



SOUTH CAROLINA PENSION REFORM ANALYSIS

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Pension Integrity Project

October 25, 2016

Prepared for:

Joint Committee on Pension Systems



SCRS's Problem: Degrading Solvency

1. SCRS: over the past 15 years, the **net fiscal position** has declined more than \$14.0 billion (actuarial value).
 - FY 2000-01 Funded Ratio: 87.8% (market) / 87.4% (actuarial)
 - FY 2014-15 Funded Ratio: 57.0% (market) / 62.0% (actuarial)
 - Market value of assets decline: \$16.4 billion
2. All Plans: over the past 15 years, the **net fiscal position** has declined about \$15.9 billion (actuarial value)
 - Market value of assets decline: \$18.6 billion
3. SCRS accounts for roughly 90% of state pension liabilities.
 - As SCRS goes, so goes the performance of the state's retirement systems



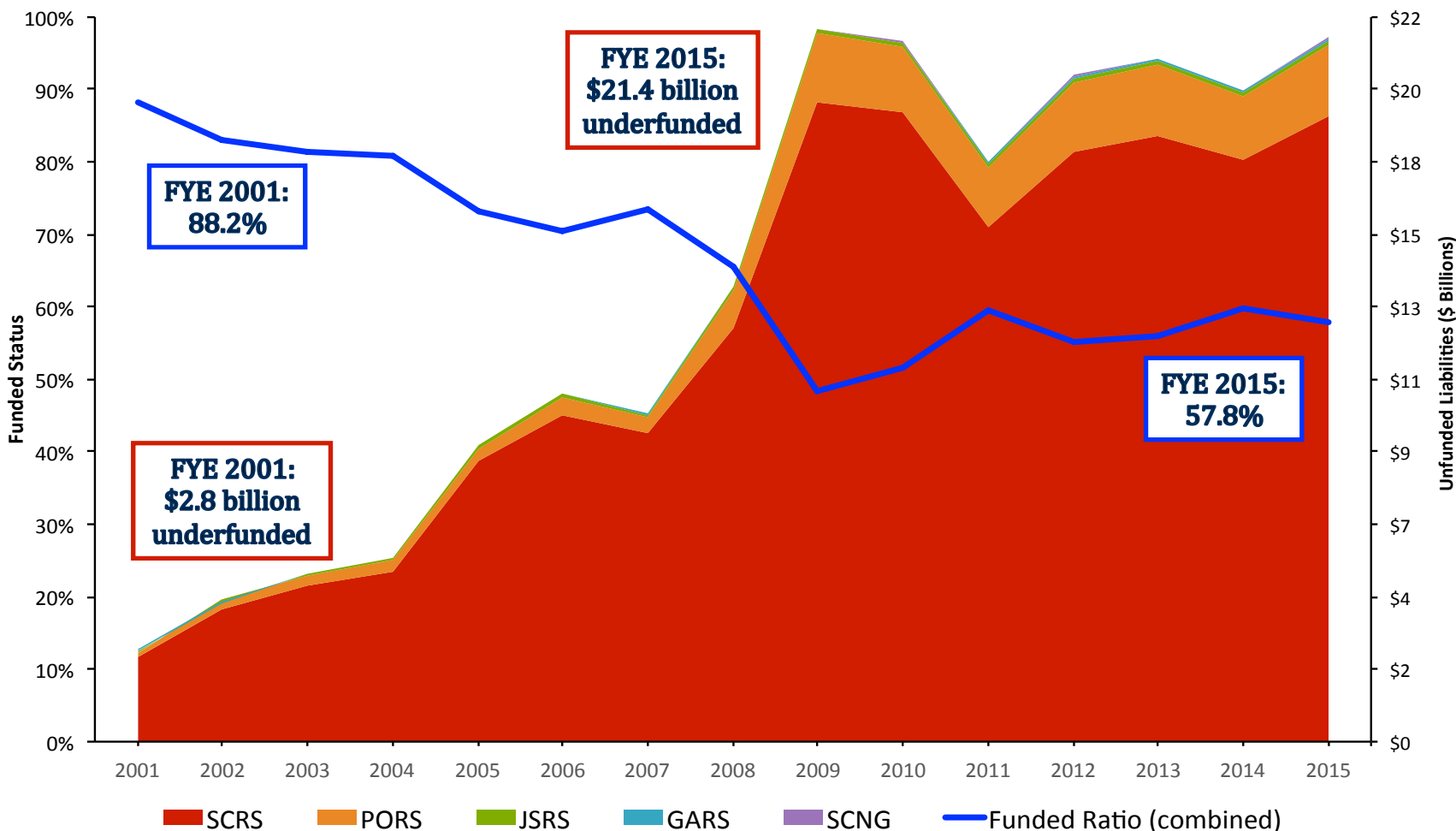
SCRS's Problem: Degrading Solvency

1. SCRS: over the past 15 years, **employer contribution** has increased roughly 156% on a dollar basis
 - FYE 2001: 7.5% payroll | \$398.9 million
 - FYE 2015: 10.9% payroll | \$1.023 billion
 - FYE 2017: 11.06% payroll
2. PORS: over the past 15 years, **employer contribution** has increased nearly 151% on a dollar basis
 - FYE 2001: 10.7% payroll | \$66.6 million
 - FYE 2015: 13.4% payroll | \$167.0 million
 - FYE 2017: 13.7% payroll



All SC Plans Degrading Solvency, FYE 2001-2015

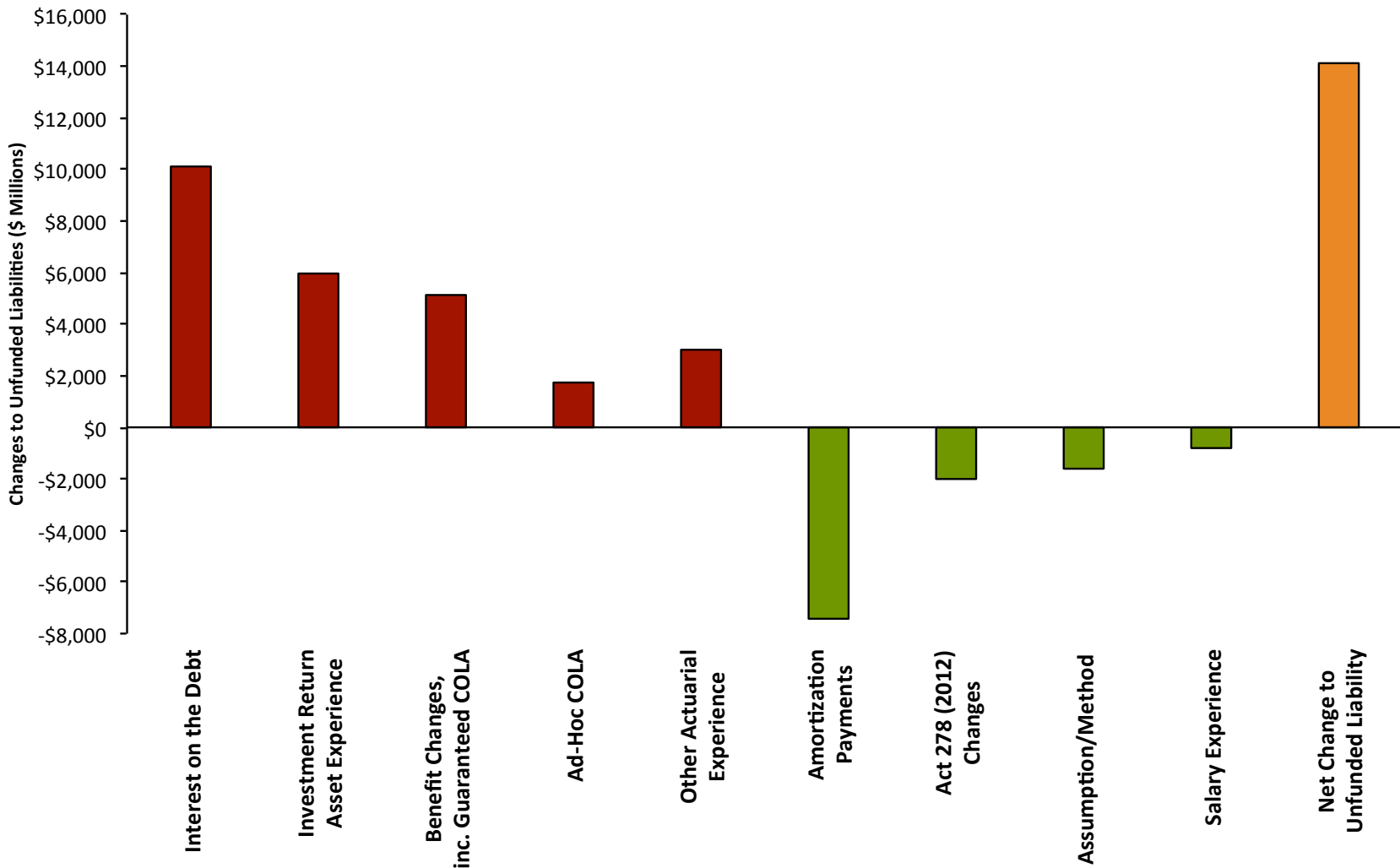
Unfunded Liability and Funded Ratio History



Source: SCRS, PORS, GARS, JSRS, and SCNG Actuarial Valuation Reports. UAL figures are at market value.

SCRS Total Unfunded Liability, FYE 2001-2015

Composition of Changes to the Unfunded Liability



Source: SCRS Actuarial Valuation Reports, data is on an actuarial value basis

SCRS & PORS Total Unfunded Liability, FYE 2001-2015

Summary: Causes of Today's Unfunded Liability



1. Negative Amortization

- Unfunded liability amortization payments have been less than interest on the so-called pension debt for more than a decade.
- The current 30-year, open amortization method is what has been the driver of this negative amortization problem.

2. Underperforming Assets

- The 15-year average actual market return for the combined investment portfolio has been approximately 2.0 percentage points below the long-term assumed rate of return.

3. Other Actuarial Assumptions

- The discount rate is undervaluing the existing unfunded liabilities
- The inflation assumptions may be understating costs
- The mortality table may be understating costs

SCRS & PORS Total Unfunded Liability, FYE 2001-2015

Summary: Causes of Today's Unfunded Liability



4. Unaccounted for Benefit Changes

- Previous legislatures initiated several retroactive benefit changes that were not pre-funded, including both guaranteed and ad-hoc COLA disbursements before 2012 — in particular, SB618 (2005) and Act 311 (2008). This caused significant spikes in unfunded liability.

Comment: Recent legislative reforms have largely mitigated this problem.

- Act 278 (2012) included a meaningful reform by capping the COLA at the lesser of 1% inflation or \$500. Further reductions in the amount of the COLA would likely not have a meaningful effect on the solvency of SCRS.
- However, based on the valuation reports it appears that these benefits are still not pre-funded. Should investment returns not be enough to pay the COLAs, they will be funded from additional unfunded liability payments. Act 278 has likely addressed the magnitude problem of unaccounted for benefit changes undermining the plan, but not the pre-funding mechanism.
- The legislature should monitor the progress of this new COLA cap approach, in case it proves better pre-fund the COLA benefit by slightly increasing normal cost contributions in order to ensure plan solvency.

PROBLEM 1: OPEN 30-YEAR AMORTIZATION METHOD

- The open amortization method with a long schedule leads to negative amortization that increases unfunded liabilities in absolute terms and undermines the efforts to improve the funded status

30-Year Open Amortization Method Creates Major Solvency



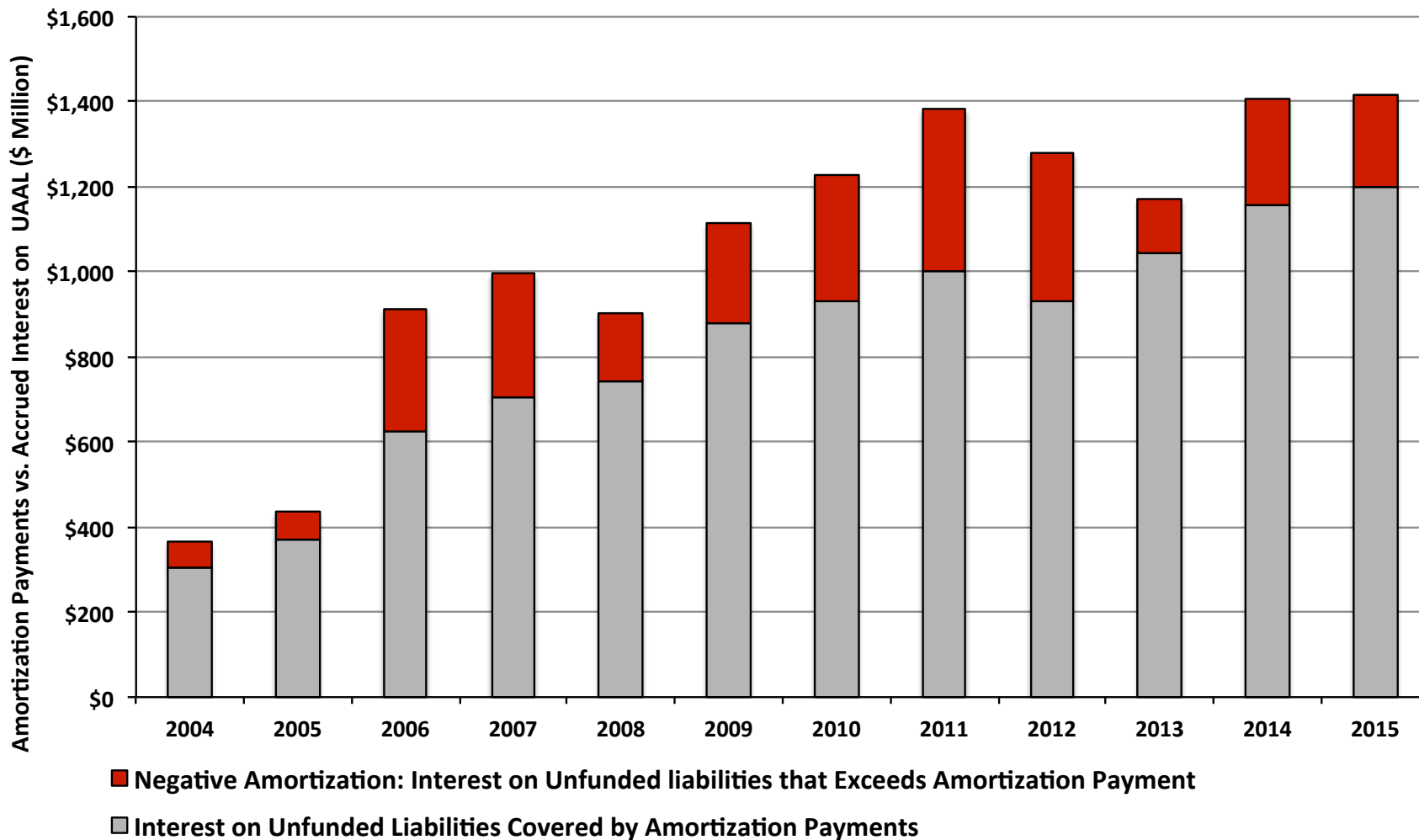
1. The **open amortization method** has undermined South Carolina pension plan solvency by keeping contributions towards the unfunded liability below levels adequate enough to fully pay off the unfunded liabilities.
 - This method allows the plan to continuously reset the amortization schedule every year, making it unlikely to ever be fully paid off.
 - The long 30-year period further lowers the annual amortization payments by stretching out the repayment period.
 - Combined, this lowers the actuarially calculated contribution rate to a level insufficient to pay down at least the interest.
2. As a result, liabilities are allowed to grow in absolute terms **leading to negative amortization.**

Former GASB Chairman James F. Antonio on open amortization methods: “Even though actuaries may consider this to be an amortization method because the unfunded actuarial liability decreases over time as a percentage of payroll, it is not an amortization method in an accounting sense because the liability increases in absolute amount” (1994).

Continued...



SCRS Negative Amortization Growth (in \$Millions) Interest on the Debt v. Actual Amortization Payments



Source: SCRS Actuarial Valuation Reports. Figures are on an actuarial value basis.

SCRS Baseline Forecast

(Amounts Paid in Contribution Fiscal Year, % of payroll)



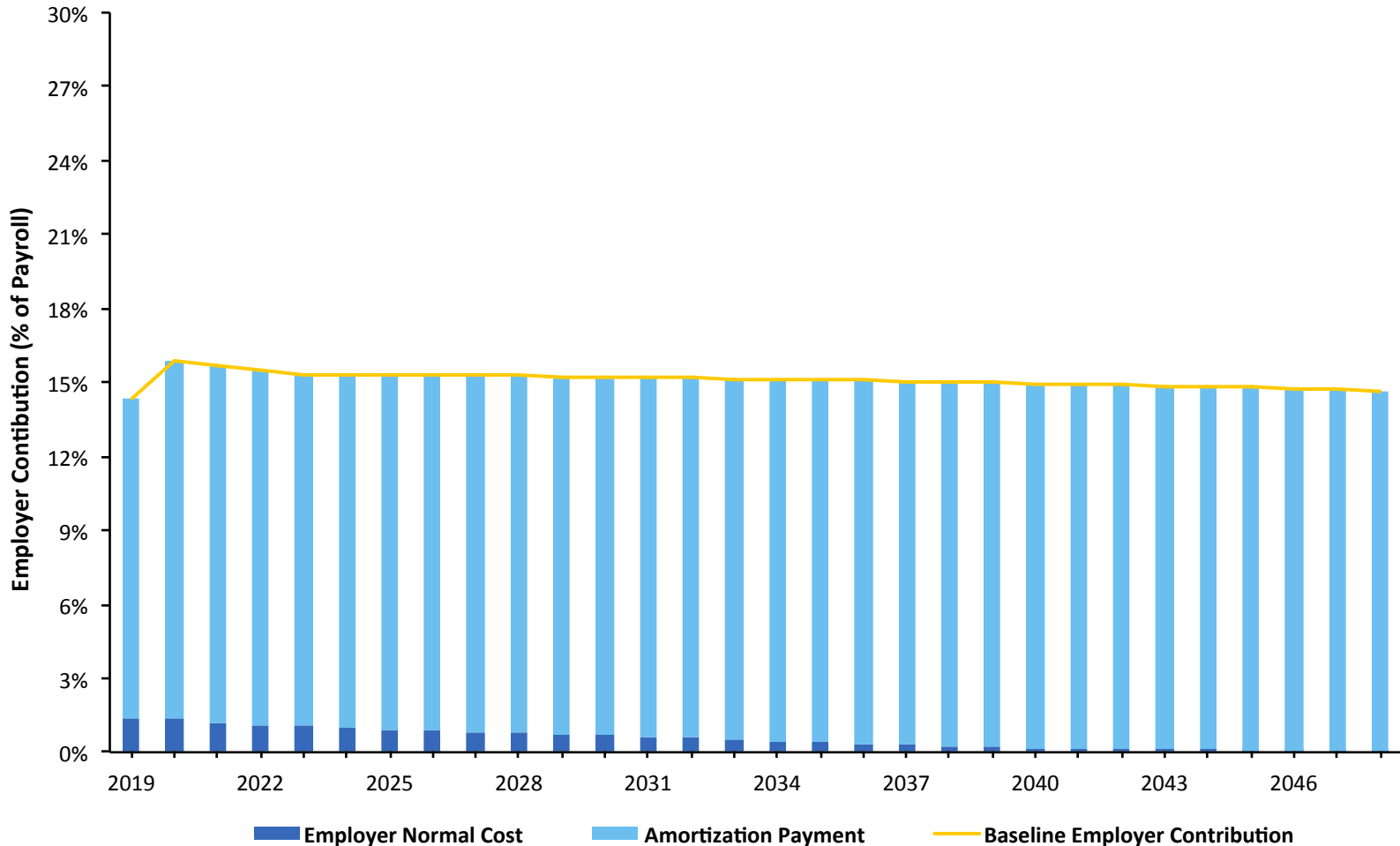
	FYE 2016 (2013 Valuation Report)
Gross Normal Cost	9.94%
NC: Legacy Members NC: New Hire (Class Three)	n/a
Unfunded Liability	9.28%
Total Required Contribution	19.22%
Employer Contribution	11.06%
Normal Cost	1.78%
Unfunded Liability	9.28%
Employee Contribution	8.16%

Note: All figure are on an actuarial value basis. All figures rounded.

SCRS Employer Contribution Forecast (as % of Payroll)

Baseline: Normal Cost + Amortization Payment

Discount Rate 7.5%, Assumed Return 7.5%, Actual Return 7.5%, Amo. Schedule: **OPEN**

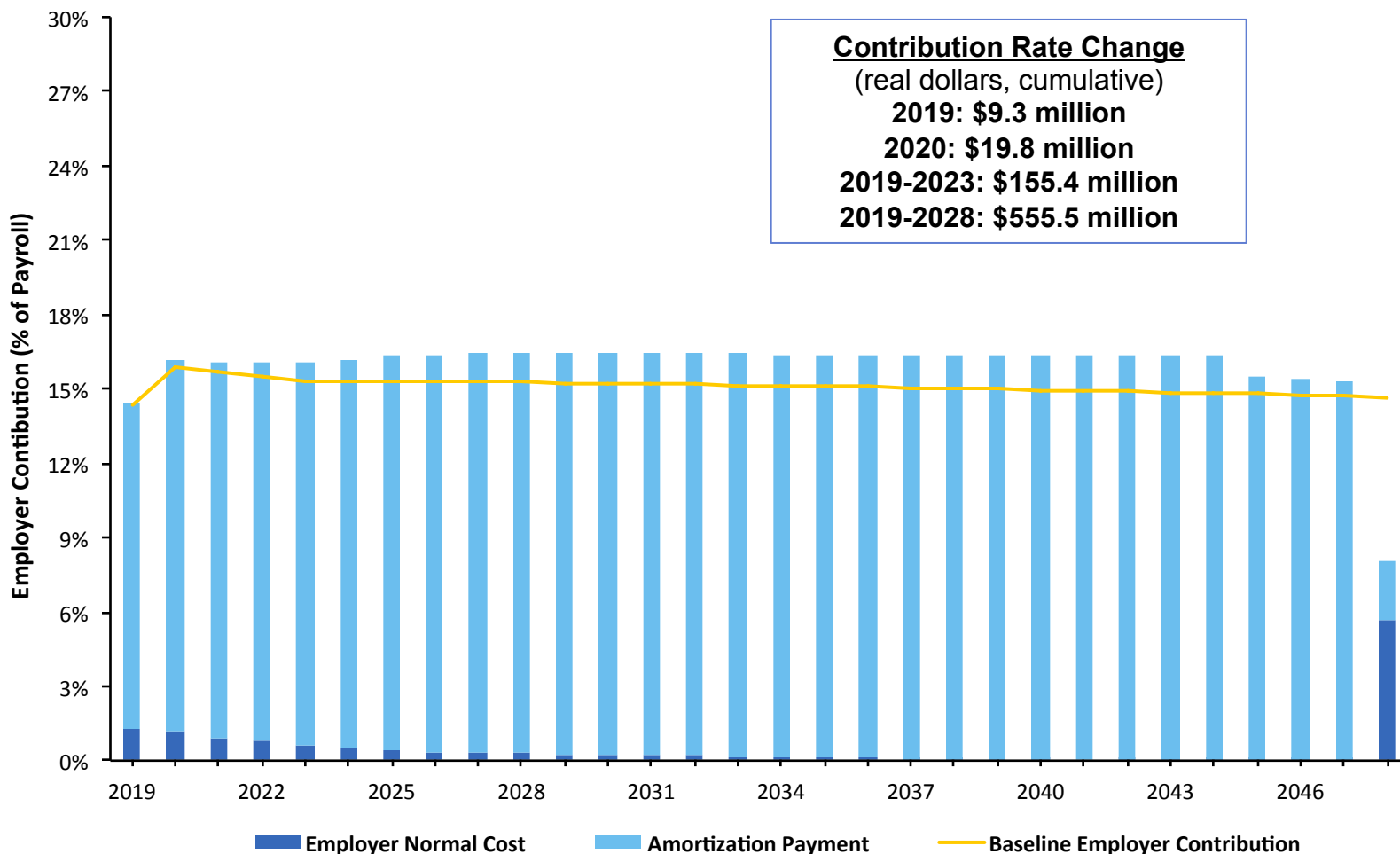


Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates.

SCRS Employer Contribution Forecast (as % of Payroll)

Close the Amortization Schedule (30-Years)

Discount Rate 7.5%, Assumed Return 7.5%, Actual Return 7.5%, Amo. Schedule: **CLOSED**



Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates.

PROBLEM 2: ASSUMED RATE OF RETURN

- SCRSs combined investment returns have consistently underperformed

South Carolina's Underperforming Assets & Unrealistic Assumed Rate of Return

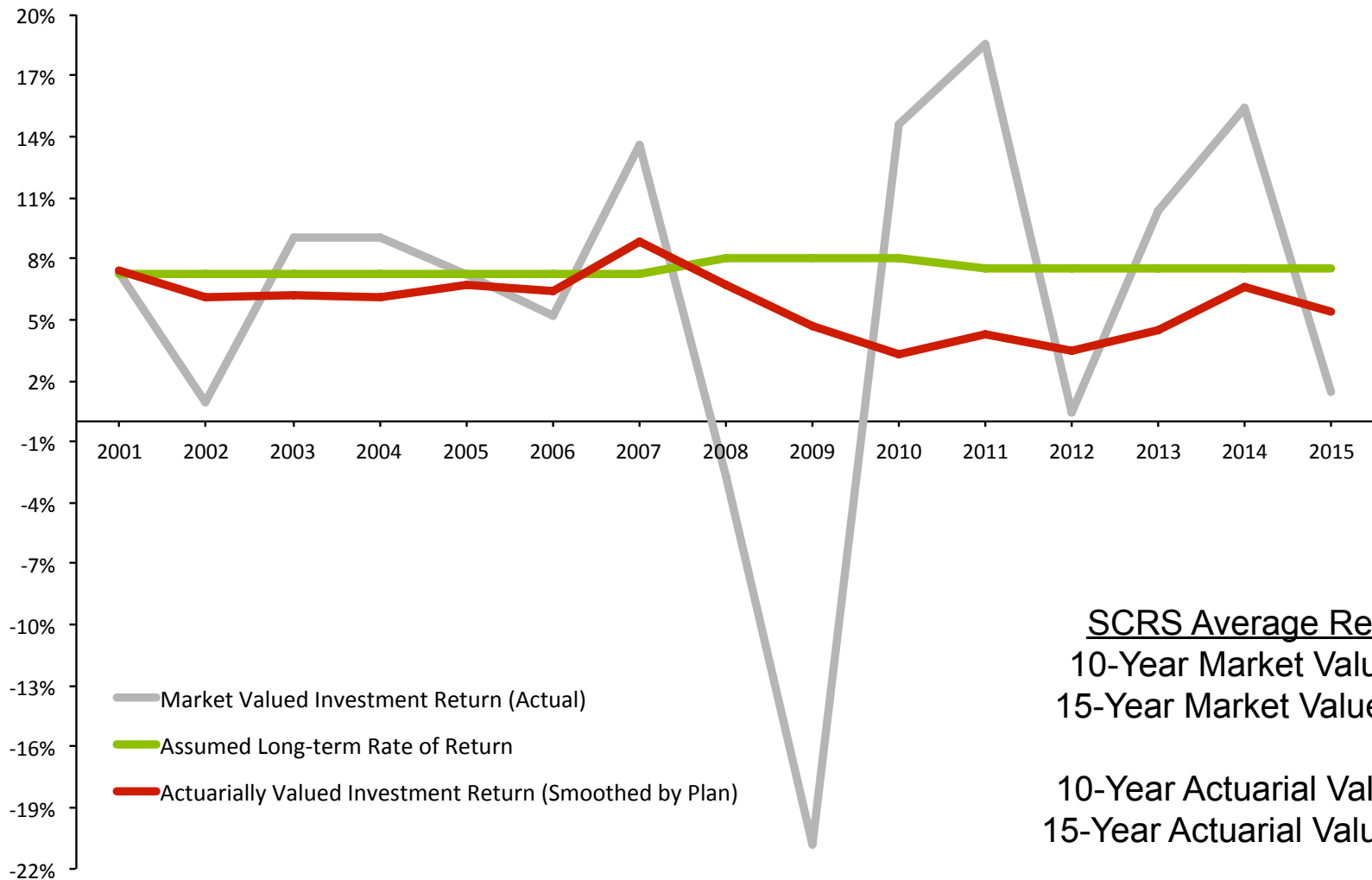


South Carolina's combined pension plans are using a long-term assumed rate of return at 7.5%.

1. Historically, retirement system assets have been underperforming:
 - Over the **past 15 years** (FYE 2001 to FYE 2015) the SCRS market value rate of return has averaged **5.5% return** (geometric average)
 - Over the **past 10 years** (FYE 2006 to FYE 2015) the SCRS market value rate of return has averaged **5.0% return** (geometric average)
2. Even the “smoothed” returns have been poor. **Actuarially valued** SCRS returns have averaged just **5.8% since FYE 2001**
3. Historic performance is not always the best measure of future performance. The new normal for institutional investment returns and most major forecasts of market conditions suggest it is unlikely the state's pension plans will make up these missed returns soon.



South Carolina Retirement System Historic Investment Returns (FYE 2001-15)



SCRS Average Returns
 10-Year Market Value: 5%
 15-Year Market Value: 5.5%
 10-Year Actuarial Value: 5%
 15-Year Actuarial Value: 5.7%



New Normal: Forecasts for Future Returns are Significantly Lower than Past Returns

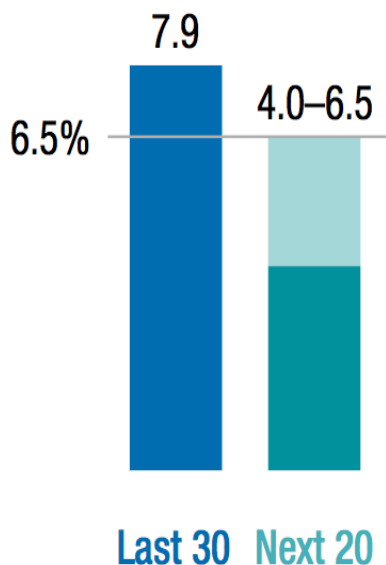
The past 30 years saw returns that exceeded the long-run average

The next 20 years could be more challenging

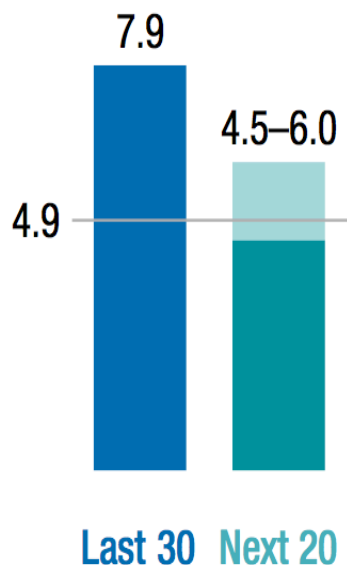
■ Historical real returns
— Last 100 years average return

■ Growth-recovery scenario
■ Slow-growth scenario

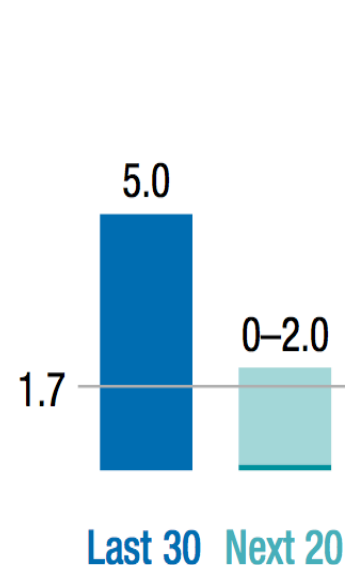
US equities



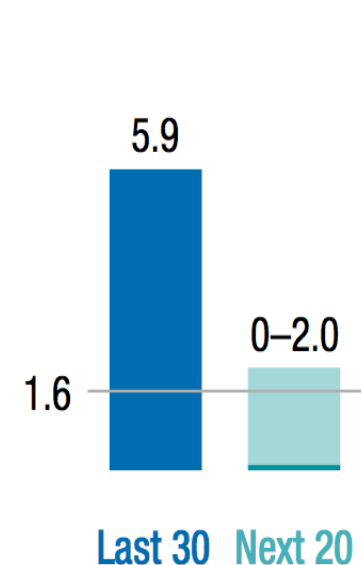
European equities



US bonds

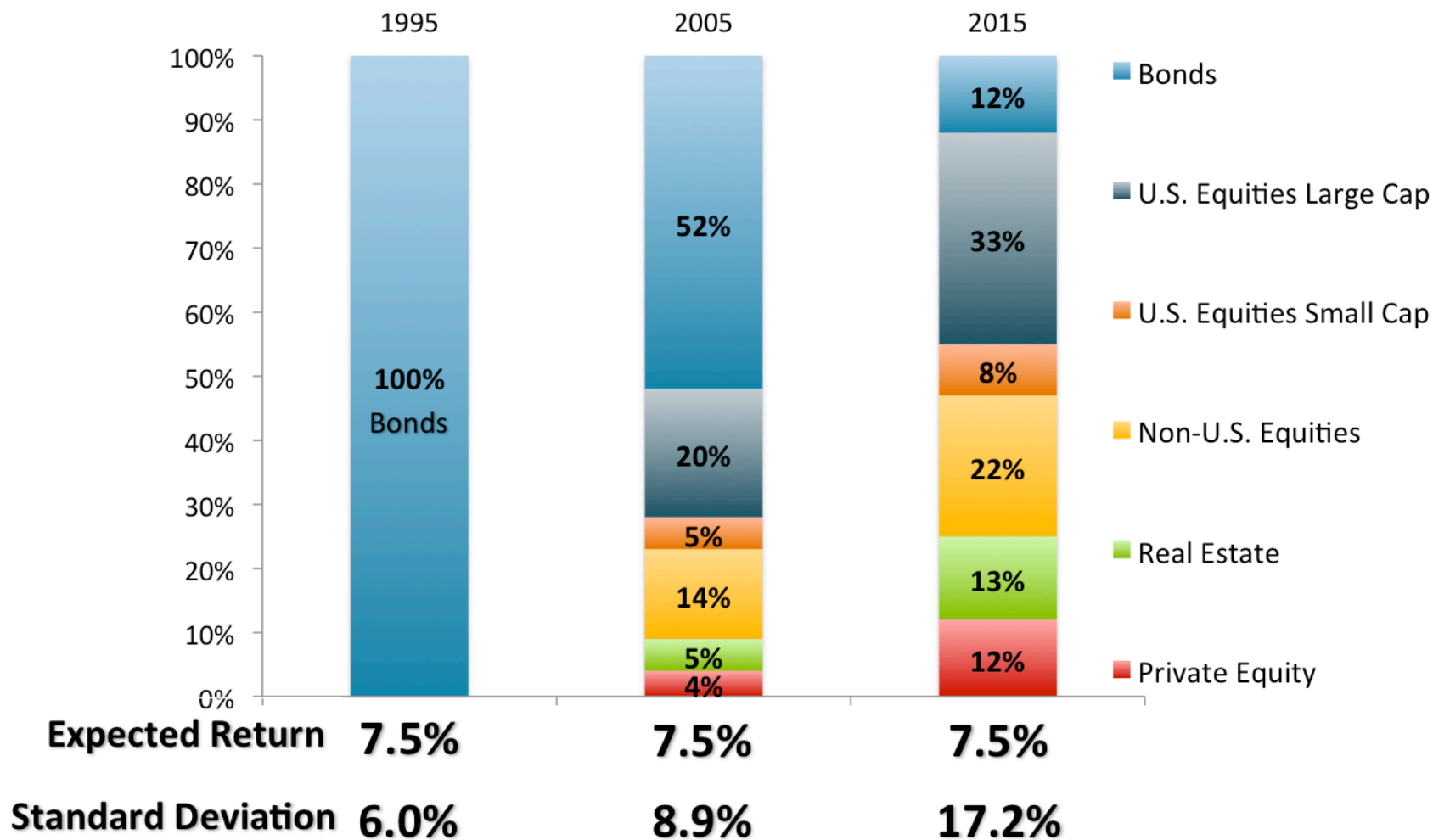


European bonds



New Normal: Market Trend Towards Risk

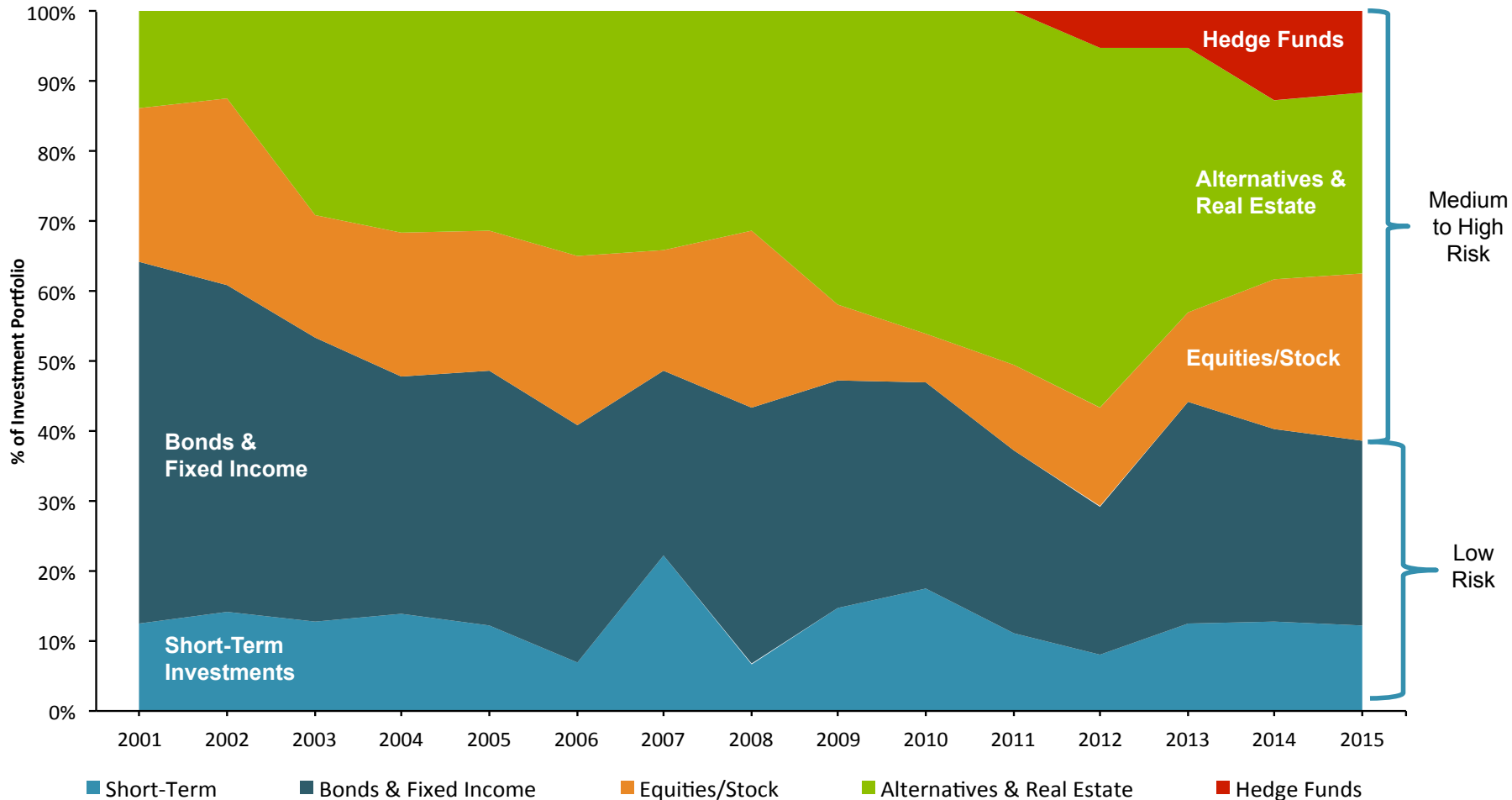
Average Portfolio Asset Allocation Necessary for a 7.5% Expected Return Has Required Shifting from 100% Bonds to a Riskier Mix of Asset Classes





South Carolina Pensions Combined Asset Allocation (2001-2015)

Increasing Investment Risk Over Time

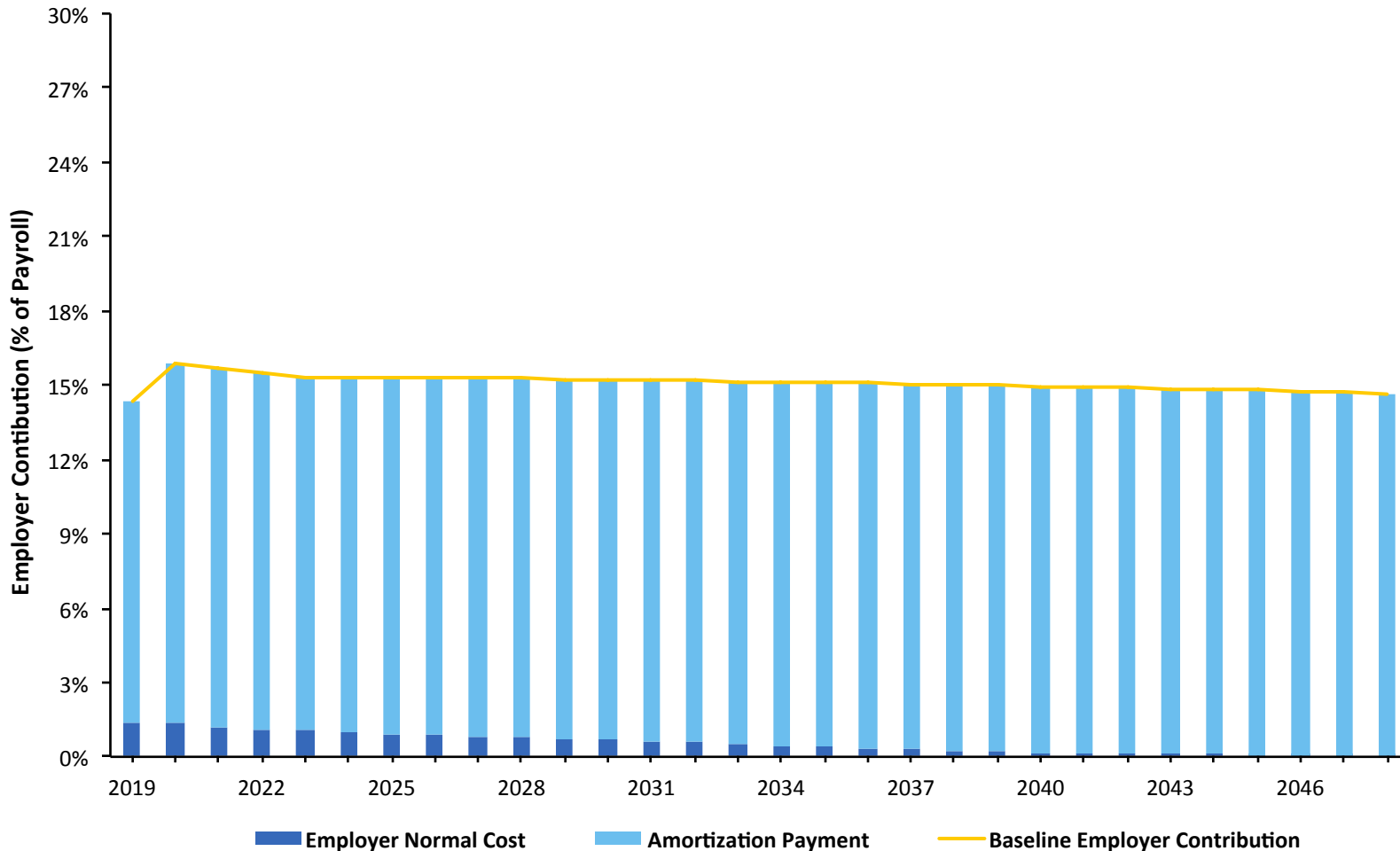


Source: Reason Foundation analysis of SCRS & PORS actuarial valuation reports, State of South Carolina CAFRs.

SCRS Employer Contribution Forecast (as % of Payroll)

Baseline: Normal Cost + Amortization Payment

Discount Rate 7.5%, Assumed Return 7.5%, Actual Return 7.5%, Amo. Schedule: **OPEN**

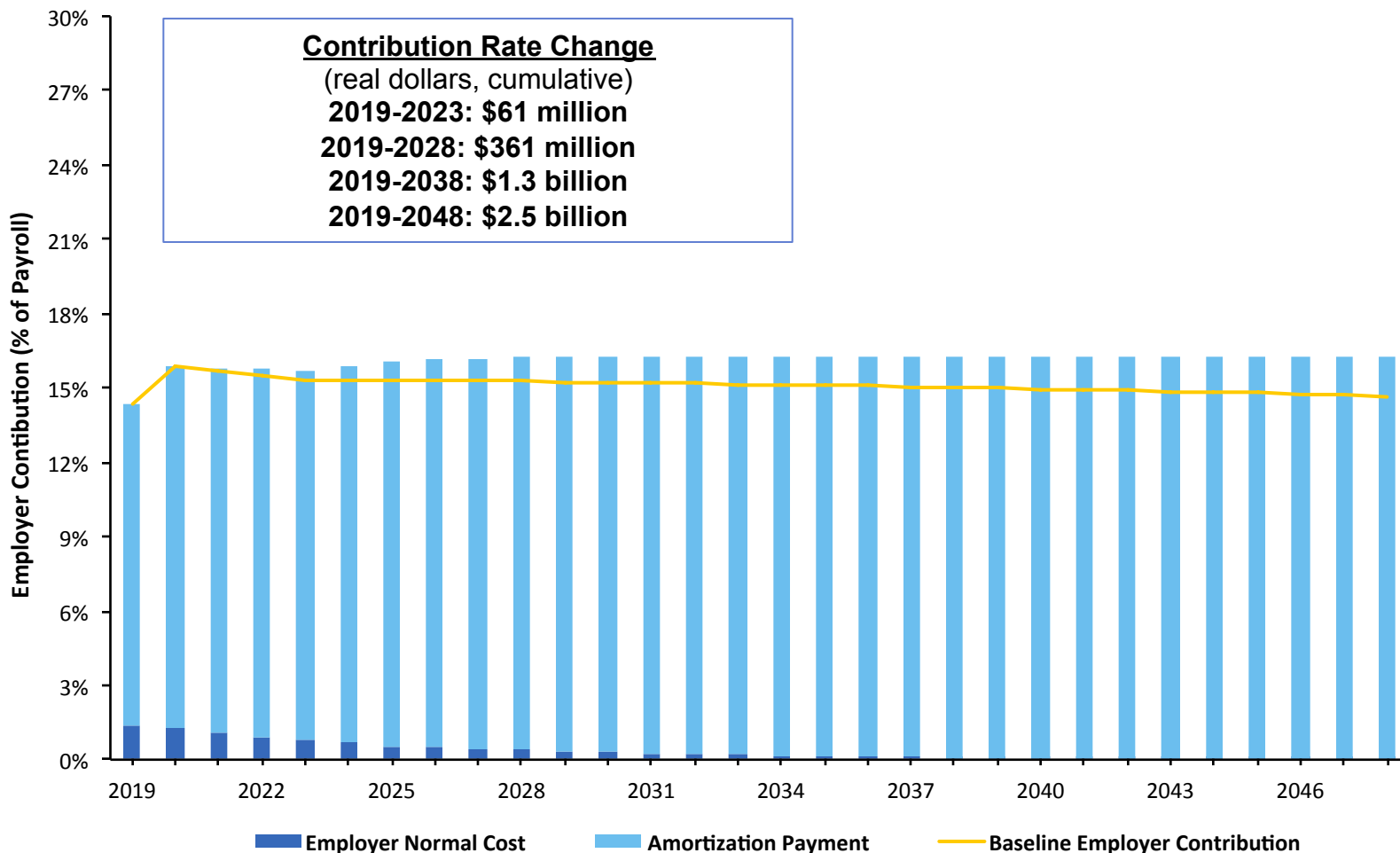


Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates.

SCRS Employer Contribution Forecast (as % of Payroll)

Underperforming Asset Scenario: 5% Returns

Discount Rate 7.5%, Assumed Return 7.5%, Actual Return 5%, Amo. Schedule: **OPEN**



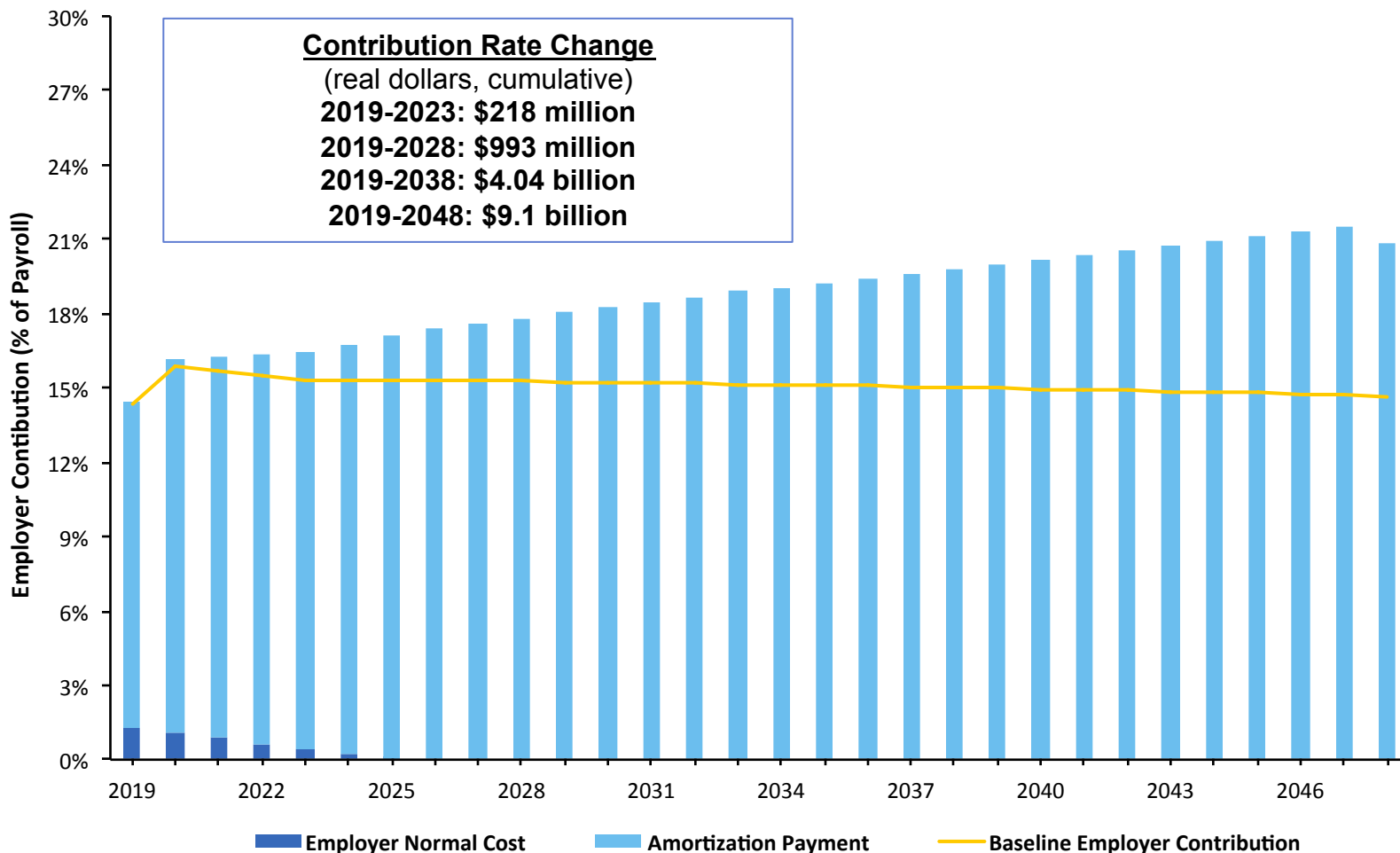
Comment: The actuarially required contribution rate increase from underperforming assets is muted by the open schedule. Most of the added unfunded liabilities are pushed out to future generations by the annual re-amortization process.

Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates.

SCRS Employer Contribution Forecast (as % of Payroll)

Underperforming: 5% Returns + Closed Amo.

Discount Rate 7.5%, Assumed Return 7.5%, Actual Return 5%, Amo. Schedule: **CLOSED**

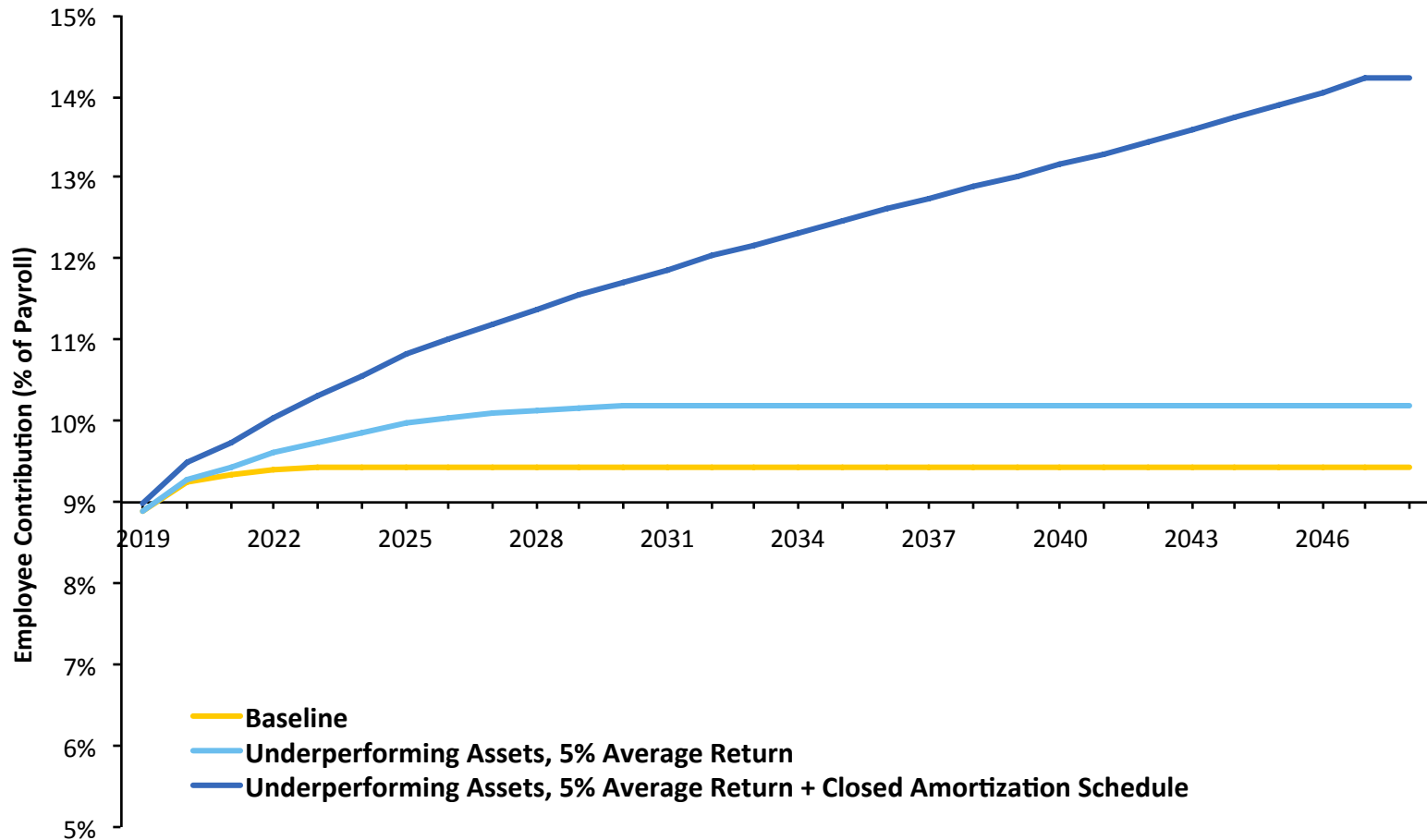


Comment: Looking at a forecast of employer contributions given underperforming assets with a closed amortization schedule more clearly demonstrates what the actuarially required contribution rate increase should be if asset returns average 250 basis points below the assumed return.

Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates.

SCRS Employee Contribution Forecast

Underperforming Scenario Comparison (as % of Payroll)



Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates.

PROBLEM 3: OTHER ACTUARIAL ASSUMPTIONS

- Discount rate undervalues liabilities
- Inflation assumption may understate costs
- Mortality table (RP-2000) may understate costs

Other Actuarial Problems Facing SCRS and PORS



- A. The discount rate used to measure the value of already existing promised pension benefits is based on the overly optimistic assumed return, which is likely leading to an undervalued the reported amount of accrued liabilities.
- B. The inflation assumption (2.75%) may be too high given the Federal Reserve's commitment to 2% inflation. If so, this would suggest the normal cost for the plan is underpriced.
- C. The mortality tables used were published 15 years ago, and though SCRS does use a projected scale, SCRS does not appear to be projecting improvements in life expectancy for males. The result is that normal cost for the plan might be underpriced.



SCRS & PORS Discount Rate Methodology is Undervaluing Liabilities

1. The “discount rate” for a public pension plan should reflect the risk inherent in the pension plan’s liabilities:

- Most public sector pension plans – including South Carolina — use the assumed rate of return and discount rate interchangeably, even though each serve a different purpose.
- The **Assumed Rate of Return** (ARR) adopted by the board estimates what the plan will return on average in the long run. ARR is used to determine how much should be contributed to the plan each year to ensure that promised benefits are paid in full. The rate usually combines the real rate of return and assumed rate of inflation.
- Conversely, the **Discount Rate** (DR) is used to determine the net present value of all already promised pension benefits. Discount rate is supposed to reflect the risks of the liabilities— i.e. the risk that the plan sponsor will not be able to pay the promised pensions. As such, a discount rate represents the combination of a so-called “risk-free interest rate” plus a risk premium associated with the particular plan’s employers.

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SCRS & PORS Discount Rate Methodology is Undervaluing Liabilities

2. Setting a discount rate too high will lead to undervaluing the amount of pension benefits actually promised:

- All else equal, the higher the discount rate used by a pension plan, the lower will be the reported value of accrued liabilities (promised pension benefits). Conversely, the lower the discount rate used, the higher will be the reported value of accrued liabilities.
- Thus, in general, the use of a “high” discount rate undervalues the actual amount of pension benefits that has been promised.
- If a pension plan is choosing to target a high rate of return with its portfolio of assets, and that high assumed return is then used to calculate the value of existing promised benefits, the result will likely be that the actuarially recognized amount of accrued liabilities is undervalued.

Continued...



SCRS & PORS Discount Rate Methodology is Undervaluing Liabilities

- 3. It is reasonable to conclude that there is almost no risk that South Carolina would not pay out all retirement benefits promised to members and retirees.**
 - South Carolina law is clear that vested benefits are protected insofar as statutes include “significant contractual language.”
 - Moreover, the General Assembly is required to appropriate all necessary funds for all state pension plans.

- 4. The discount rate used to account for this minimal risk should be appropriately low.**
 - The higher the discount rate used by a pension plan, the higher the implied assumption of risk for the pension obligations.

SCRS & PORS Discount Rate Methodology is Undervaluing Liabilities

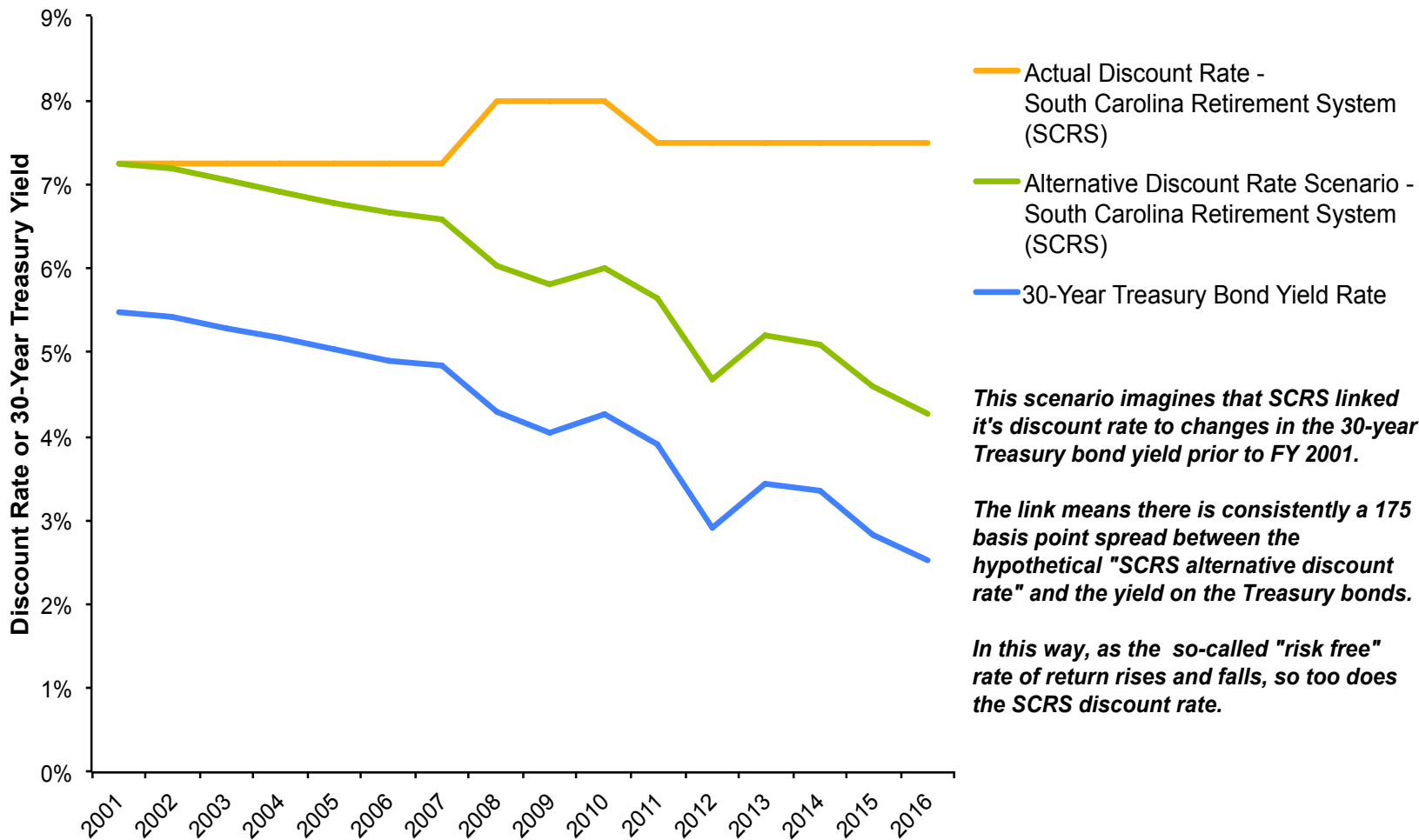


- 5. In 2001, the yield on 30-year Treasury bonds was about 5.5%, and SCRS and PORS discount rate was 7.25%.**
 - This implies that both SCRS and PORS were pricing the risk that the state would not be able to fully pay promised pension benefits at about 1.75% (175 basis points) above a 'risk-free' rate of return.
 - As a point of reference, **if SCRS had used a 5.5% “risk free” rate in 2001, its report funded ratio (on actuarial value basis) would have been closer to 70% than 87.4%.**

- 6. Over the past 15 years as the yield on Treasury bonds has substantially changed, the discount rate has not been modified accordingly.**
 - If SCRS and PORS pegged their discount rate to the yield on 30-year Treasury bonds, it would be about **4.3% today (2016).**



Comparing Change in Discount Rate to the Change in Risk Free Rate, 2001-2016



SCRS & PORS Discount Rate Methodology is Undervaluing Liabilities



7. Using an inaccurate discount rate has resulted in a systematic undervaluing of pension liabilities.

Better discount rate practice options:

- The best measure of SCRS's risk would be the yield on South Carolina's general obligation bonds.
- Alternatively, the plan could pick a certain risk premium amount -- such as 1% or 2% -- and add this to a "risk free rate of return" such as the a 30-year Treasury Bond.
- At a minimum, the discount rate should be reduced as risk free rates of return – i.e. Treasury bills or 30-year Treasury Bonds – decline.

SCRS Total Unfunded Liability, 2015

Debt Level Sensitivity to the Discount Rate (Market Value)



	Funded Ratio (Market Value)	Unfunded Liabilities	Accrued Liabilities
7.50% Discount Rate (Current Baseline)	57%	\$19 billion	\$44 billion
6% Discount Rate	49%	\$26 billion	\$52 billion
5% Discount Rate	44%	\$32 billion	\$57 billion
4% Discount Rate	40%	\$38 billion	\$63 billion

Source: Reason Foundation analysis of SCRS actuarial valuations and CAFRs; figures shown are rounded.

LOOKING TO THE FUTURE: REFORM POLICY DESIGN CONSIDERATIONS

Summary: South Carolina's Pension Future Is Only Going to Get Worse

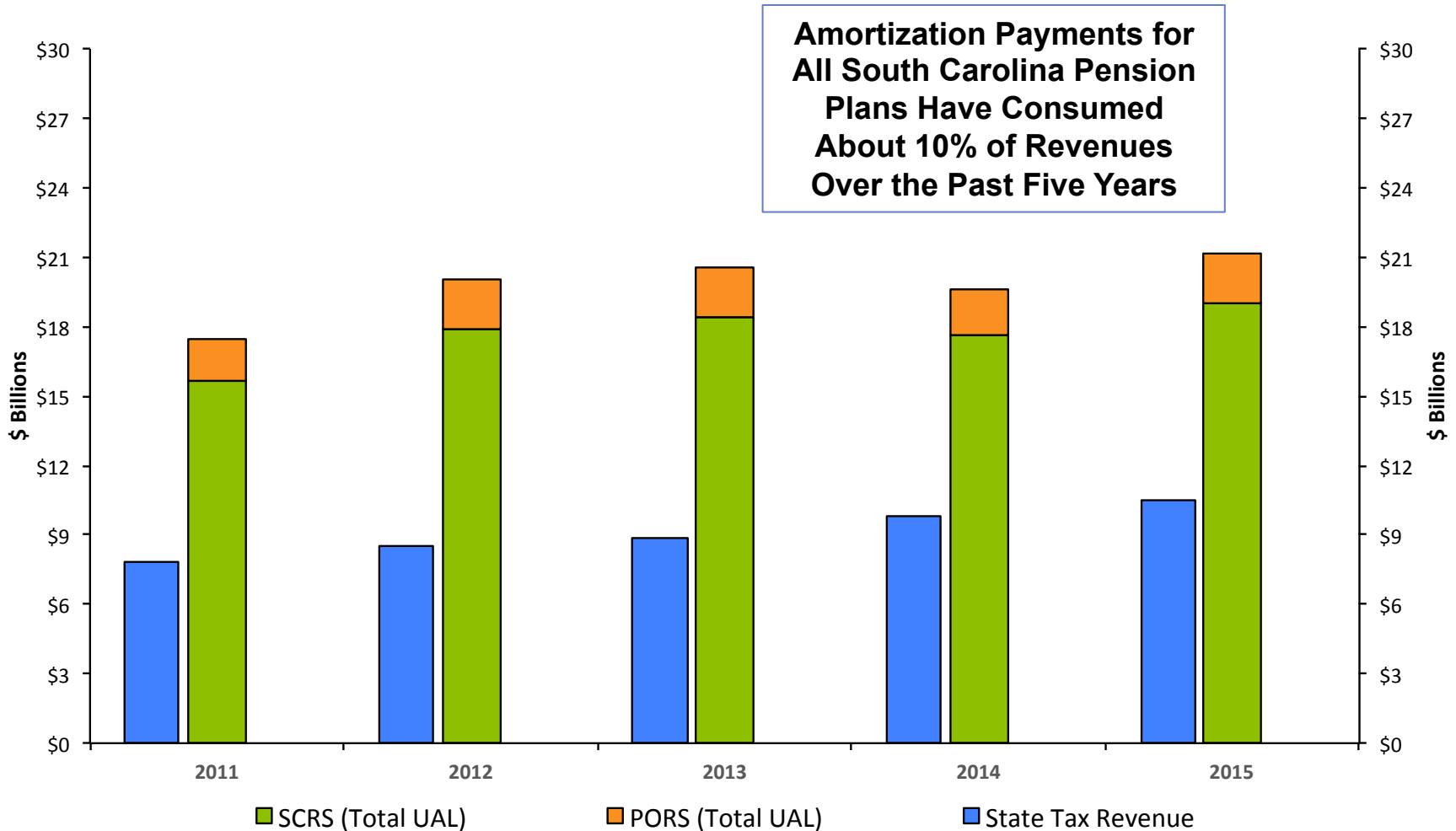


1. The Open, 30-year Amortization Method has undermined the solvency of the plan by allowing pension debt to grow in absolute terms on an annual basis.
 - For SCRS this will continue to be a problem in perpetuity.
2. The Assumed Rate of Return used by all plans is exposing taxpayers to a range of significant risks.
 - Investment returns have underperformed for more than a decade and the assumed return does not reflect the “new normal” for financial markets. Plus, the low assumed rate of return means the “normal cost” for benefits is likely being significantly underpriced.
3. Other Actuarial Assumptions expose taxpayers to even further risk of growing unfunded liabilities
 - The discount rate has not adjusted enough over time as risk-free rates of return (e.g. the Treasury yield curve) have declined; this suggests the liabilities of the plan may be undervalued. The inflation assumption of 2.75% and RP-2000 mortality table may be understating actual long-term costs.



SCRS & PORS Total Unfunded Liability, 2011-2015

Unfunded Liabilities as a Share of Tax Revenue



Source: SCRS & PORS actuarial valuation reports, State of South Carolina CAFRs.



The Risks of Inaction

1. Rising employer contribution rates result in more money flowing to pensions, leading to:
 - Crowd out of public services;
 - New tax or debt issuance proposals;
 - Service-level insolvency.
2. Rising employee contribution rates make it more difficult to hire or retain public sector workers.
3. Open amortization schedule exposes pension systems to insolvency in the long-run.
4. Combined, the challenges lead to volatility in both employer and employee contribution rates, making it challenging to plan for future budgets.



Objectives of Good Reform

- Provide retirement security for all employees, current and future
- Stabilize contribution rates for the long-term
- Reduce taxpayer and pension system exposure to financial risk and market volatility
- Reduce long-term costs for employers/taxpayers and employees
- Ensure ability to recruit 21st Century employees
- Improve governance
 - Expert driven governance
 - Improve efficiency and create consistency for employers

DEFINED BENEFIT PLAN: 1. FUNDING POLICY REFORM



Policy Reform Scenario

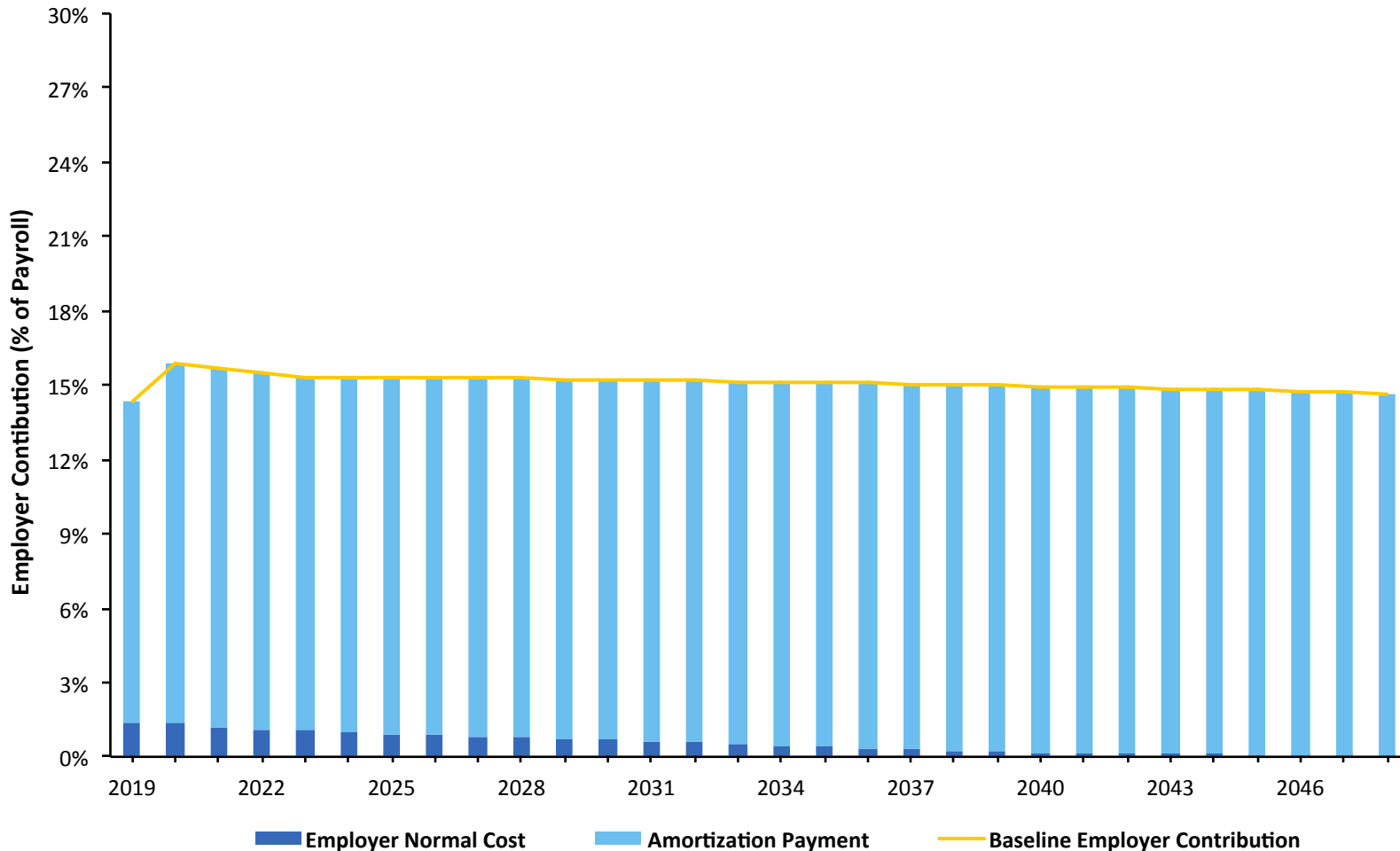
Funding Policy Reform Ideas

1. Close the amortization schedule
 - Could use a layered bases approach instead of a fixed end date
 - Should consider using 15 to 20 years for bases
2. Lower the assumed rate of return & discount rate
 - Could create a tapered down schedule that lowers the maximum assumed rate of return by 25 to 50 basis points a year
 - Could put in place asset allocation ranges for certain asset classes, such as requiring a minimum of 40% of assets in bonds, and a maximum of 5% in alternatives
3. Establish a schedule for increasing the minimum contribution rate floor by 25 to 50 basis points annually until 100% funded
 - Could define “100% funded” as based on a lower discount rate, such as one derived from an assumed return that is based on an asset allocation of 80% bonds, 20% equities
4. Review current actuarial assumptions with an eye towards adopting more conservative assumptions that will reduce risk

SCRS Employer Contribution Forecast (as % of Payroll)

Baseline: Normal Cost + Amortization Payment

Discount Rate 7.5%, Assumed Return 7.5%, Actual Return 7.5%, Amo. Schedule: **OPEN**

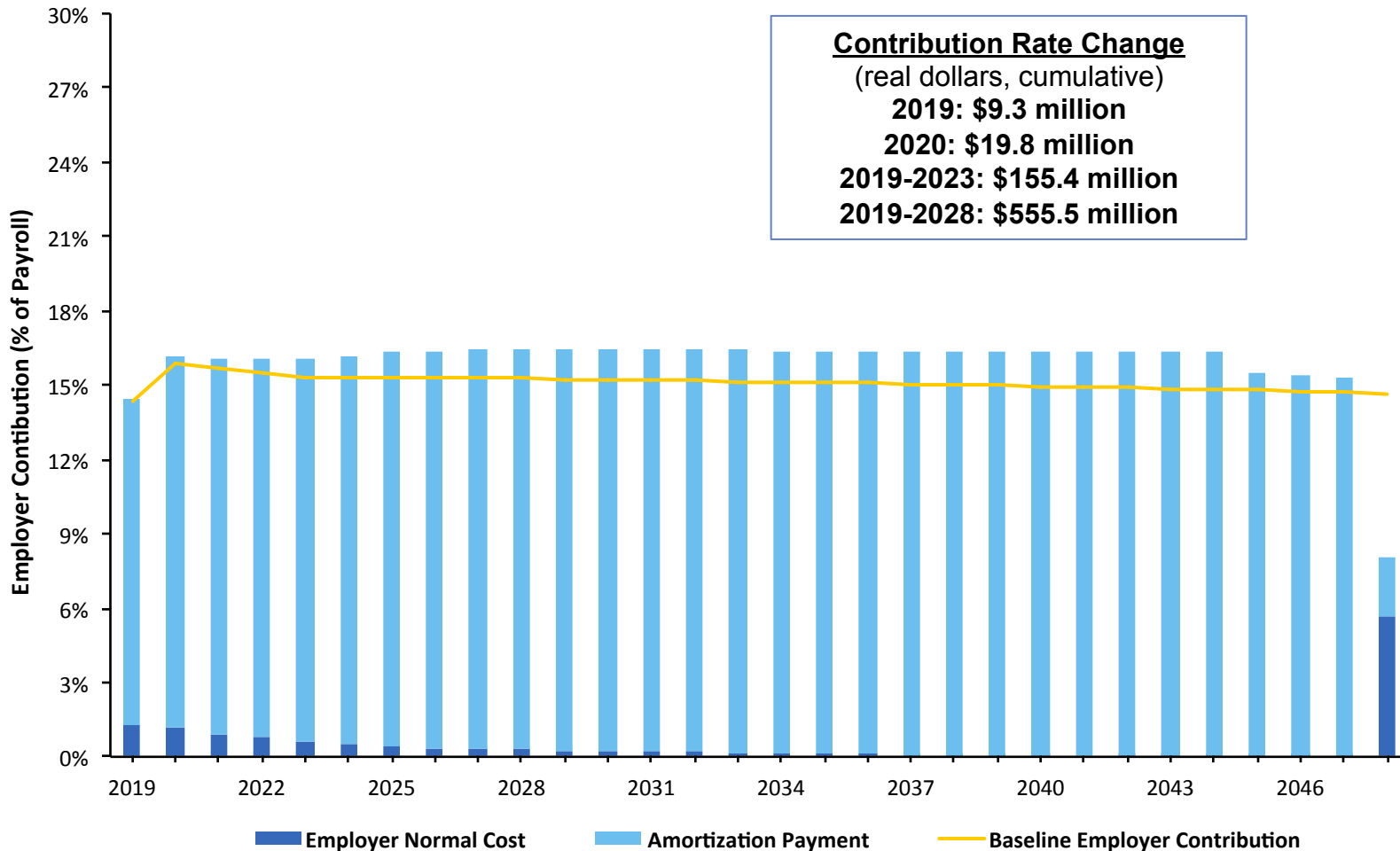


Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates.

SCRS Employer Contribution Forecast (as % of Payroll)

Close the Amortization Schedule (30-Years)

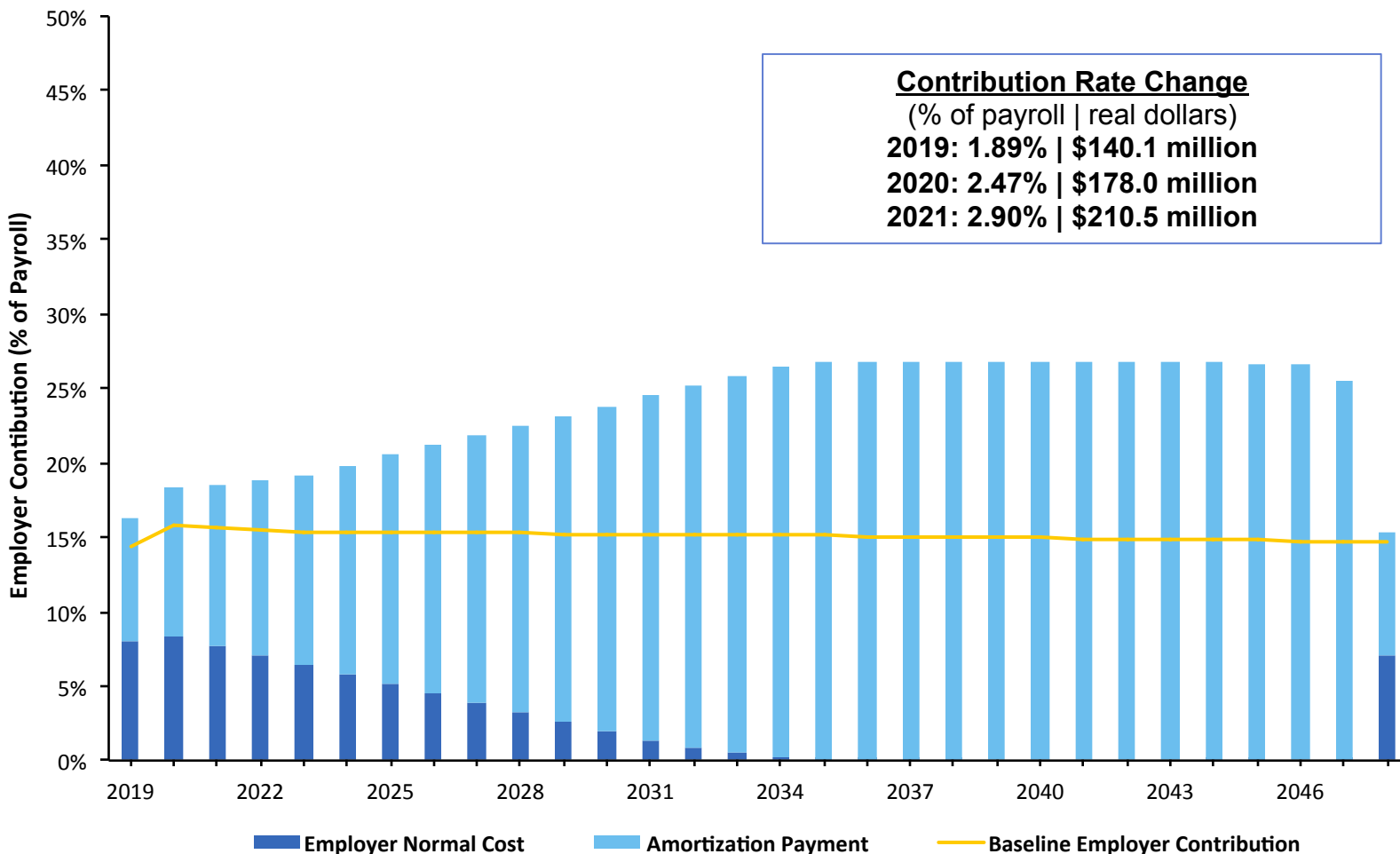
Discount Rate 7.5%, Assumed Return 7.5%, Actual Return 7.5%, Amo. Schedule: **CLOSED**



Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates.

SCRS Employer Contribution Forecast (as % of Payroll) Closed Schedule + 5% Assumed Return

Discount Rate 5%, Assumed Return 5%, Actual Return 5%, Amo. Schedule: **CLOSED**



Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates.

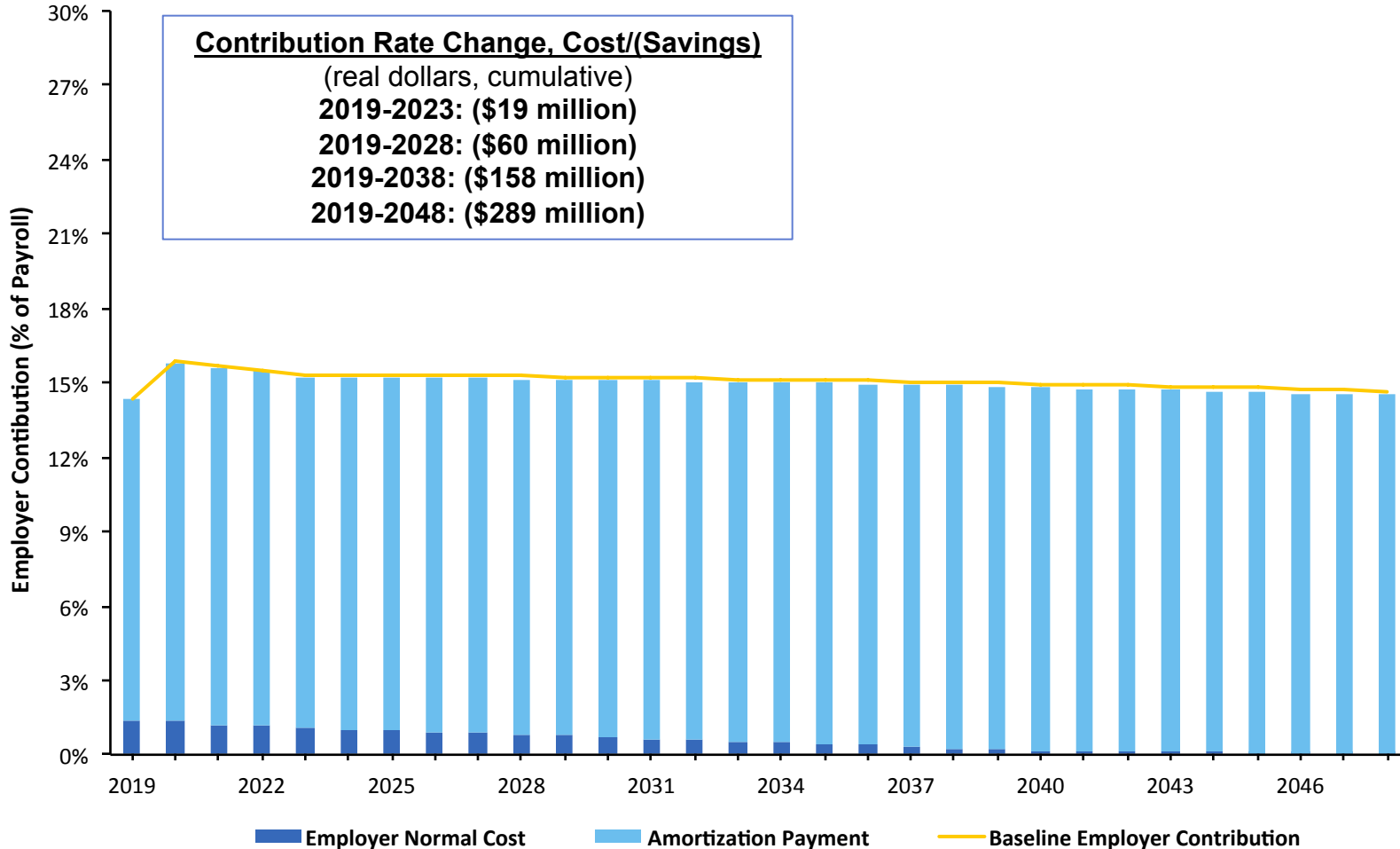
DEFINED BENEFIT PLAN:

2. COLAs

- The state *could* consider freezing COLAs until the plan reaches a certain funding level
- We find that this would have a marginal, but not meaningful, influence on pension contribution rates
- The 2012 reform effort likely addressed most of the COLA related challenges to plan solvency

SCRS Employer Contribution Forecast (as % of Payroll) Baseline with No COLAs + Open Schedule

Discount Rate 7.5%, Assumed Return 7.5%, Actual Return 7.5%, Amo. Schedule: **OPEN**



Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates.

Analysis: Freezing or Eliminating COLAs Would Not Yield Significant Employer Savings



1. After Act 278, guaranteed COLAs were capped at 1% or \$500 annually, meaning eliminating COLAs (or freezing them) has only a marginal capacity to produce savings for the employer.
2. At the same time, eliminating COLAs may undermine retirement security for members.

PROSPECTIVE STRUCTURAL PENSION REFORM

South Carolina Retirement System



Policy Reform Scenario

Prospective Structural Reform Options

- Modify defined benefit (DB) plan benefits
- Defined Contribution (DC) Only plan
- DB / DC Hybrid
 - Example:
 - 1% multiplier for the DB, with normal cost split 50/50
 - 3% DC employer contribution rate
 - 3% or more DC employee contribution rate
- Cash Balance (CB) plan
 - Example:
 - Employee and Employer made defined contributions to the CB plan
 - Employer guarantees at least 4% investment return on contributions
 - Employer/employee share all investment returns above 4% (such as 75% of surplus gains to employee, 25% to employer to fund the plan)



SCRS Policy Reform Scenario

Two Example Options Modeled

1. **DB / DC Hybrid Plan: “Hybrid Plan”**
 - New hires would be placed into a new defined benefit tier that offers a 1% multiplier for the DB, with normal cost split 50/50.
 - New hires would also have a DC account created with a 1% employer contribution into individual retirement accounts.
 - Employees would contribute 2.3% of payroll to the DB (half of the DB plan’s normal cost), plus a 5% contribution to their own DC plan.

2. **Defined Contribution Only Plan: “DC Plan”**
 - All new hires would be put into a DC Only retirement plan with a 3% employer contribution into individual retirement accounts.
 - Employees would make a minimum 3% contribution rate, though they would have the option to make larger contributions.

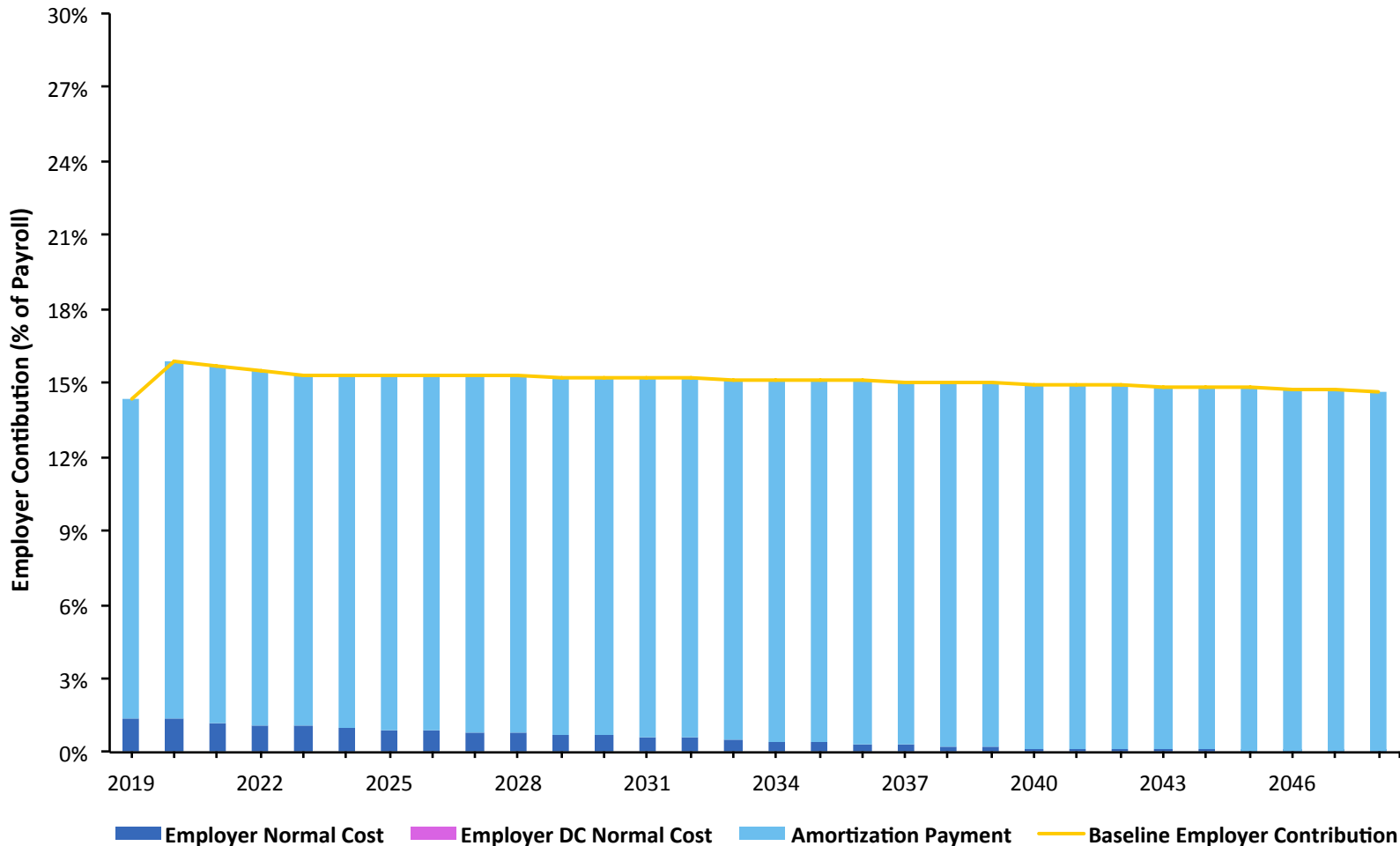
Under both options we assume the following:

- Open 30-year amortization method will be changed to Closed 30-year amortization method.
- Existing liabilities would be amortized over the total payroll, similar to the existing amortization schedule.

SCRS Employer Contribution Forecast (as % of Payroll)

Baseline: Normal Cost + Amortization Payment

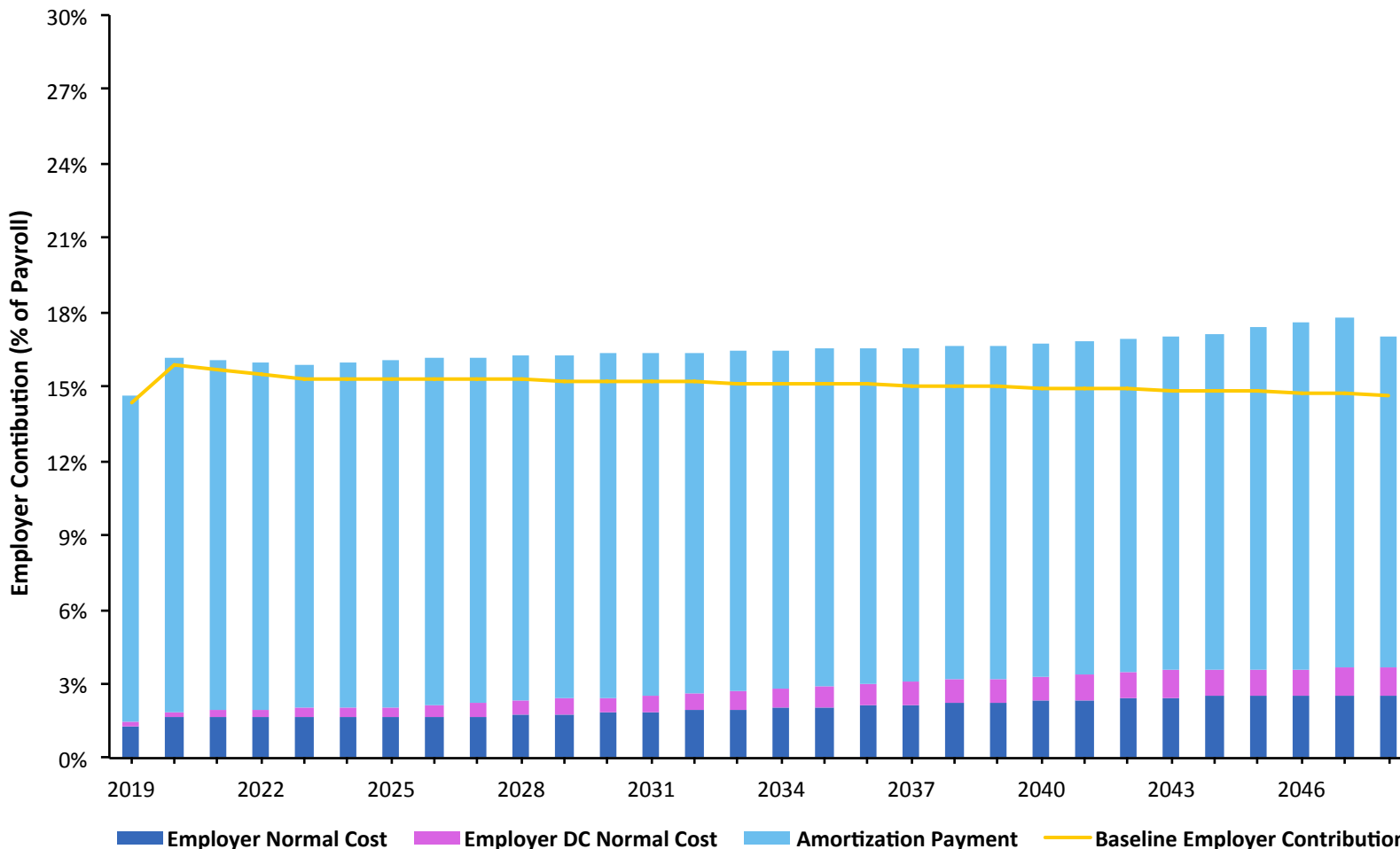
Discount Rate 7.5%, Assumed Return 7.5%, Actual Return 7.5%, Amo. Schedule: **OPEN**



Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates.

SCRS Employer Contribution Forecast (as % of Payroll) Adopt Hybrid Plan + Closed Amortization

Discount Rate 7.5%, Assumed Return 7.5%, Actual Return 7.5%, Amo. Schedule: **CLOSED**

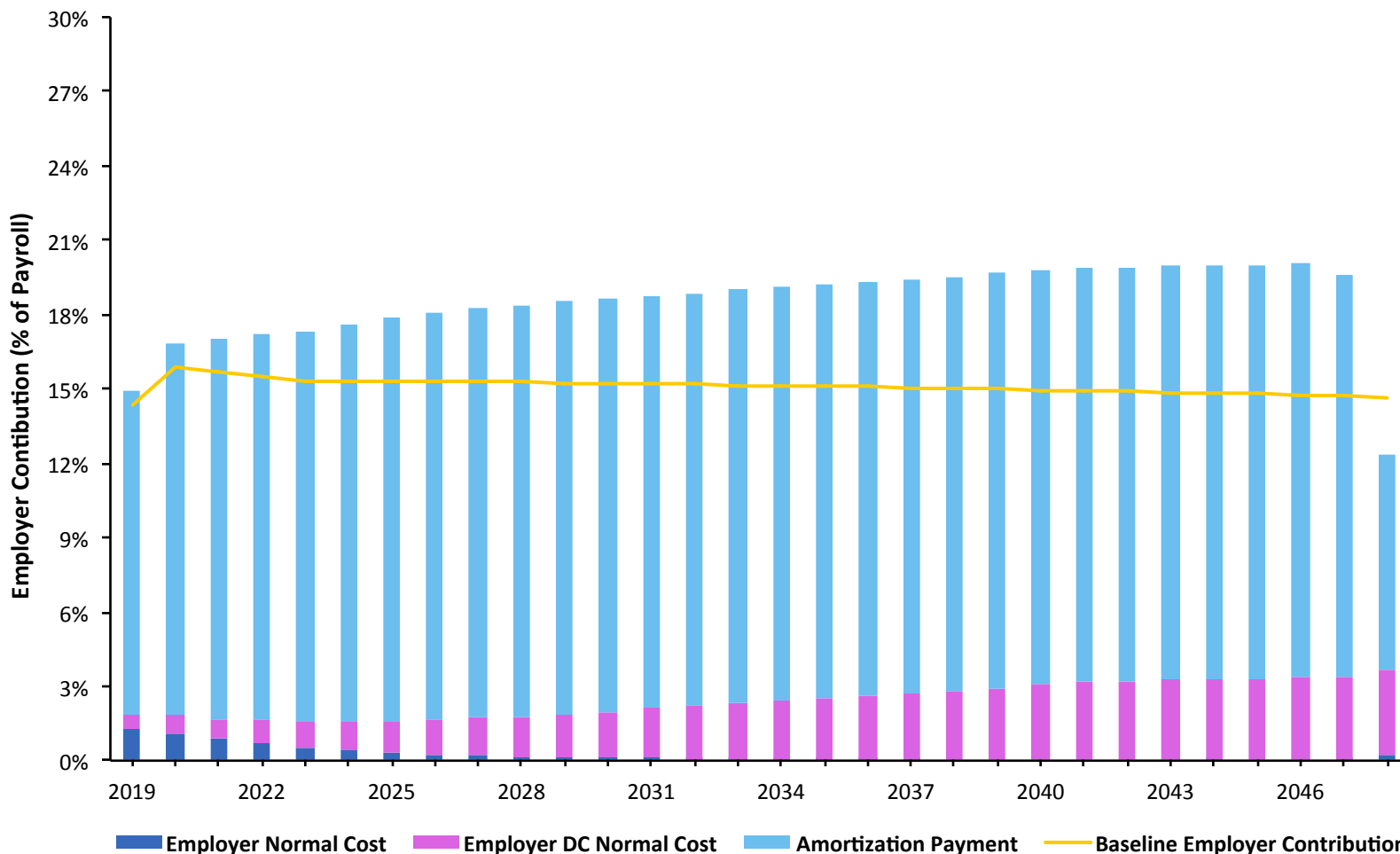


Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates. Scenario assumes a 1% DB multiplier with gross normal cost of 4.68% split 50/50 between the employee and employer; a DC plan with a 1% employer contribution; a closed amortization schedule spread over total payroll; maintaining the existing differential and minimum contribution funding policies.

SCRS Employer Contribution Forecast (as % of Payroll)

Adopt DC Plan + Closed Amortization

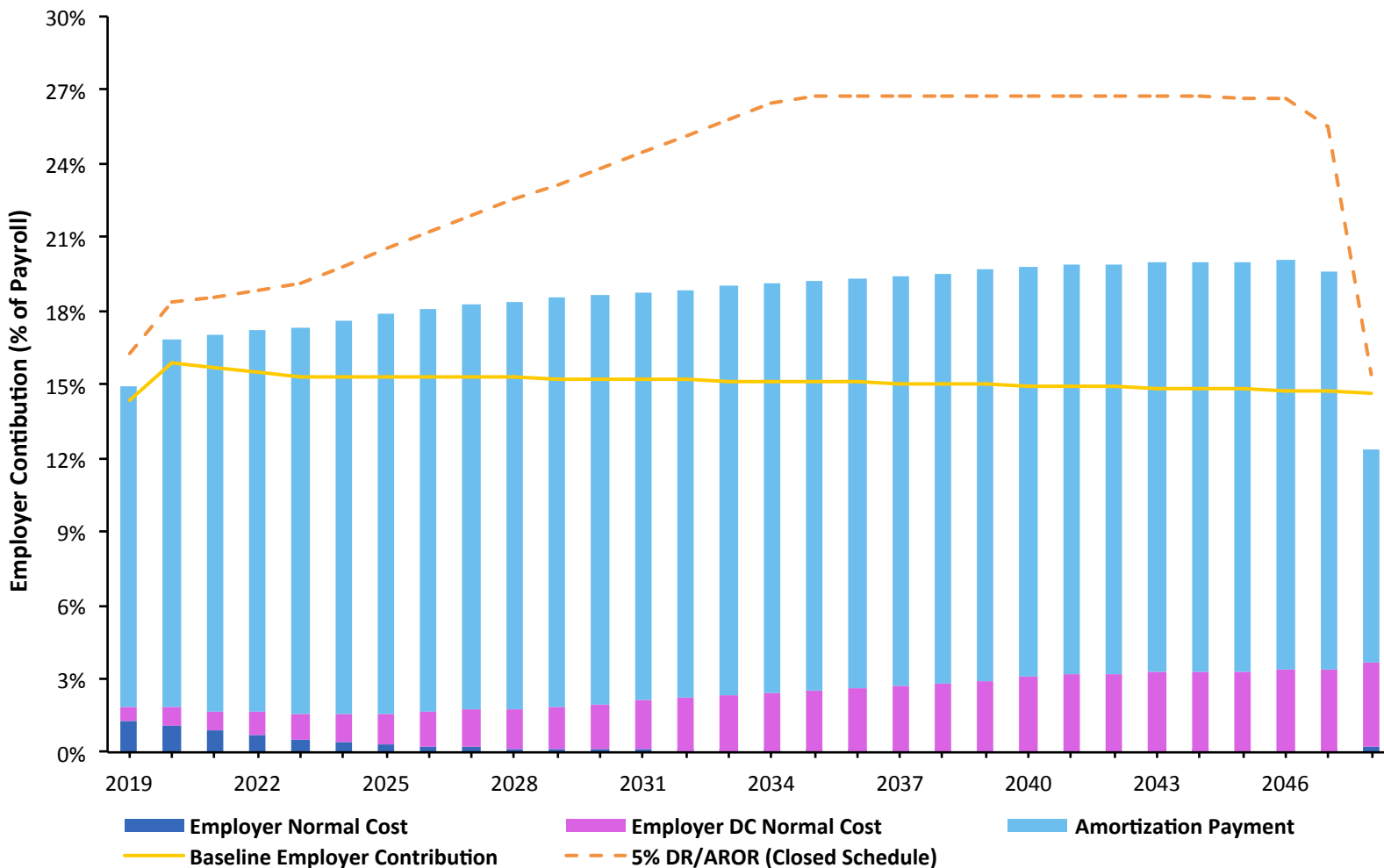
Discount Rate 7.5%, Assumed Return 7.5%, Actual Return 7.5%, Amo. Schedule: **CLOSED**



Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates. Scenario assumes a DC plan with a 3% employer contribution; a closed amortization schedule spread over total payroll; maintaining the existing differential and minimum contribution funding policies.

SCRS Employer Contribution Forecast (as % of Payroll) DC Plan Forecast Compared to Alt. Baseline

Alternative Baseline (5% Assumed Return, 5% Discount Rate, Closed Schedule)

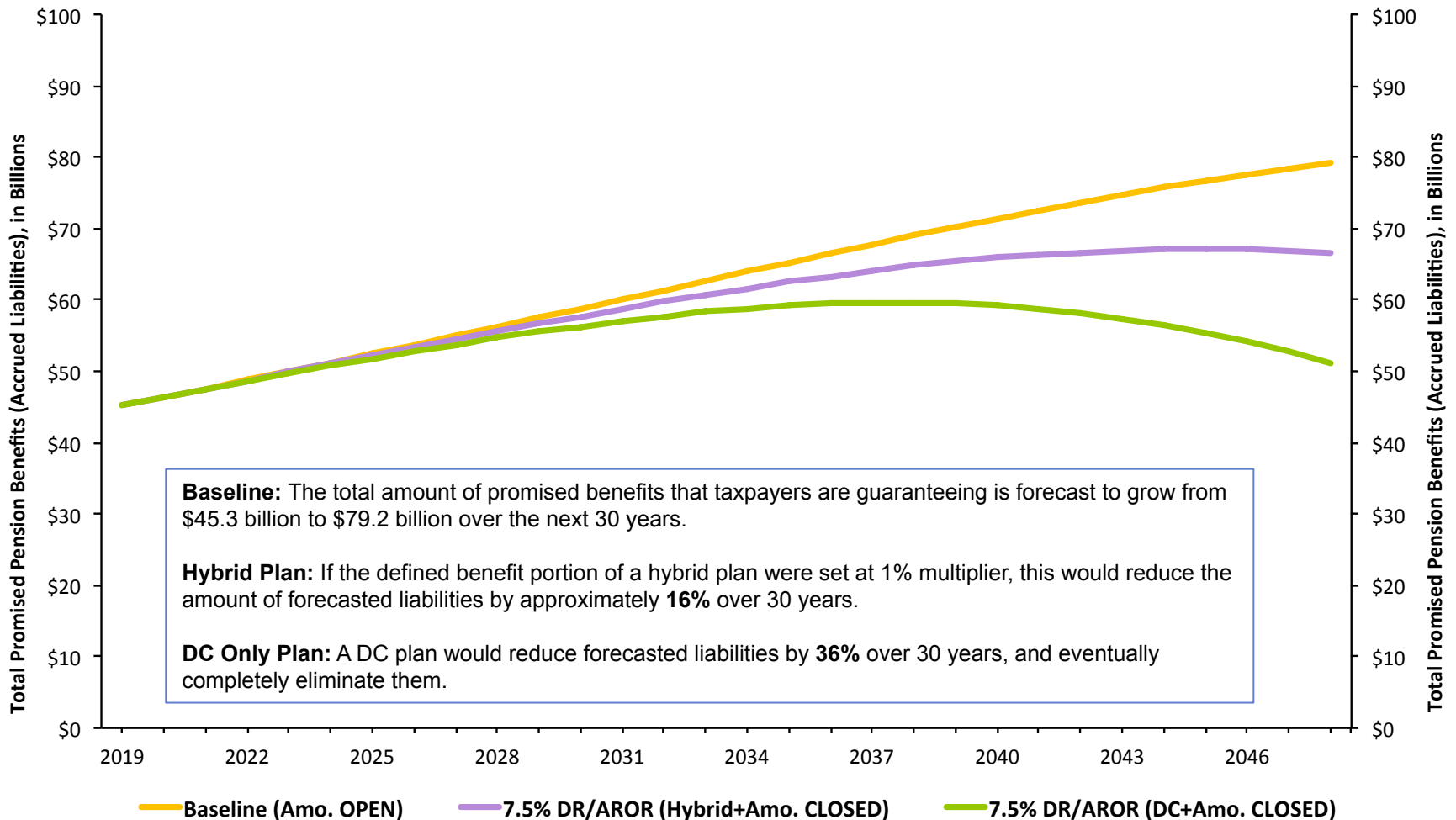


Note: Forecast includes inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates. Scenario assumes a DC plan with a 3% employer contribution; a closed amortization schedule spread over total payroll; maintaining the existing differential and minimum contribution funding policies.



SCRS Actuarial Accrued Liabilities Forecast

Comparative Scenarios



Note: Forecasts include inflation adjusted figures using the plan's inflation assumption. Years shown are contribution fiscal year end dates.



Objectives of Good Reform

- Provide retirement security for all employees, current and future
- Stabilize contribution rates for the long-term
- Reduce taxpayer and pension system exposure to financial risk and market volatility
- Reduce long-term costs for employers/taxpayers and employees
- Ensure ability to recruit 21st Century employees
- Improve governance
 - Expert driven governance
 - Improve efficiency and create consistency for employers



Questions?

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