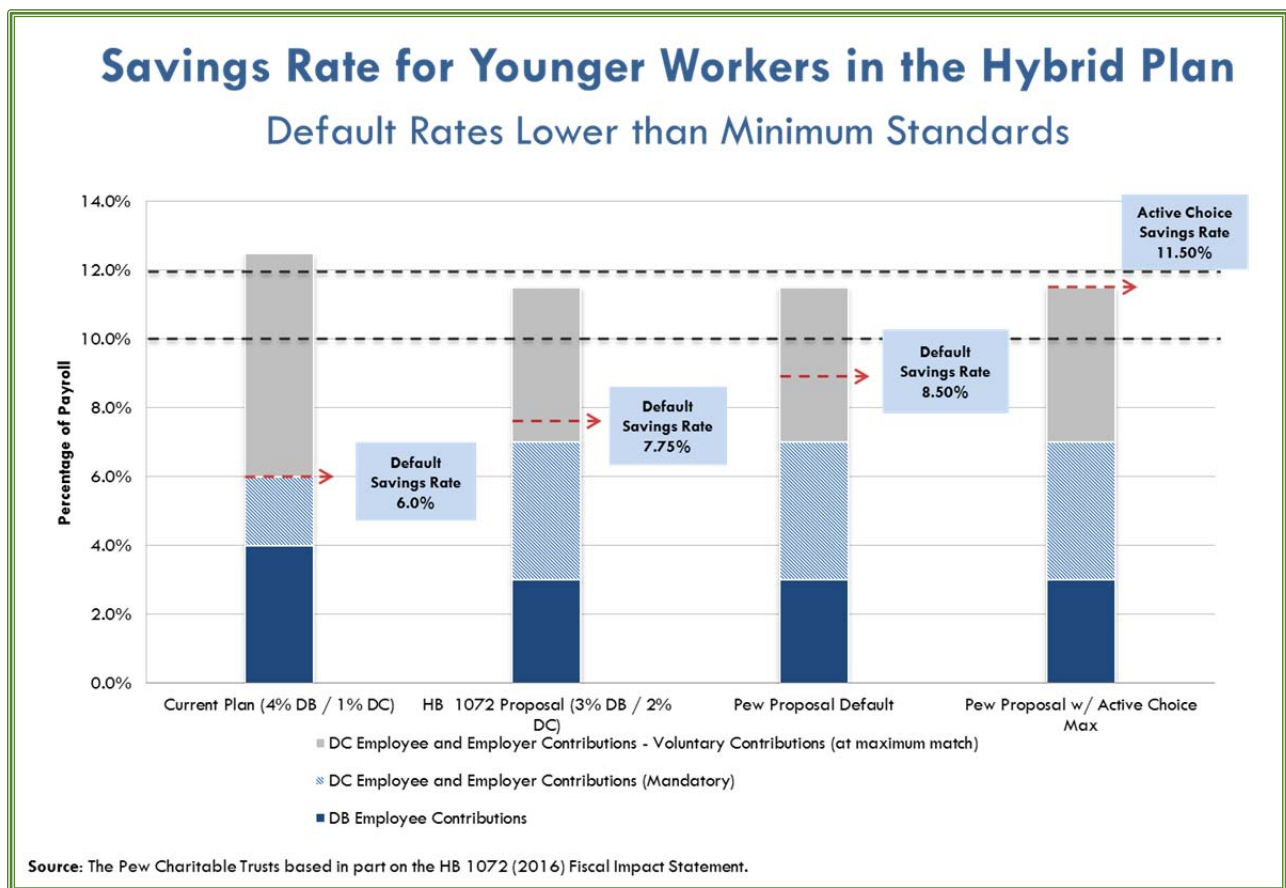
Source: All forecasted results based on actuarial analysis by The Terry Group, informed by input from VRS. Stress testing analysis includes projecting results at 5%, 6%, and 9% as well as under baseline assumptions. Sensitivity analysis also includes estimates using a discount rate of 3.7%. According to the Wilshire Group, the median 10-year investment return for public pension plans was approximately 6% as for June 30, 2016.

*See *"Sensitivity and Stress Testing Analysis for Virginia"* in the Appendix for a detailed description of our proposed stress testing methodology and additional output exhibits.

2. Modify the Hybrid Plan to Improve Default Retirement Savings

The Virginia legislature should adopt VRS' suggested changes to the current hybrid plan, as reflected in HB 1072 (2016), and consider modifications to either: **(1)** Set the default voluntary employee contribution rate to the maximum level required to receive the full state match; or **(2)** Provide workers with an "active choice" option to set their initial voluntary contribution to the maximum level required to receive the full state match; and **(3)** Provide workers with an "active choice" to set their initial voluntary contribution to 1% per year, with an auto-escalation of 1% per year until the maximum voluntary contribution is reached.

Rationale: Would raise long-term retirement security, by providing an immediate path to achieve a minimum standard level of retirement savings, and make the split of employee and employer contributions in the DB plans more equitable across all tiers. The modified plan would accomplish these objectives, at an employer contribution rate this is similar to and more predictable than the service cost of the state DB plans. If policymakers have concerns about asking workers to contribute more from their paychecks on a default basis, an active choice model can be employed to address those concerns, as reflected in the three options in this recommendation.



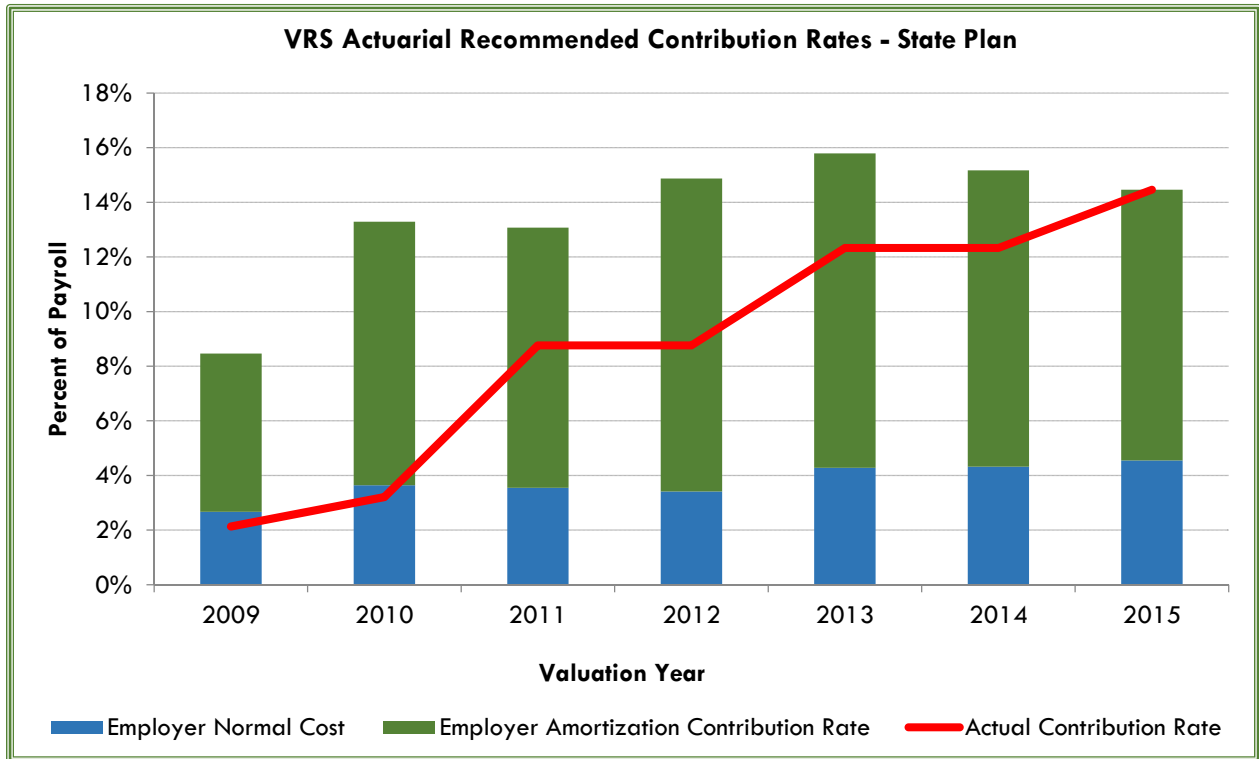
3. Create a Defined Contribution Plan for New Hires

The Virginia legislature should create a defined contribution (DC) plan* similar to the existing Optional Retirement Plan for Political Appointees (ORPPA) for new hires beginning in 2018 (**application to be a policymaker decision**).

Rationale: Would raise retirement savings early in workers' careers and provide a more portable retirement plan at a fixed and predictable cost for the state. Elements of a well-designed plan include sufficient contributions to enable adequate savings; a limited number of appropriate, low-fee investment

options; and access to annuities or other forms of lifetime retirement income. Virginia's existing ORPPA currently provides sufficient contributions and low fee investment options. The contribution rate would be higher than the actuarial contribution rate for the DB and hybrid plans, but lower than the state's realized cost for retirement benefits.

Current Realized Contribution Rates Are Well Above Normal Cost



*See “*Virginia Defined Contribution Plan Design Considerations*” in the Appendix for a detailed discussion of DC plan design considerations.

4. Consider Options for Adding a Variable Cost-Sharing Feature to the DB Component

The Virginia legislature should consider adding a prospective cost sharing provision that would (1) make employee contributions - to the defined benefit (DB) component - variable within a limited range based on realized cost and/or (2) set cost of living adjustment (COLA) benefits as contingent based on plan fiscal health. As noted in the materials from previous meetings and summarized in the October 17 presentation, several states have approached this concept in different ways, any of which could be designed effectively in Virginia.

Rationale: Cost sharing would provide the state with an additional “shock absorber” to manage investment risk and improve cost predictability while preserving the fundamental structure of the DB component.

Table 1: Examples of Existing Cost-Sharing Mechanisms

Cost-Sharing Mechanism	Participating Systems	Description
Employer/Employee Split	Arizona, Iowa, South Carolina, Wisconsin	<ul style="list-style-type: none"> • AZ – Employees contribute 50% of total cost • IA – Employees contribute 40% of total cost • SC – Employees contribute 50% of cost increases but Board may reduce contribution rate when funding level exceeds 90% • WI – Employees contribute 50% of total cost
Variable Benefits	Maryland, Minnesota, Wisconsin	<ul style="list-style-type: none"> • MD – COLA is capped at 2.5% if returns meet or exceed expectation and capped at 1% in downside scenarios • MN – COLA is capped at 2.5% if funding level is above 90% and capped at 1% when funding level is below 90% • WI – Post-retirement annuity + / - based on investment returns

5. Further Improve Investment Transparency and Reporting Policy

VRS should adopt a formal policy to continue providing the VRS investment policy online and including 20- and 25-year investment performance data in regular reporting.

Rationale: Would build on recent practice improvements to provide policymakers and stakeholders with increased transparency on investment strategies and performance, including critical information on the strategies that the systems follow for the investment of public funds. As of this year, VRS posts its investment policy and 20- and 25-year investment performance data online, and has provided this information to JLARC and other stakeholders and policymakers historically. Further, VRS notes that its existing Request for Board Action (RBA) process is likely the best procedural vehicle for adopting a formal policy.

6. Report Investment Performance and Carried Interest Fees

VRS should adopt a formal policy to report performance and carried interest fees for private equity and other alternative investments regularly.

Rationale: Improved disclosure in this area would make Virginia a national leader in this effort and provide policymakers and stakeholders with clear information about the costs of the plan’s investment management strategies. Currently, only three states provide comprehensive fee disclosure on private equity. VRS notes that it is currently exploring using a streamlined version of the Institutional Limited Partners Association (ILPA) template for enhanced reporting of carried interest and other similar fee structures. Including this information in regular reporting would make VRS a national leader on investment fee transparency.

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APPENDIX

Virginia Defined Contribution Plan Design Considerations

Virginia currently offers optional defined contribution (DC) plans for higher education employees, political appointees and school superintendents. Commission and working group members have identified features of these plans, as well as the DC component of the hybrid plan, as a model for developing a plan for other public workers in the state. The analysis below summarizes how such a plan could be designed to meet Pew's principles for retirement security based on the state's DC and hybrid plans. These principles, included in each of our presentations to the Commission on Employee Retirement Security & Pension Reform can be applied to evaluate any retirement plan.

I. Target sufficient contributions and savings to help put employees on a path to a secure retirement

The state's optional retirement plans for workers hired after July 1, 2010 includes mandatory contributions of 8.5% from the state and 5% from workers - a combined level that can be expected to provide a substantial level of retirement security at a fixed and predictable cost for the state. While the employer contribution rate is significantly higher than the current blended rate for the DB and hybrid plans (e.g. 4.5% for State) it is also well below the realized cost for these plans, as reflected in a total contribution rate of 14.5% including payments for the unfunded liability.

Policymakers have indicated that the employer contribution rate could be set at a lower level for other public workers in the state. Pew recommends that any changes be considered based on the impact to retirement security, as well as analysis of both cost and cost variation, as described in the recommendations on stress testing and sensitivity analysis.

II. Invest assets in professionally managed, pooled investments with low fees and appropriate asset allocations

Pew's research points to the federal government's Thrift Savings Plan (TSP) as a well-established model for providing DC investment options. Under TSP, employees choose among ten low-fee funds: five index funds and five target date funds. Similarly, VRS provides workers in the optional retirement plans and DC component of the hybrid plan with index and target date fund options.

This limited range of choices helps to ensure that workers with limited financial literacy make appropriate investment choices. The plan options include a Do-It-For-Me Path, which defaults members who do not make an active choice into the appropriate target date fund, a Help-Me-Do-It Path which provides ten funds for members to choose from, and Do-It-Myself Path for members who want to have a self-directed brokerage account. In addition, VRS DC plans allow workers to participate in the VRS investment portfolio, which allows workers to invest in the unitized VRS defined benefit trust.

The Help-Me-Do-It funds include options with fees below 10 basis points while fees on the target date funds are between 8 and 9 basis points. Reported administrative expense for the VRS defined benefit plan are approximately 59 bps.

Studies have shown that DC plans with well-designed, low fee investment options can provide investment returns in line with DB plans. In addition, information presented to commission members during the August 22 meeting also demonstrates that a combination of stocks and bonds can provide similar returns as a portfolio with a more complex mix of asset classes.

III. Provide access to lifetime income in retirement

The DC component of the VRS hybrid plan includes the following distribution options: full or partial lump sum distribution, periodic payments, partial lump sum combined with periodic payments, rollover into another plan, and the option to purchase an annuity with all or a portion of an employee's account balance. In addition, the Optional Retirement Plan for Higher Education gives workers with an option through the TIAA provider to contribute to an annuity over the course of their working years, as well as convert assets to an annuity at retirement. VRS is also considering additional measures to enhance current distribution options.

Sensitivity and Stress Testing Analysis for Virginia

We recommend presenting a sensitivity analysis that looks at plan liabilities and costs at different discount rates as well as projections of key financial information at both the current plan assumptions over a 30-year time horizon as well as alternative actual return scenarios over 20-year time horizons. Projections should cover key financial information including plan assets, liabilities, employer payments, and whether contributions to the pension plan are expected to pay down pension debt. Alternative investment scenarios should also be applied to the cost analysis for changes in retirement policy.

The details included here are based on Pew's analysis of the Blue Ribbon Panel recommendations and practices in other states, informed by work already being done by VRS, and tailored based on input from members of the Virginia Commission on Employee Retirement Security and Pension Reform. The proposed output identifies select number of exhibits that provide comprehensive information for policymakers, based on the underlying analysis provided below. The stress test and scenario analysis cited below are just a sample of the type of scenarios that could be modeled. Stress testing and shock tests can be tailored to reflect current economic outlooks or unexpected market fluctuations to provide information on potential impacts to plans under extreme scenarios.

Policy Specifications

I. Baseline Projections

- 1) Projections of assets, liabilities, pension debt, service cost, employee contributions, actuarial recommended employer contributions, net amortization, benefit payments, payroll, and funded ratio based on plan assumptions for the next 30 years;
- 2) The expected contributions as a percent of payroll, the ratio of benefit payments to payroll, the ratio of funding liability to payroll, and the ratio of market value of assets to payroll.

II. Sensitivity Analysis

- 1) The estimated actuarially accrued liability using Entry Age Normal, the total plan normal cost for all benefit tiers, the employer normal cost for all benefit tiers, the total normal cost for the latest benefit tier, and the employer normal cost for the latest benefit tier calculated using a discount rate equal to the assumed rate of return.
- 2) The above calculated at the following discount rates:
 - a. 5%
 - b. 9%
 - c. The ten-year average of the yield of 30-year Treasury notes (currently estimated at about 3.7%)¹

III. Stress Test Analysis

- 1) Estimates of the items listed in the baseline projections over a 20 year period assuming investment returns are 2 percentage points above plan assumptions, and 2 percentage points below plan assumptions, with the following assumptions regarding contribution policy:
 - a. Employer contributions adjust based on current policy

¹ Board of Governors of the Federal Reserve System (US), 30-Year Treasury Constant Maturity Rate [DGS30], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/DGS30>, November 2, 2016.

- b. Employer contributions are held constant at the levels calculated for the Baseline Projections

IV. **Scenario Analysis (Asset Shock with Low Growth):**

- 1) Estimates of the items listed in paragraph (1) if, for example, there is a one year loss on investments of 15%, followed by a 20 year period of investment returns 2 percentage points below plan assumptions, with the following assumptions regarding contribution policy:
 - a. Employer contributions adjust based on current policy
 - b. Employer contributions are held constant at the levels calculated for the Baseline Projections

Projected pension costs are based on a number of actuarial and investment return assumptions. Stress testing can help policymakers better understand and plan for cost uncertainty if assumptions are not met. This recommendation is informed by our analysis of the historical causes of the unfunded pension liability and consistent with recent recommendations by the Society of Actuaries Blue Ribbon Panel on pension funding. It also builds on new government accounting rules that require limited stress tests in certain plan documents.

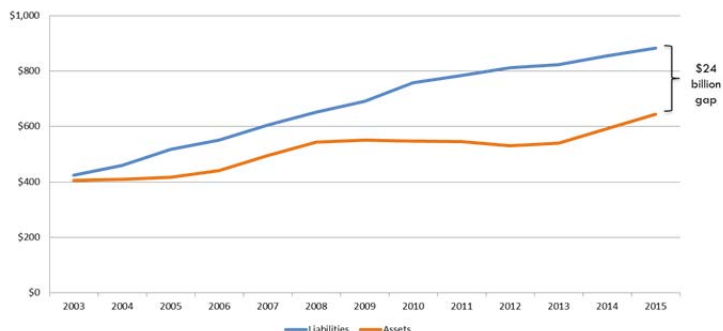
Pension Funding, Cost Variability, and Stress Testing

Overview

Consistent with the national trend for state pension funds, which in aggregate have over \$1 trillion in unfunded pension liabilities as of 2015 reporting, Virginia has experienced a growing pension debt since the bull run of the stock market during the 1990's. The main drivers of Virginia's pension debt – and increase of \$23 billion since the state plans were fully funded in 2002 - are under-funding of the annual contribution to the pension fund, investment under-performance, and assumptions changes.

Virginia Retirement System

Assets & Liabilities: 2003 - 2015



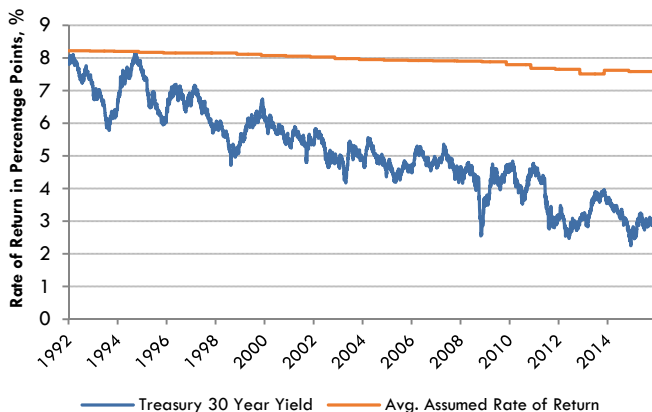
The state has taken action to address these issues, including a plan to achieve 100% of annual required contribution (ARC) payments by FY2018, and the adoption of a 7% long-term investment return target – among the lowest for state sponsored pension plans which average 7.6%. However, challenges remain for Virginia and states across the country in terms of making full pension payments and managing the volatility of expected investment returns. This document illustrates the risks inherent in volatility in investment performance over the past decade, and provides sample upside and downside scenarios that may affect the system in the coming years.

Risk Premiums and Volatile Returns

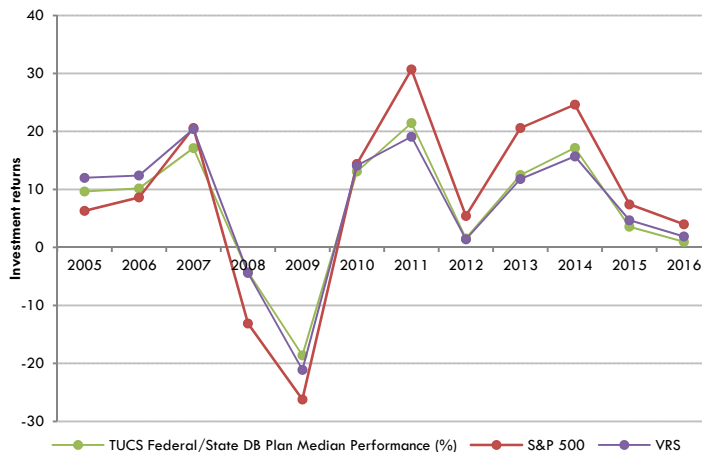
The graph on the left plots falling bond yields (i.e., the “risk-free rate”) against relatively stable average assumed rate of return among public pension plans. Practically, this growing risk premium means that funds are assuming more risk when calculating contribution policy as compared to 1992 when the average assumed rate matched the risk-free rate. Today, public pension plans have 75% of assets invested in stocks and alternative investments. The graph on the right plots median investment performance against the S&P 500 equity index to illustrate the pattern of pension funds tracking market volatility.

Pension Fund Risk Premium at Historic High

US Public Fund Average Increasing Risk Premium – Plan's Assumed Rate of Return Remains Relatively Stable, While Bond Yields Have Declined



VRS – Average Annual VRS, Stock Market, and Pension Fund Returns

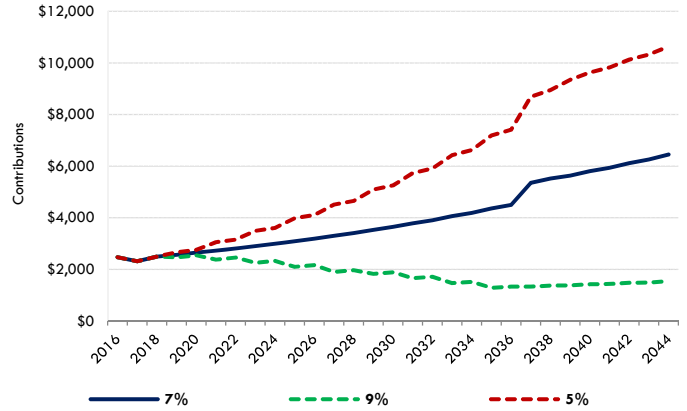


The graph to the right shows what the state can expect to pay if the current assumed rate of return of 7% is met compared to a 5% downside scenario and 9% upside scenario. While over 60% of current and 75% projected payments for the state and teachers plans are associated with paying down the unfunded liability, long-term differences in the rate of return on fund assets can also impact the state's cost for new benefit accruals.

Note: All charts on this page reflect costs for the State and Teachers plans and do not include costs for other plans run through VRS, including the Political Subdivision, VaLORS, SPORS, and JRS plans.

Pension Cost to Investment Returns

VRS State, Teacher and Political Subdivision Plans - Estimated Contributions at Varying Investment Returns Under Current Law

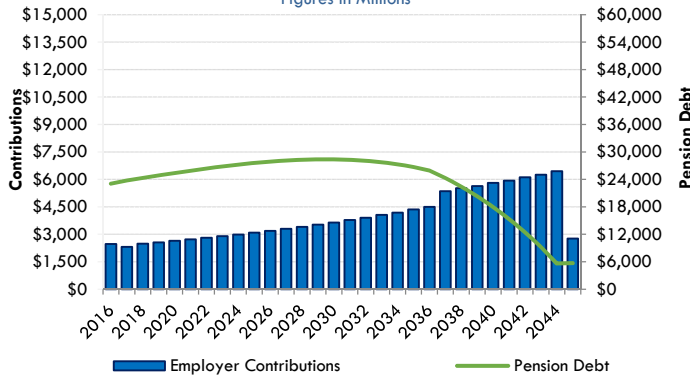


Stress Testing

The following graphs project the level of employer contributions and pension debt under both the assumed rate of return on investments of 7% and a downside scenario of 5% returns. In addition, they depict scenarios where contributions are held constant compared to when contributions adjust upward in response to rising debt. The bottom right chart compares cost variability of the Plan 2 DB and the Hybrid Plan. The stress testing charts are provided as samples and can be generated based on any scenario of interest to policymakers. Stress testing investment return assumptions to estimate the impact on costs under different scenarios helps policymakers to better understand and plan for the fiscal risks built into the retirement policies. The Society of Actuaries commissioned a Blue Ribbon Panel report that identified stress tests as a best practice and these practices are in place in other states, including California and Washington. New Government Accounting Standards Board rules require limited stress tests in certain plan documents.

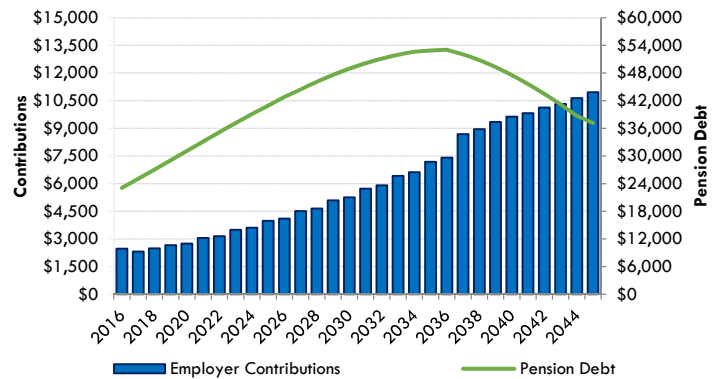
Contributions and Debt Projections Through 2045

(Under Current Investment Return Assumption of 7%)
Figures in Millions



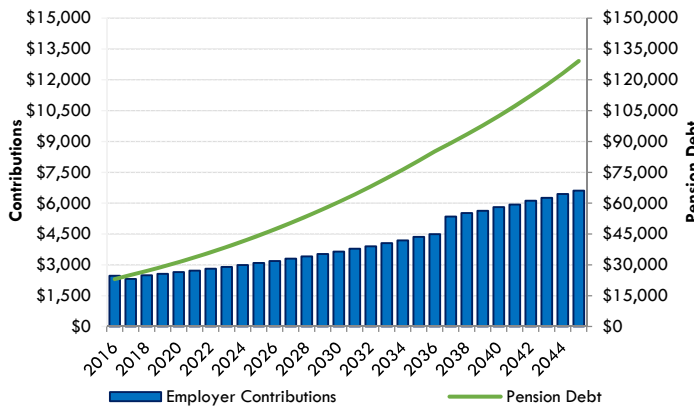
Stress Testing – 5% Return, Contributions Adjusting

Figures in Millions

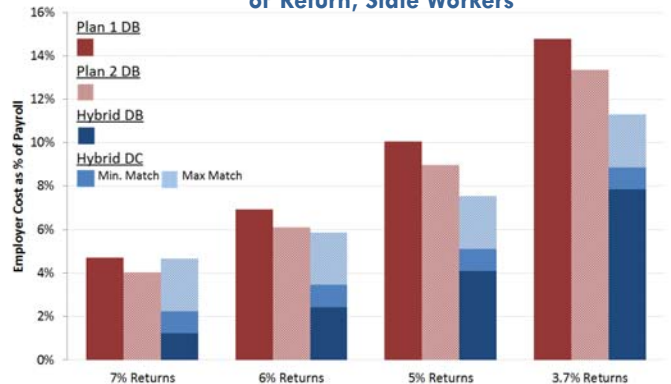


Stress Testing – 5% Return, Contributions Held Constant

Figures in Millions



Sensitivity of Employer Contribution Rate to Assumed Rate of Return, State Workers



All forecasted results based on actuarial analysis by The Terry Group, informed by input from VRS. Stress testing analysis includes projecting results at 5%, 6%, and 9% as well as under baseline assumptions. Sensitivity analysis also includes estimates using a discount rate of 3.7%. According to the Wilshire Group, the median 10-year investment return for public pension plans was approximately 6% as for June 30, 2016.