

ARKANSAS TEACHER RETIREMENT SYSTEM SOLVENCY ANALYSIS

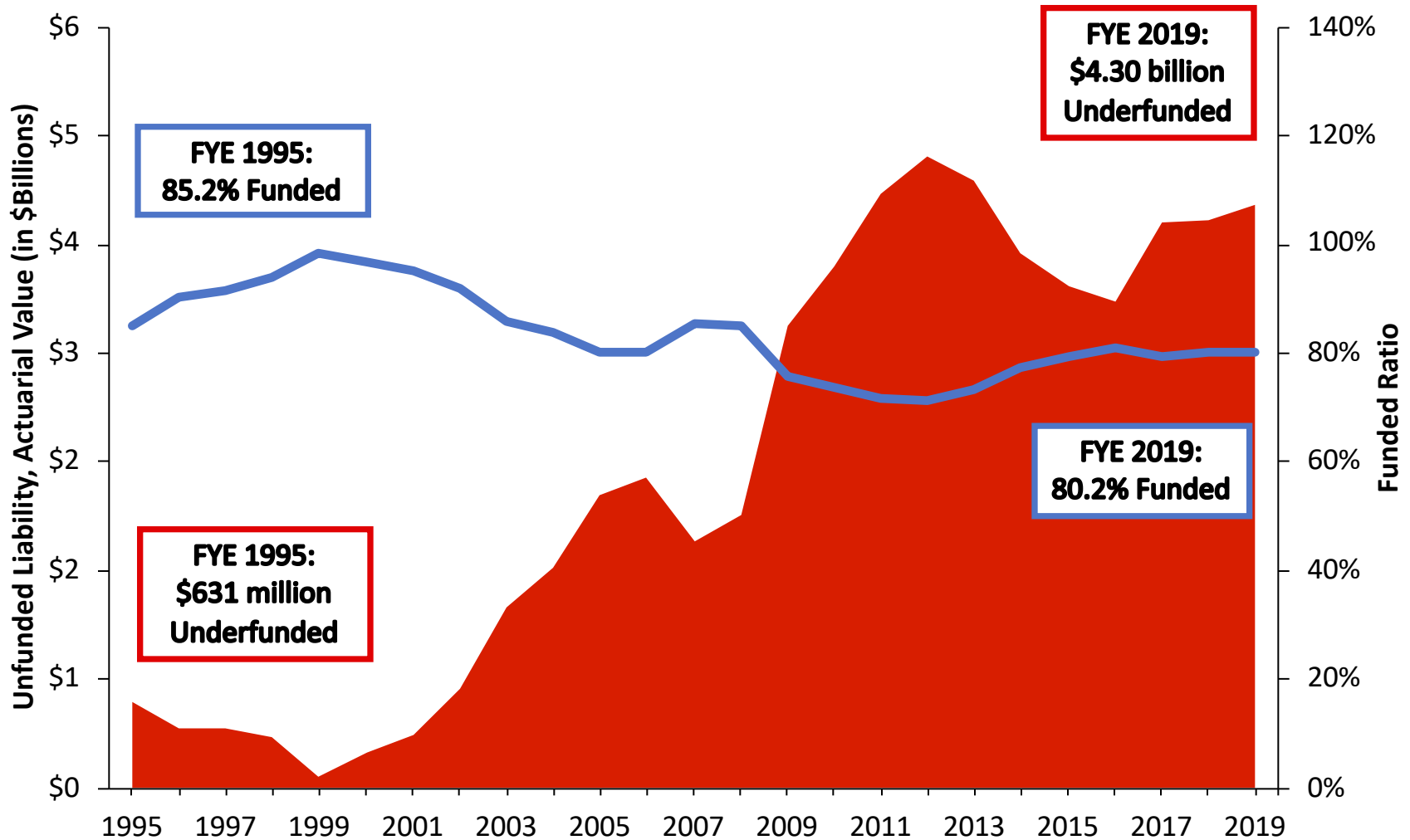
Prepared by:

Pension Integrity Project at Reason Foundation

April 29, 2020 — Working Draft

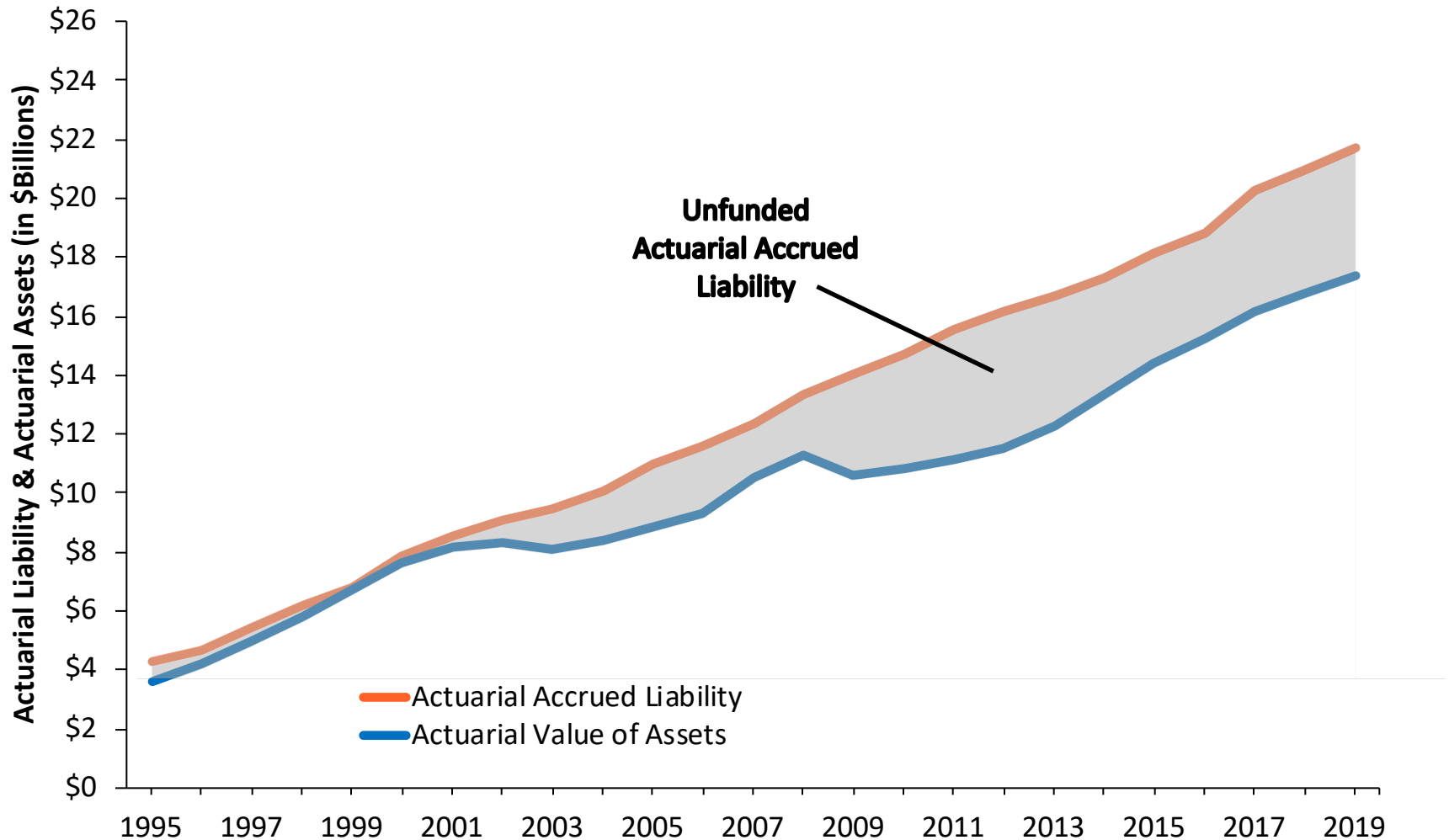


A History of Weakening Solvency (1995-2019)



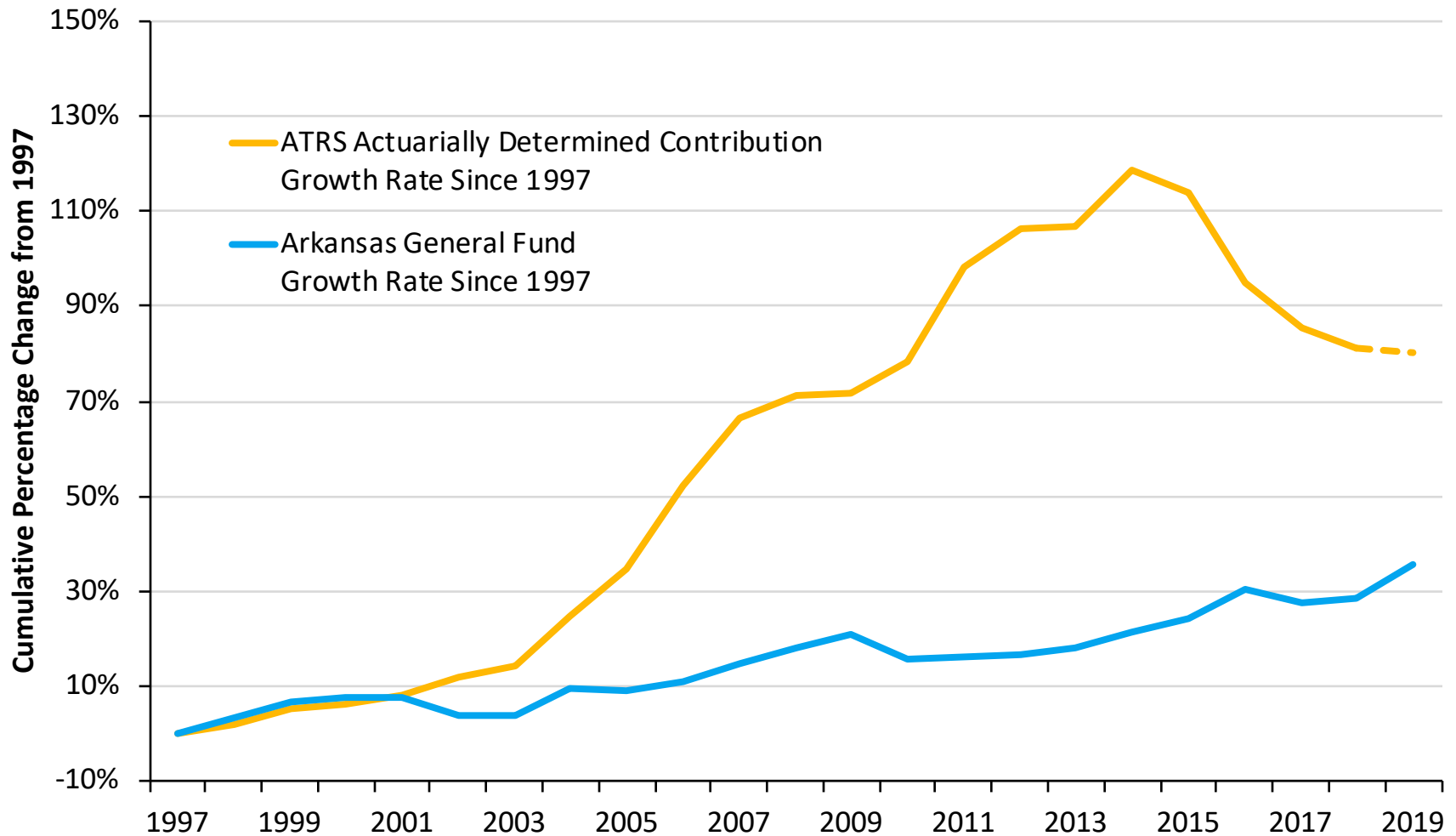
Source: Pension Integrity Project analysis of ATRS actuarial valuation reports through FY2019.

ATRS Liabilities are Growing Faster than Assets



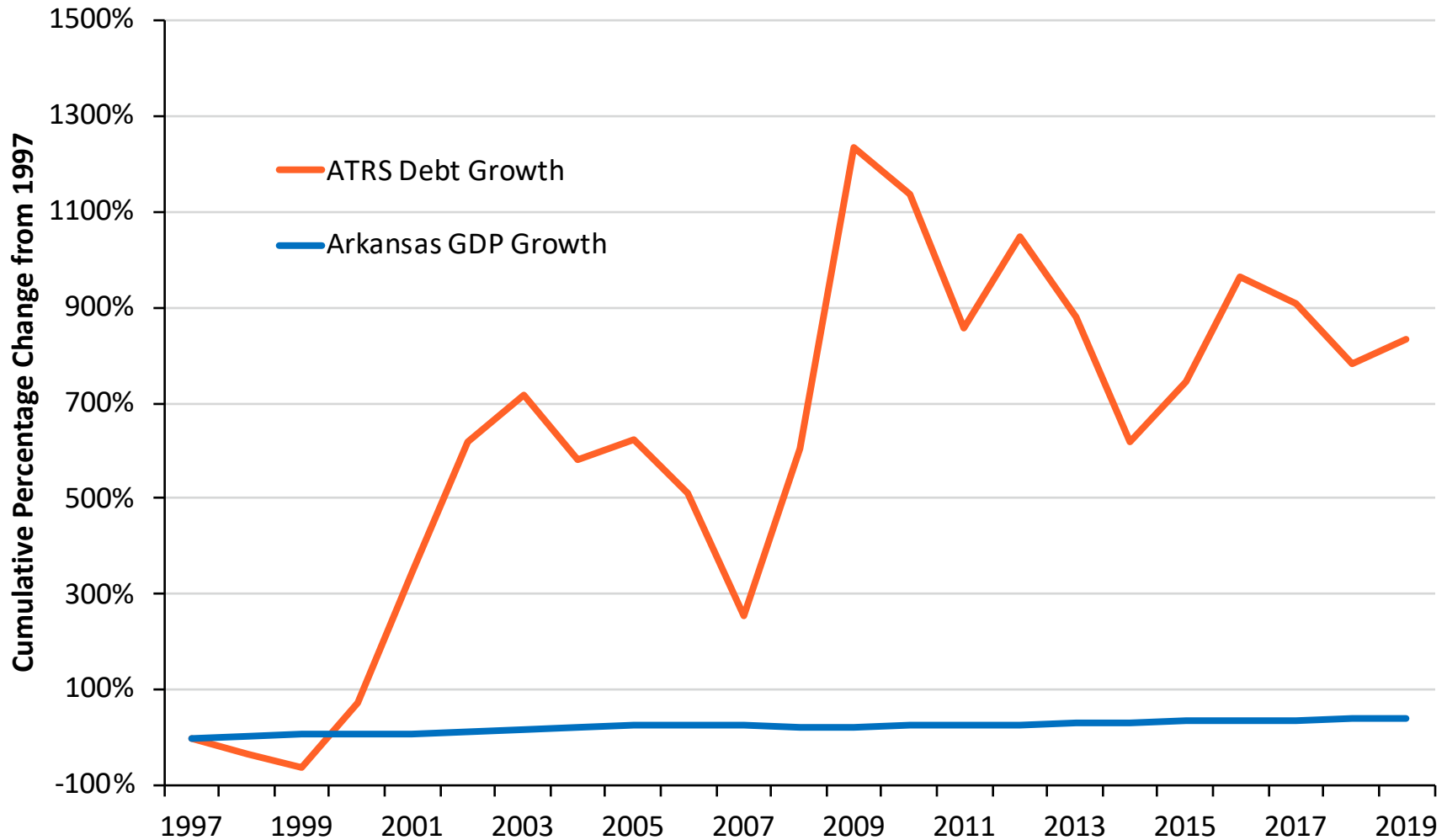
Source: Pension Integrity Project analysis of ATRS actuarial valuation reports through FY2019.

ATRS Costs are Growing Faster than the State Budget



Source: Pension Integrity Project analysis of ATRS actuarial valuation reports and CAFRs, and data from NASBO Fiscal Survey of States. GASB recently changed the definition of Actuarially Required Contribution (ARC) to Actuarially Determined Employer Contribution (ADEC). The latest 2019 ADEC number comes from Author's projection.

ATRS Unfunded Liabilities are Growing Faster than the Arkansas Economy



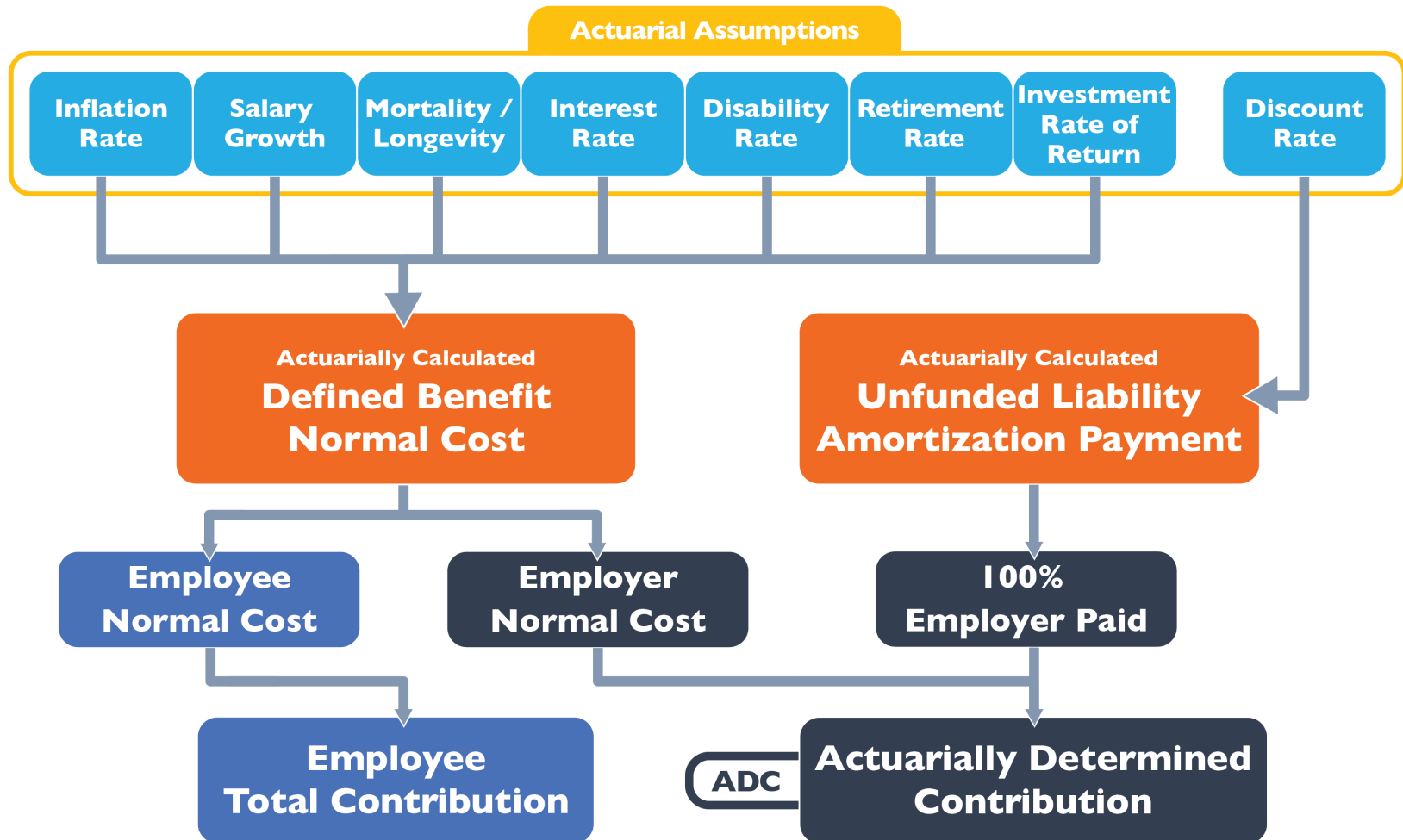
Source: Pension Integrity Project analysis of ATRS actuarial valuation reports and CAFRs, and NASBO Fiscal Survey of States.



CHALLENGES CURRENTLY FACING ATRS



How a Pension Plan is Funded





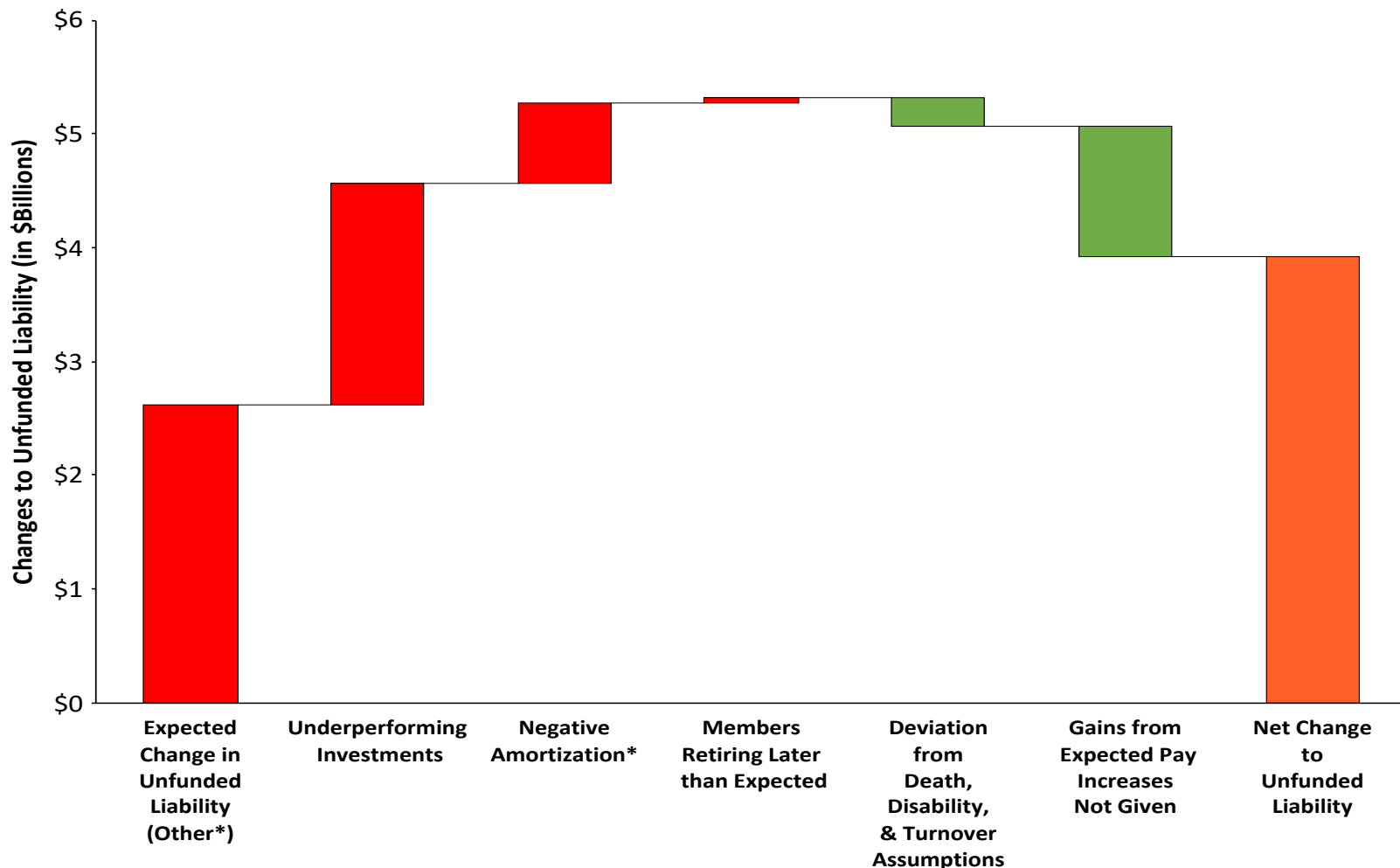
Makeup of ATRS Contributions

	FY2019 Contributions	
	% of Payroll	\$ Value
Employees (Normal Cost)	6.00%	\$141,885,632
Employer (Normal Cost)	6.30%	\$193,889,095
Employer (Debt Amortization)	7.70%	\$236,974,561
Total Employer	14.00%	\$430,864,656

In FY2020, ATRS contribution rates are scheduled to begin increasing in increments of 0.25%, rising to 7% (employee) & 15% (employer) by the end of FY2023.

The Causes of the Pension Debt

Actuarial Experience of ATRS, 2000-2018



Source: Pension Integrity Project analysis of ATRS CAFRs. Data represents cumulative unfunded actuarial liability by gain/loss category. “**Expected Change in Unfunded Liability (Other)**” is an estimate and includes liabilities from new entrants and changes in benefits, assumptions, and methods. “**Negative Amortization**” is an estimate of the difference between interest accrued on the debt and amortization payments.



Driving Factors Behind ATRS Challenges

- 1. Underperforming Investment Returns** have been the largest single contributor to the unfunded liability, adding \$1.94 billion to the unfunded liability from 2000 to 2018.
 - *ATRS' assets have consistently returned less than assumed, leading to growth in unfunded liabilities.*
- 2. Insufficient prefunding** means statutory contributions have fallen short of actuarially determined amounts in some years, adding roughly \$305 million to the unfunded liability from 2011 to 2018, undermining asset growth.
- 3. Historic amortization methods, actuarial changes, and liability experience** resulted in interest on the unfunded liability exceeding amortization payments that added \$717 million, and other components (i.e. "Expected Change in Unfunded Liability") added \$2.62 billion to the unfunded liabilities since 2000.
- 4. Undervaluing Debt** through discounting methods has likely led to the tacit undercalculation of required contributions.



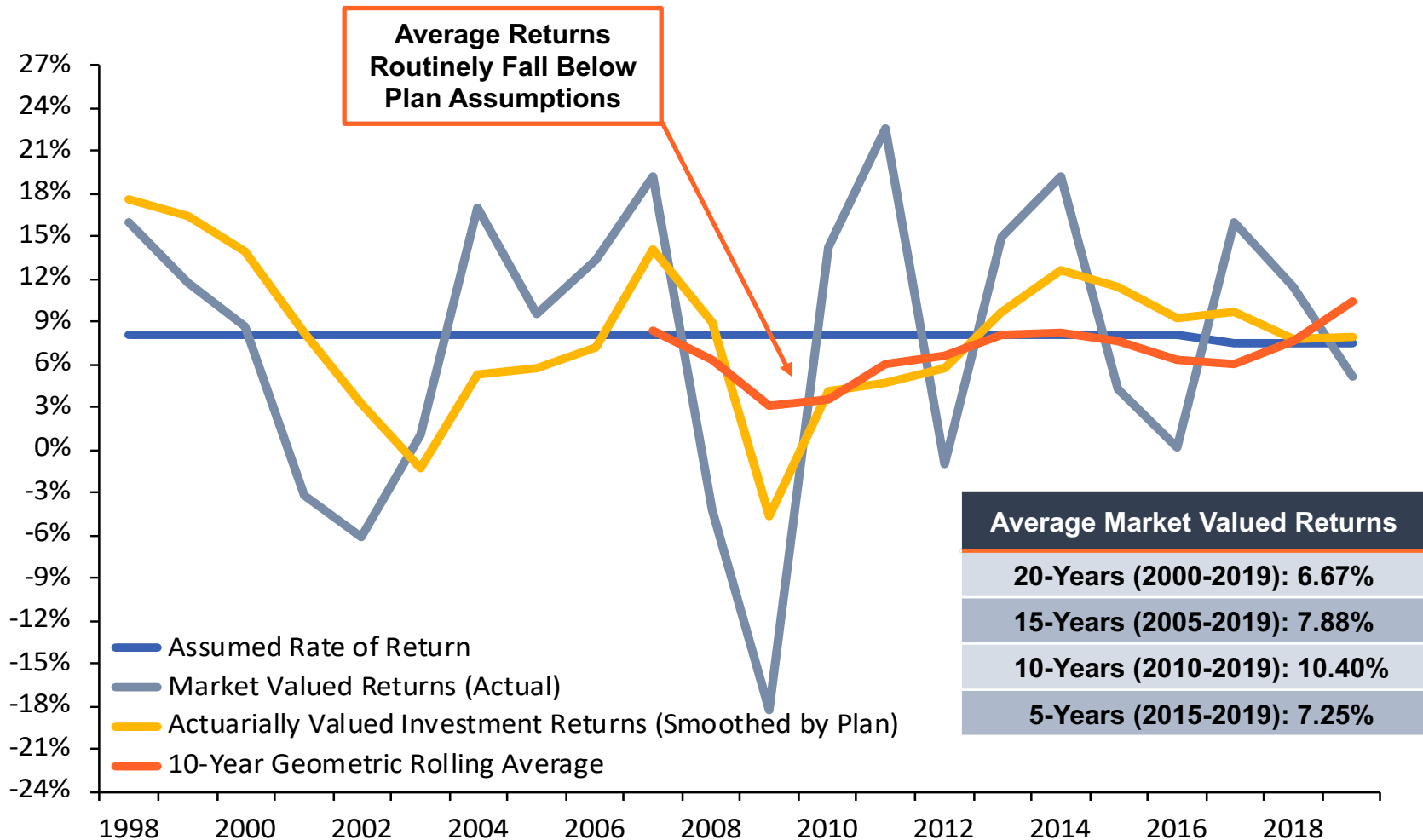
CHALLENGE I: ASSUMED RATE OF RETURN

- **Unrealistic Expectations:** The ATRS assumed return exposes taxpayers to significant investment underperformance risk.
- **Underpricing Contributions:** Using an unrealistic assumed return leads to underpricing benefits and an undercalculated actuarially determined contribution rate.



ATRS Problem: Underperforming Assets

Investment Returns History, 1998-2019



Source: Pension Integrity Project analysis of ATRS valuation reports and CAFRs. The assumed return was 8% between 1998-2016, and lower to 7.5% in 2017.

ATRS Problem: Underperforming Assets

Investment Returns Have Underperformed



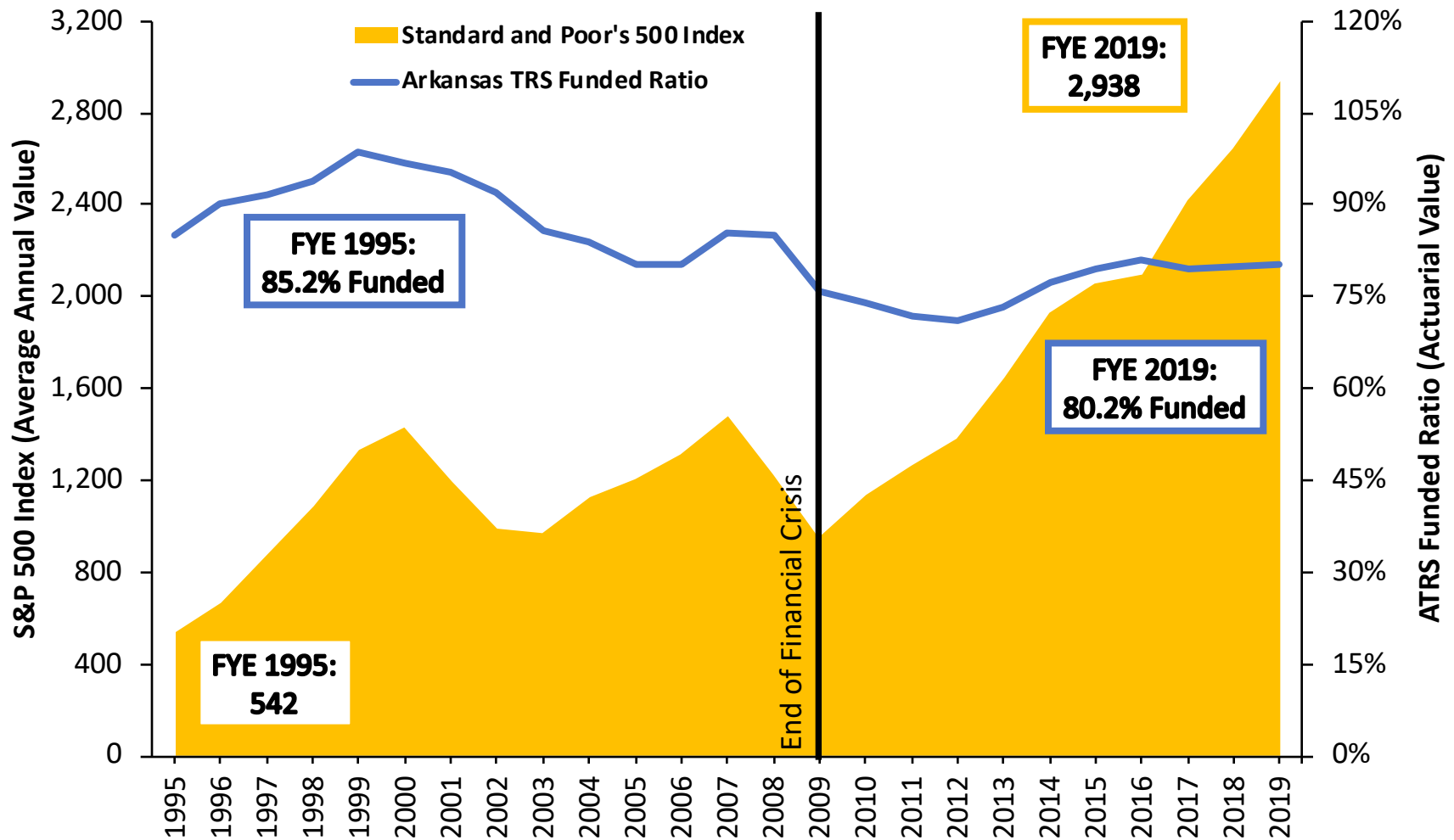
- ATRS actuaries have historically used an 8% assumed rate of return to calculate benefit cost to members and employers despite significant market changes, only lowering the rate to 7.5% in 2018.
- Average long-term portfolio returns have not matched long-term assumptions over different periods of time:

Average Market Valued Returns	Average Actuarially Valued Returns
20-Years (2000-2019): 6.67%	20-Years (2000-2019): 7.06%
15-Years (2005-2019): 7.88%	15-Years (2005-2019): 7.51%
10-Years (2010-2019): 10.40%	10-Years (2010-2019): 8.25%
5-Years (2015-2019): 7.25%	5-Years (2015-2019): 9.20%

Note: past performance is not the best measure of future performance, but it does help provide some context to the problem created by having an excessively high assumed rate of return.



New Normal: Markets Have Recovered Since the Crisis—ATRS’s Funded Ratio Has Not



Source: Pension Integrity Project analysis of ATRS actuarial valuation reports, CAFRs, and Yahoo Finance data.



New Normal: The Market Has Changed

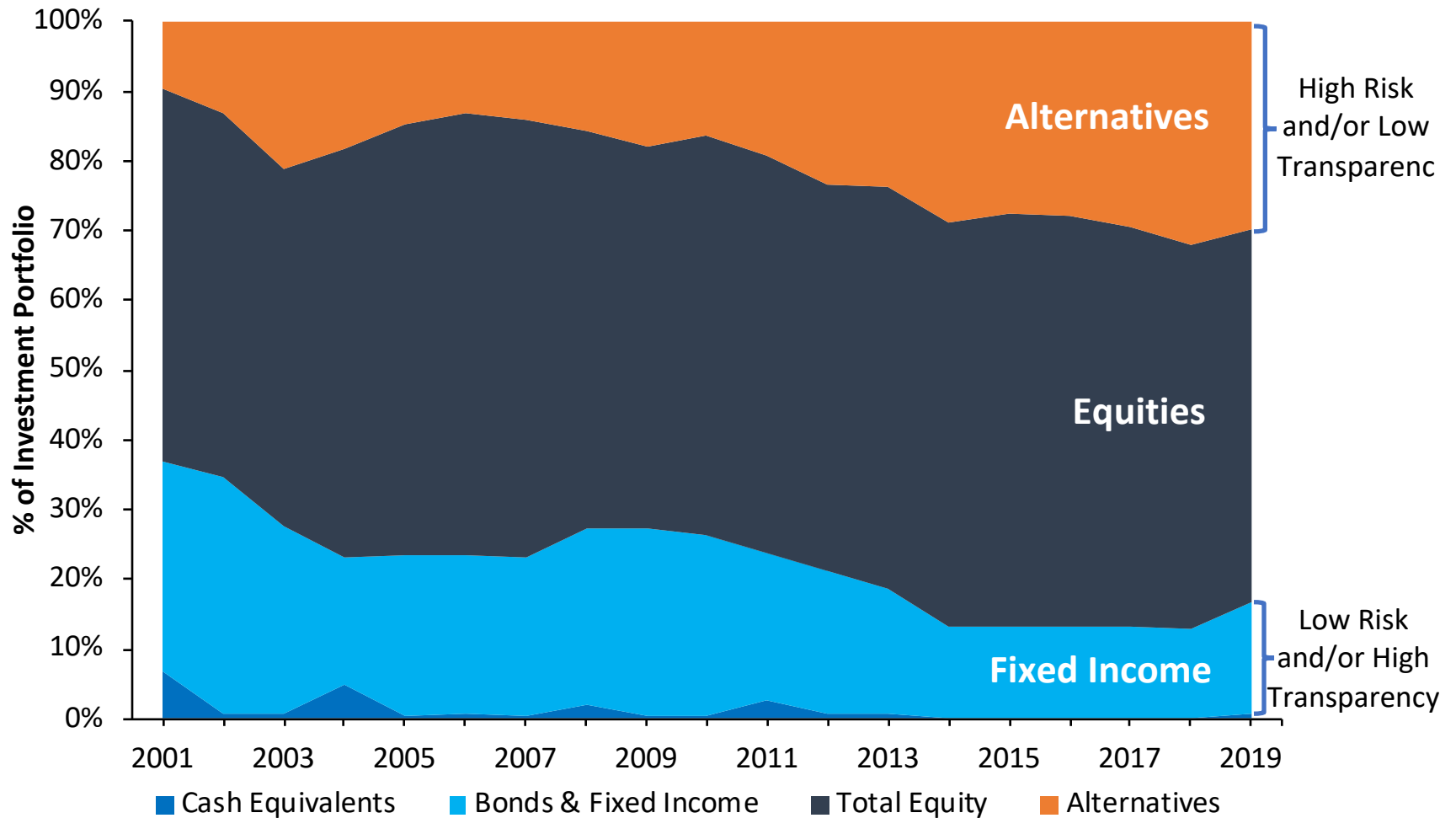
The “new normal” for institutional investing suggests that achieving even a 6% average rate of return is optimistic.

1. Over the past two decades there has been a steady change in the nature of institutional investment returns.
 - 30-year Treasury yields have fallen from around 8% in the 1990s to consistently less than 4% today.
 - New phenomenon: negative interest rates, designates a collapse in global bond yields.
 - The U.S. experiences the longest economic recovery in history, yet average growth rates in GDP and inflation are below expectations.
 - Per empirical analysis (e.g. using Gordon Growth Model), subdued economic, inflation and dividend yield growth rates portend equity returns in the ballpark of 6 percent over the long-term.
2. McKinsey & Co. forecast the returns on equities will be 20% to 50% lower over the next two decades compared to the previous three decades.
 - Using their forecasts, the best-case scenario for a 70/30 portfolio of equities and bonds is likely to earn around 5% return.
3. ATRS has yet to recover from the 2009 recession, and now it will be dealing with the fallout of COVID-19.



ATRS Asset Allocation (2001-2019)

Expanding Alternatives in Search for Yield



Source: Pension Integrity Project analysis of ATRS actuarial valuation reports and CAFRS.

Asset allocation for 2019 is as of March 31, 2019.

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



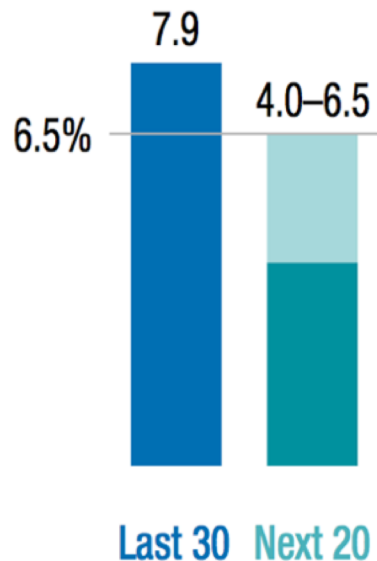
The past 30 years saw returns that exceeded the long-run average

- Historical real returns
- Last 100 years average return

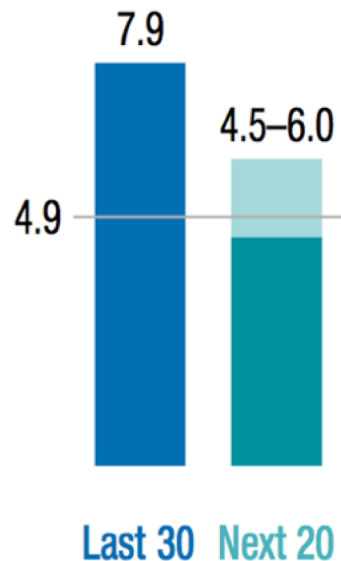
The next 20 years could be more challenging

- Growth-recovery scenario
- Slow-growth scenario

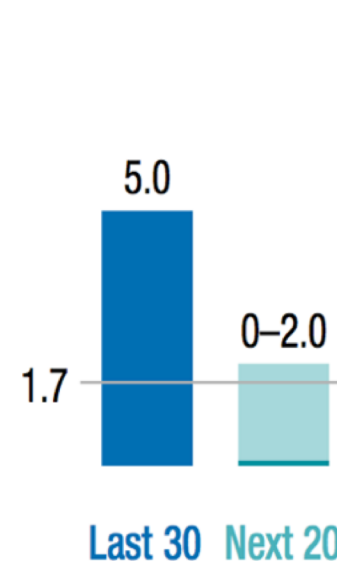
US equities



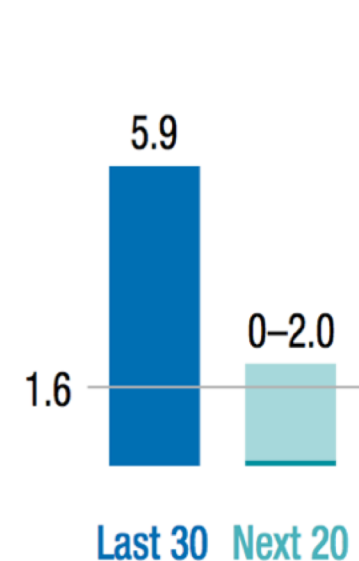
European equities



US bonds

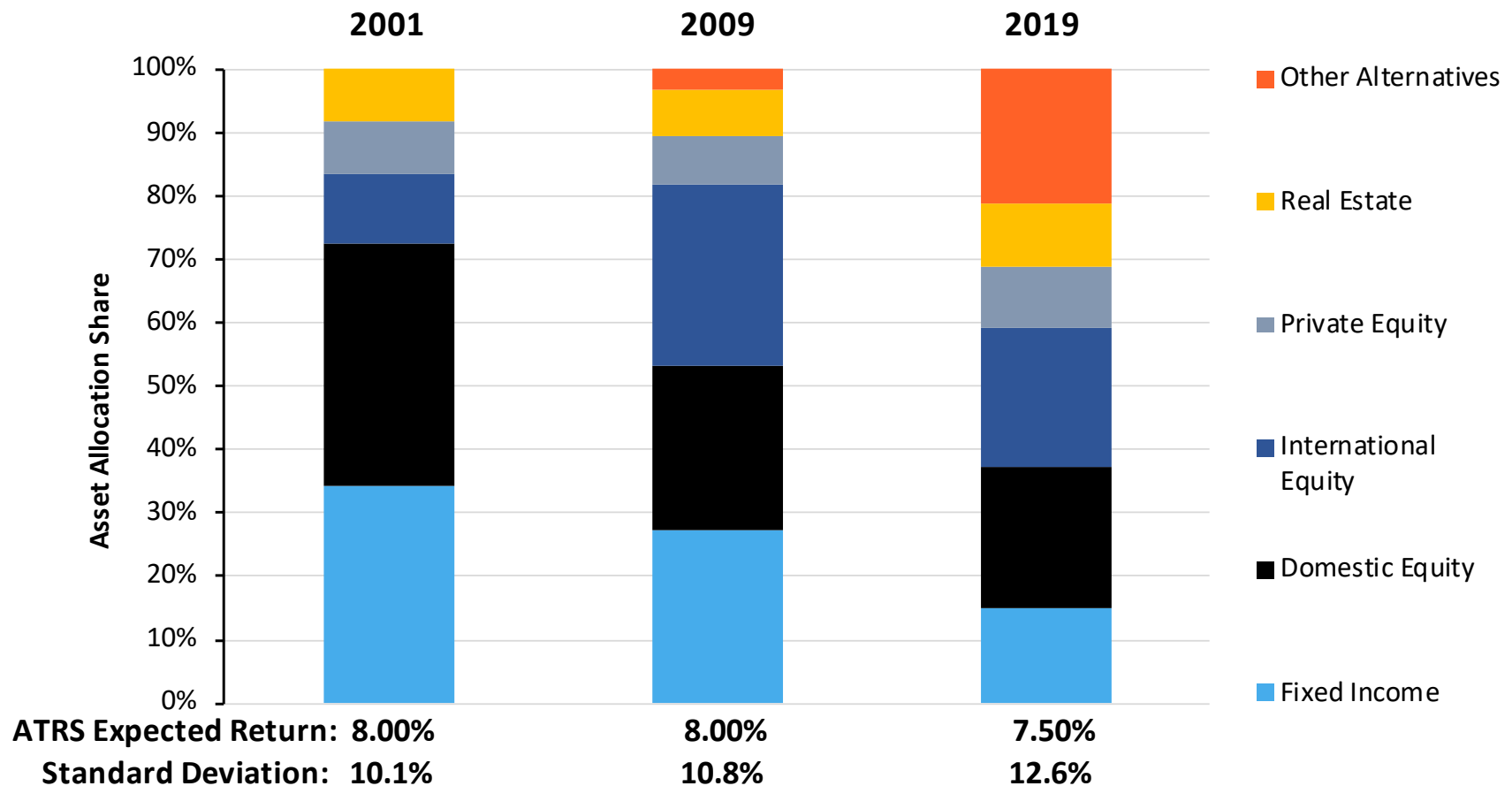


European bonds



New Normal: Market Trend Towards Risk

ATRS Has Changed its Asset Allocation Towards More Risky Investments Resulting in a Higher Annual Standard Deviation of Returns



Source: Pension Integrity Project Monte Carlo model based on ATRS asset allocation and reported expected of returns by asset class.

Probability Analysis: Measuring the Likelihood of ATRS Achieving Various Rates of Return



Possible Rates of Return	Probability of ATRS Achieving A Given Return Based On:							
	ATRS Forecast		Short-Term Market Forecast				Long-Term Market Forecast	
	ATRS Forecast	ATRS Historical Returns	Research Affiliates 10-Year Forecast	BNY Mellon 10-Year Forecast	JP Morgan 10-15 Year Forecast	Horizon 10-Year Market Forecast	BlackRock 20-Year Forecast	Horizon 20-Year Market Forecast
9.0%	30.5%	16.3%	11.8%	15.5%	18.6%	23.5%	34.5%	36.3%
8.0%	44.0%	29.0%	20.3%	25.8%	30.4%	35.5%	46.7%	48.4%
7.5%	50.0%	36.2%	25.6%	32.6%	37.2%	41.9%	53.4%	54.7%
7.0%	56.5%	44.7%	31.7%	39.9%	44.0%	48.7%	59.9%	60.9%
6.5%	63.7%	53.3%	38.2%	47.4%	51.2%	55.5%	66.0%	67.4%
6.0%	69.4%	61.4%	45.2%	54.9%	58.3%	61.5%	72.0%	73.3%
5.0%	79.8%	76.1%	59.9%	69.7%	71.3%	72.8%	81.8%	82.9%

Source: Pension Integrity Project Monte Carlo model based on ATRS asset allocation and reported expected returns by asset class. Forecasts of returns by asset class generally by BNYM, JPMC, BlackRock, Research Affiliates, and Horizon Actuarial Services were matched to the specific asset class of ATRS. Probability estimates are approximate as they are based on the aggregated return by asset class. For complete methodology contact Reason Foundation.

Probability Analysis: Measuring the Likelihood of ATRS Achieving Various Rates of Return



ATRS Forecast

- A probability analysis of ATRS historical returns over the past 20 years (2000-2019) indicates only a modest chance (36%) of hitting the plan's 7.55% assumed return.
- ATRS actuaries calculate around 50% chance of achieving their investment return target each year.

Short-Term Market Forecast

- Returns over the short to medium term can have significant negative effects on funding outcomes for mature pension plans with large negative cash flows like ATRS.
- Analysis of capital market assumptions publicly reported by the leading financial firms (BlackRock, BNY Mellon, JPMorgan, and Research Affiliates) suggests that over a 10-15 year period, ATRS returns are likely to fall short of assumptions.

Long-Term Market Forecast

- Longer-term projections typically assume ATRS investment returns will revert back to historical averages.
 - ✓ The “reversion to mean” assumption should be viewed with caution given historical changes in interest rates and a variety of other market conditions that increase uncertainty over longer projection periods, relative to shorter ones.
- Forecasts showing long-term returns near 7.55% being likely also show a significant chance that the actual long-term average return will fall far shorter than expected.
 - ✓ For example, according to BlackRock's 20-year forecast the probability of achieving an average return of 7.55% or higher is about 53%, the probability of earning a rate of return below 5% is about 18%.



RISK ASSESSMENT

- **How resilient is Arkansas TRS to volatile market factors?**

Important Funding Concepts



Employer Contribution Rates

- *Statutory Contributions*: ATRS employers make annual payments based on a rate set in Arkansas state statute, meaning contributions remain static until changed by legislation
- *Actuarially Determined Employer Contribution (ADEC)*: Unlike statutory contributions, ADEC is the annual required amount ATRS's consulting actuary has determined is needed to be contributed each year to avoid growth in pension debt and keep ATRS solvent

All-in Employer Cost

- The true cost of a pension is not only in the annual contributions, but also in whatever unfunded liabilities remain. The "All-in Employer Cost" combines the total amount paid in employer contributions and adds what unfunded liabilities remain at the end of the forecasting window

Baseline Rates

- The baseline describes ATRS' current current assumptions using the plan's existing contribution and funding policy and shows the status quo before the 2020 market shock

Employee Rates

- The scenarios in this analysis assume that employee continuation will increase by 0.25% increments to 7% by 2023 and stay fixed after.

Quick Note:

With actuarial experiences of public pension plans varying from one year to the next, and potential rounding and methodological differences between actuaries, projected values shown onwards are not meant for budget planning purposes. **For trend and policy discussions only.**

Stress Testing ATRS Using Crisis Simulations



Stress on the Economy:

- Market watchers expect dwindling consumption and incomes to severely impact near-term tax collections – applying more pressure on state and local budgets.
- Revenue declines are likely to undermine employers' ability to make full pension contributions, especially for those relying on more volatile tax sources (e.g., sales taxes) and those with low rainy-day fund balances.
- Many financial advisors project double-digit drops in U.S. GDP for Q2 2020. In Q1 2020 alone the S&P500 dropped by 20%, while the Federal Reserve lowered federal funds rate virtually to zero.

Methodology:

- The stress testing scenarios in this section assume a crash comprised of one year of -26.4% returns in 2020, followed by three years of 11% average returns.
- Recognizing expert consensus regarding a diminishing capital market outlook, the scenarios assume a long-term investment return on 6% once markets rebound.
- Given the increased exposure to volatile global markets and rising frequency of Black Swan economic events, we include a scenario incorporating a second Black Swan crisis event in 2035.
- In the event plan sponsors are unable to appropriate their full actuarially determined contributions amid budget stress, additional scenarios show the impact of a five-year employer contribution freeze.

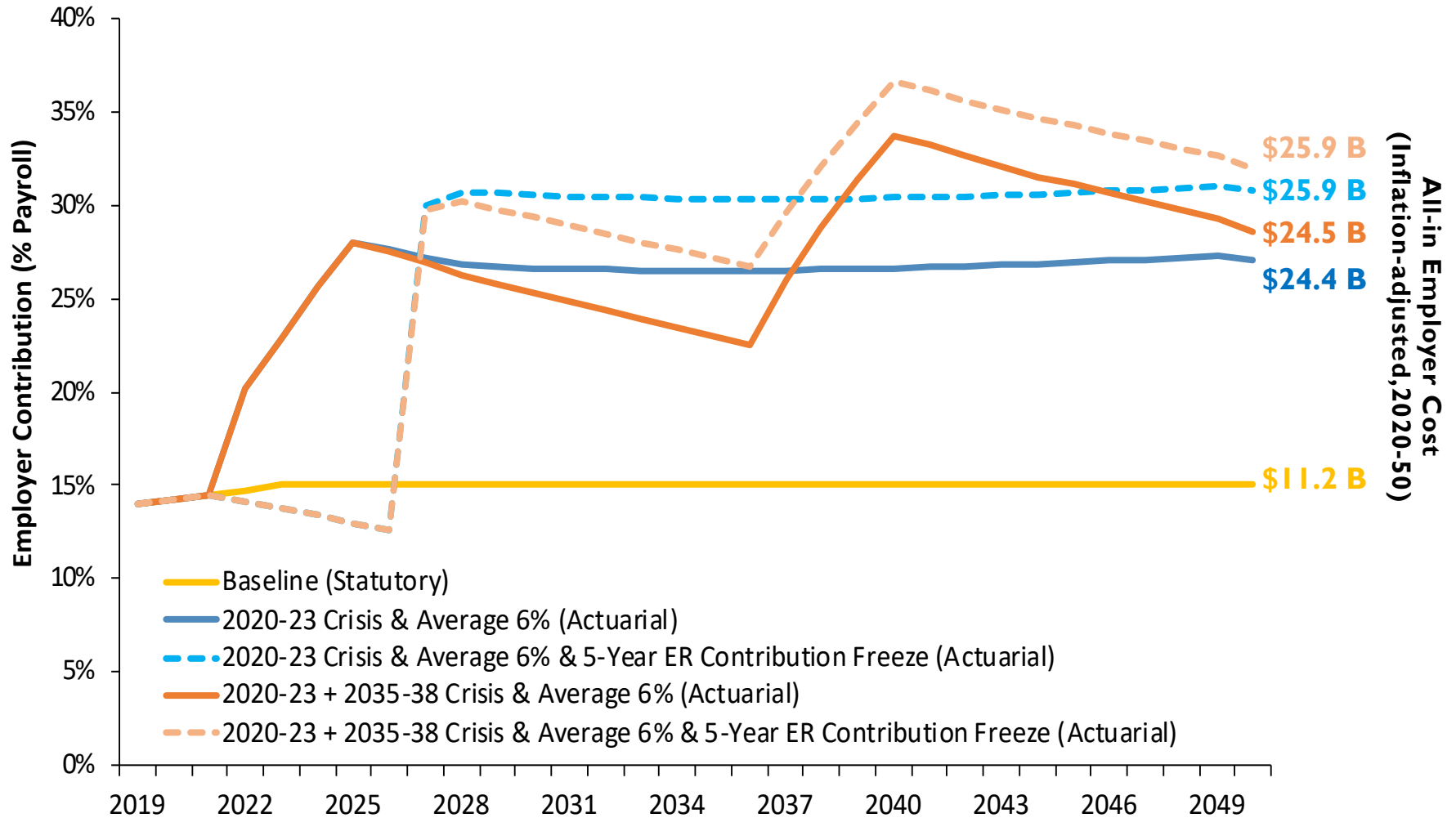
Stress Testing Scenarios:

1. 2020-23 Crisis + Average 6.0% Long-Term
2. 2020-23 Crisis + 2035-38 Crisis + Average 6.0% Long-Term
3. Scenario 1 + 5-Year Employer Contribution Freeze
4. Scenario 2 + 5-Year Employer Contribution Freeze

ATRS Stress Testing: All-in Employer Cost Projections

How a Crisis Increases ATRS Costs

Discount Rate: 7.5%, Assumed Return: 7.5%, Actual Return: Varying, Amo. Period: 30-Year, Closed

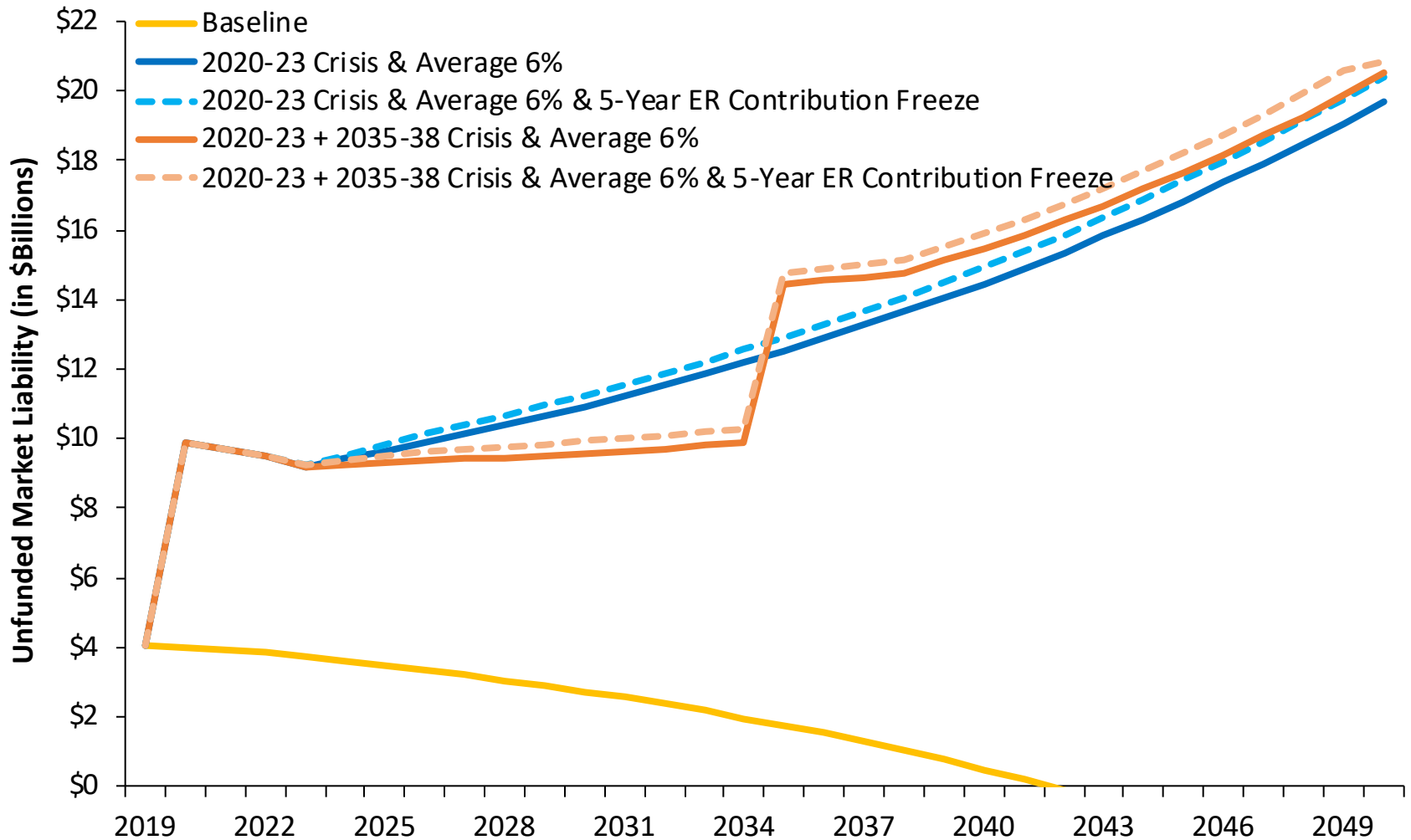


Source: Pension Integrity Project actuarial forecast of ATRS. Values are rounded and adjusted for inflation. State is assumed to make 100% actuarially required contributions. The "All-in Cost" includes all employer contributions over the 30-year timeframe, and the ending unfunded liability accrued by the end of the forecast period.

ATRS Stress Testing: Unfunded Liability Projections

Unfunded Liabilities Skyrocket Under Crisis Scenarios

Discount Rate: 7.5%, Assumed Return: 7.5%, Actual Return: Varying, Amo. Period: 30-Year, Closed

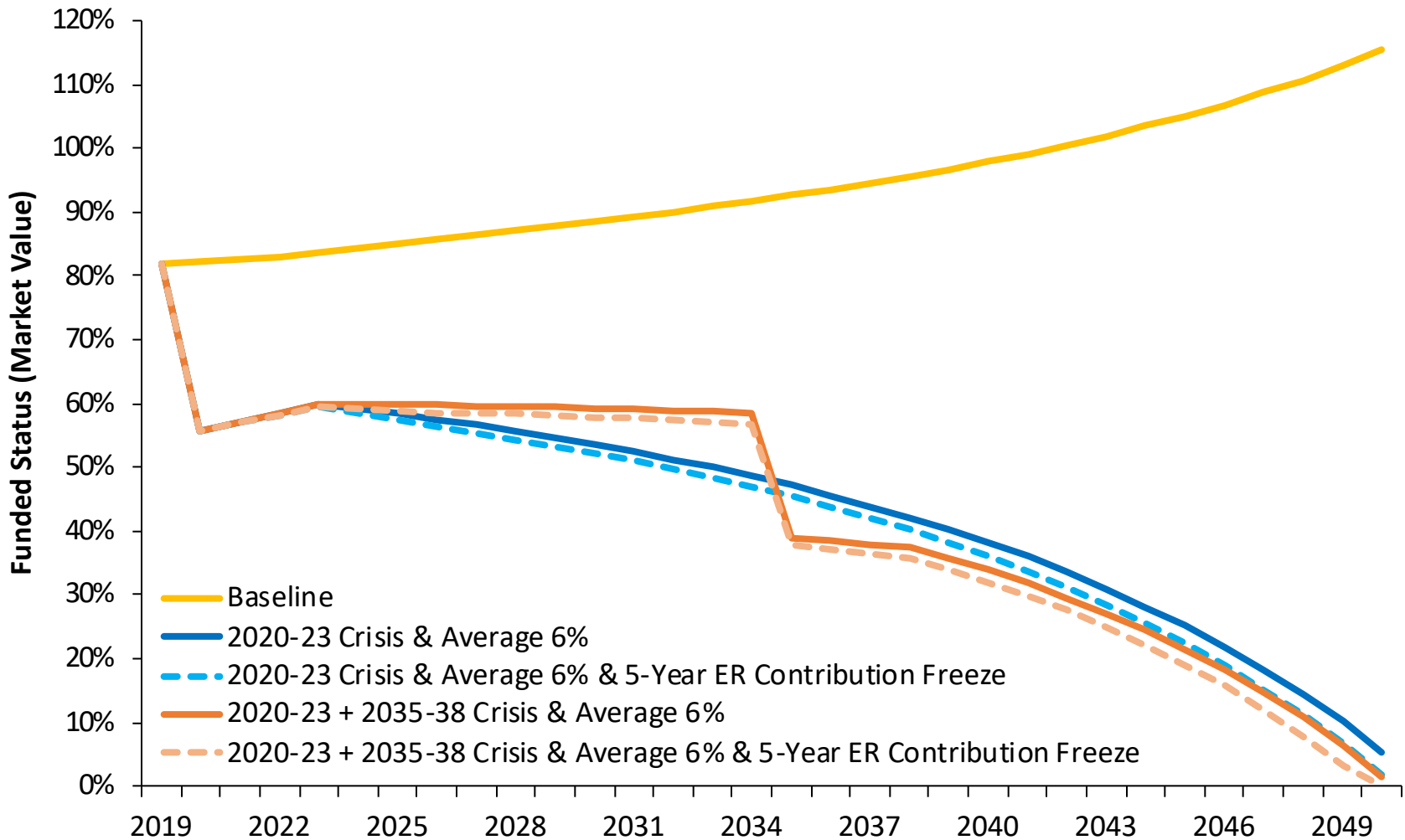


Source: Pension Integrity Project actuarial forecast of ATRS funding. Values are rounded and adjusted for inflation. State is assumed to make statutory contributions. The "All-in Cost" includes all employer contributions over the 30-year timeframe, and the ending unfunded liability accrued by the end of the forecast period.

ATRS Stress Testing: Funded Status Projections

ATRS Solvency Degrades Under Crisis Scenarios

Discount Rate: 7.5%, Assumed Return: 7.5%, Actual Return: Varying, Amo. Period: 30-Year, Closed



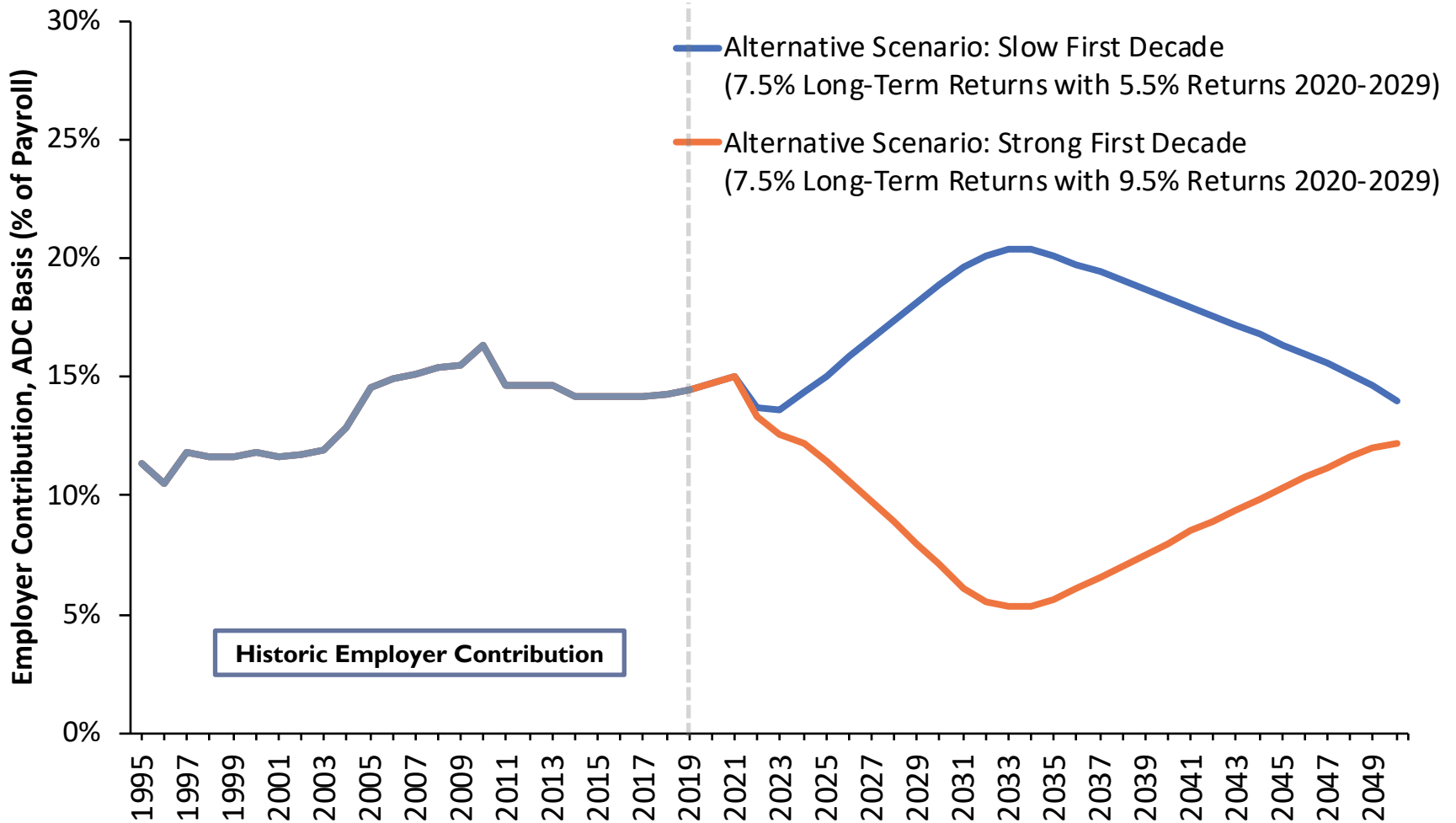
Source: Pension Integrity Project actuarial forecast of ATRS funding. State is assumed to make statutory contributions. The "All-in Cost" includes all employer contributions over the 30-year timeframe, and the ending unfunded liability accrued by the end of the forecast period.



30-year Employer Contribution Forecast

Timing of Returns Affects What Arkansas Pays

Long-Term Average Returns of 7.5%



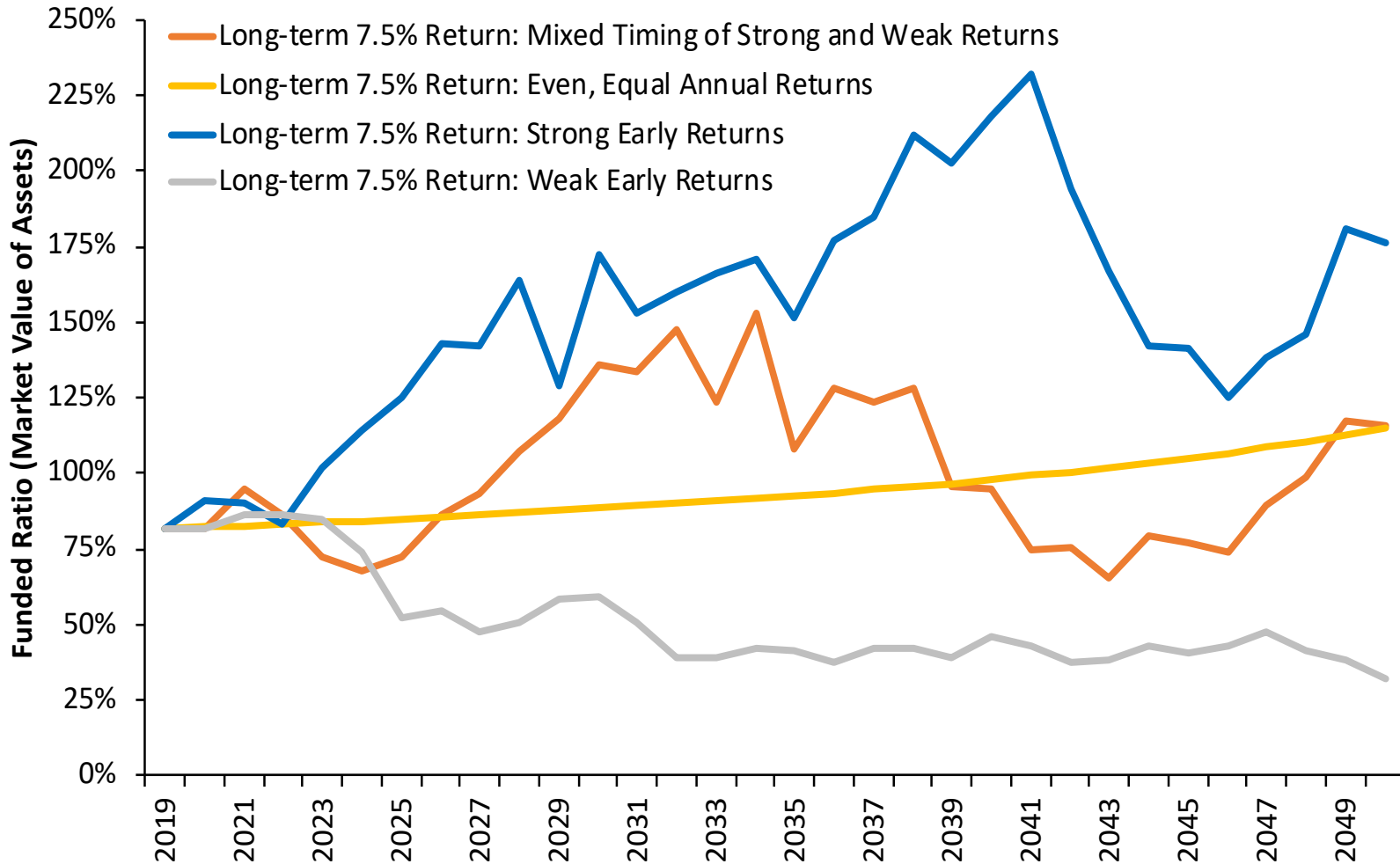
Source: Pension Integrity Project actuarial forecast of Arkansas TRS. Figures are adjusted for inflation.



30-year Funded Ratio Forecast (Statutory Contribution Policy)

All Paths to a 7.5% Average Return Are Not Equal

Long-Term Average Returns of 7.5%



Source: Pension Integrity Project actuarial forecast of ATRS plan. Strong early returns (TWRR=7.5%,MMRR=8.3%), Even, equal annual returns (Constant Return = 7.5%), Mixed timing of strong and weak returns (TWRR=7.5%,MMRR=7.5%), Weak early returns (TWRR=7.5%,MMRR=5%) Scenario assumes that ATRS pays the actuarially required rate each year. Years are plan's fiscal years.

Forecasting the Impact of Market Volatility



Random Investment Return Analysis

What is it?

- Model generates 10,000 different random investment return scenarios, creating ranges in required contributions and funding outcomes
- The analysis displays 50 percent of all outcomes that are closest to the median outcome

Why use it?

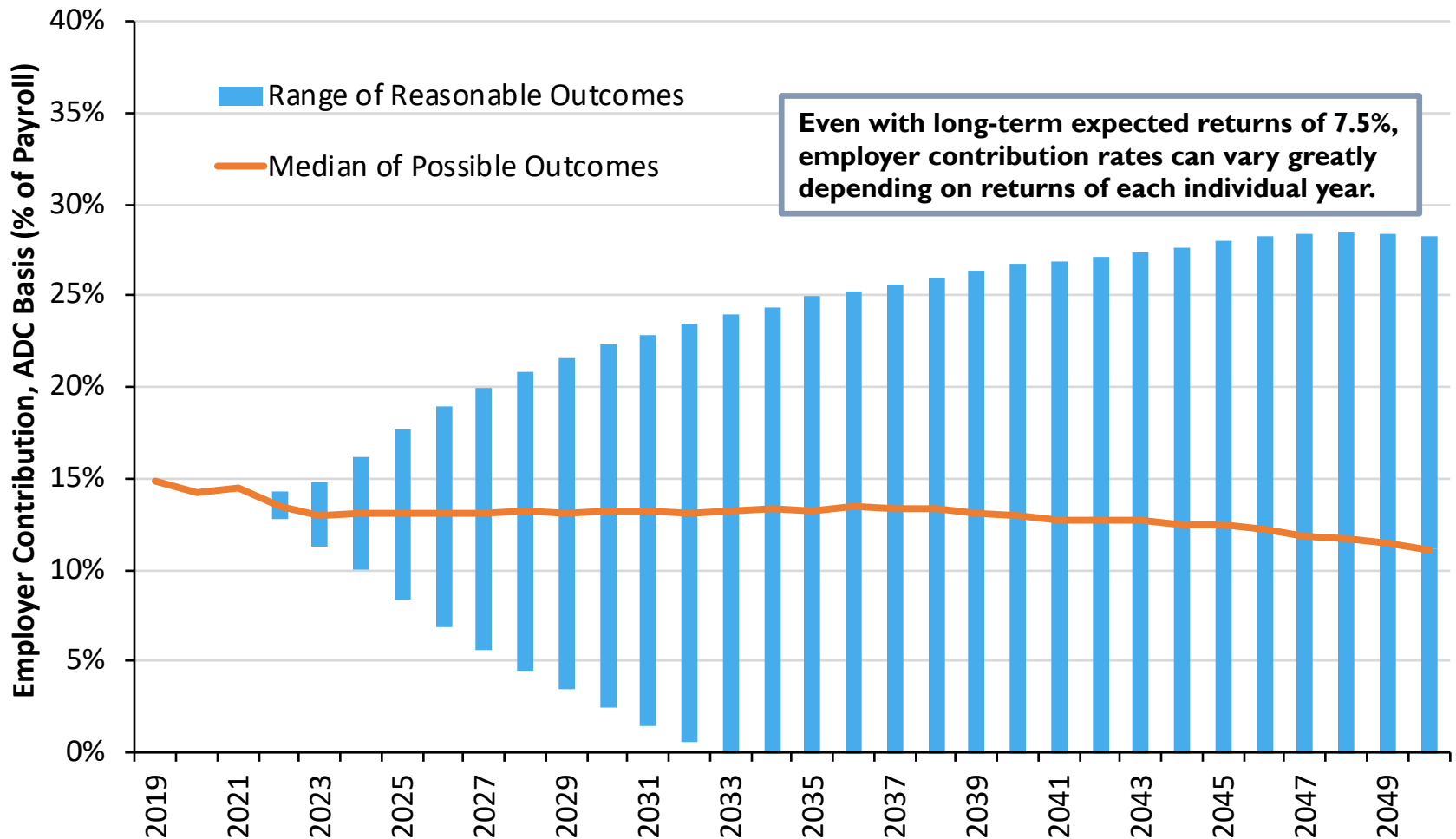
- Using a large sample of potential 30-year return scenarios can show the differences in how plan's funding will react to high or low investment fluctuations.
- The cone of displayed outcomes and the median illustrates the level of risk placed on the plan
- A narrow cone suggests a plan is more resilient—and has less investment risk—than that of a wider cone



30-year Employer Contribution Forecast

If ATRS Performs as Expected, Rates Can Still Vary

Long-term Average Expected Returns of 7.5%



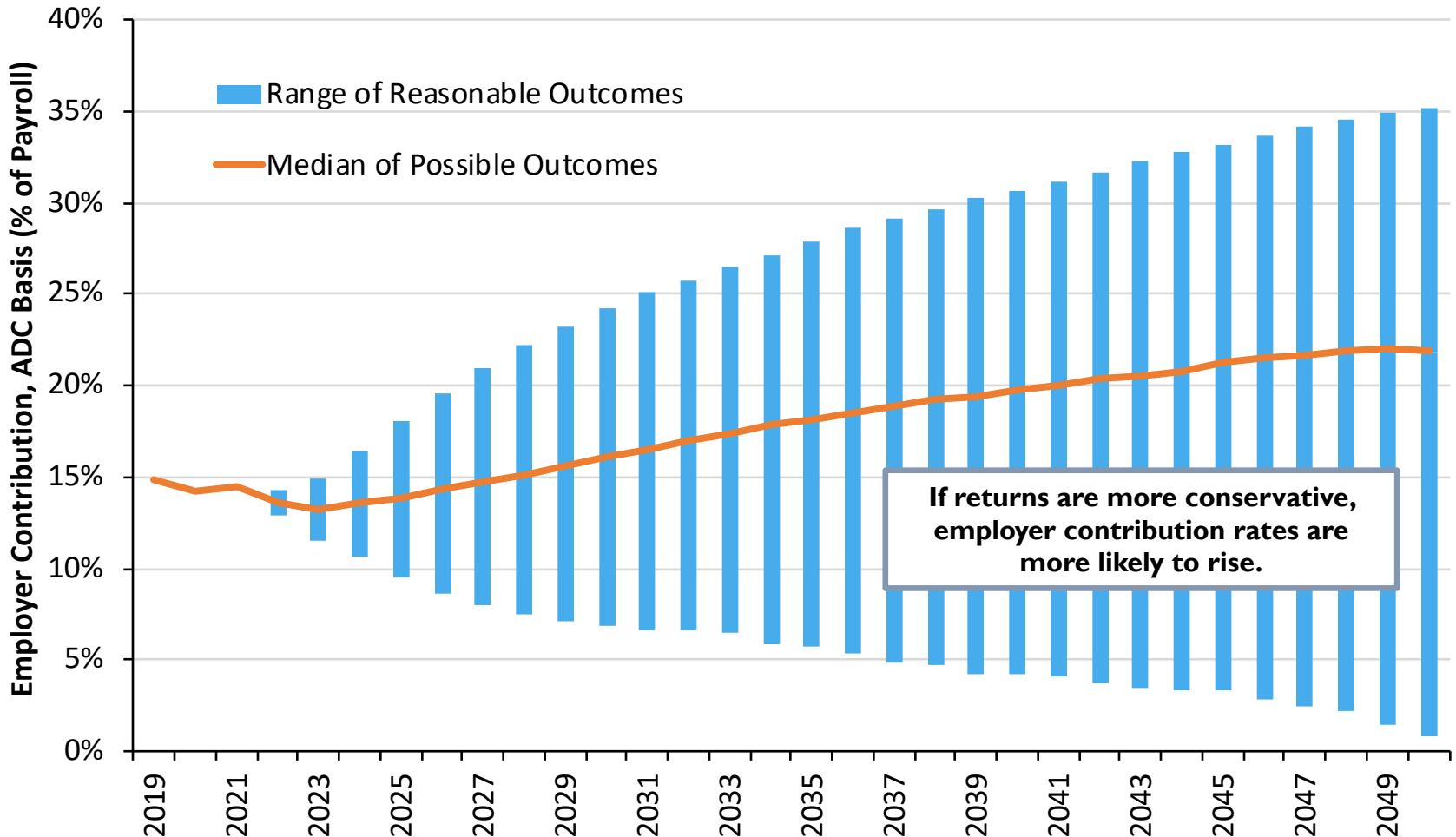
Source: Pension Integrity Project actuarial forecast of ATRS. Scenario assumes that the state continues to pay 100% of the actuarially determined contribution each year. Range of Reasonable Outcomes represents the 50% of possible outcomes closest to the median.



30-year Employer Contribution Forecast

If ATRS Underperforms, Expect Higher Contribution Rates

More Conservative Long-term Average Expected Returns



If returns are more conservative, employer contribution rates are more likely to rise.

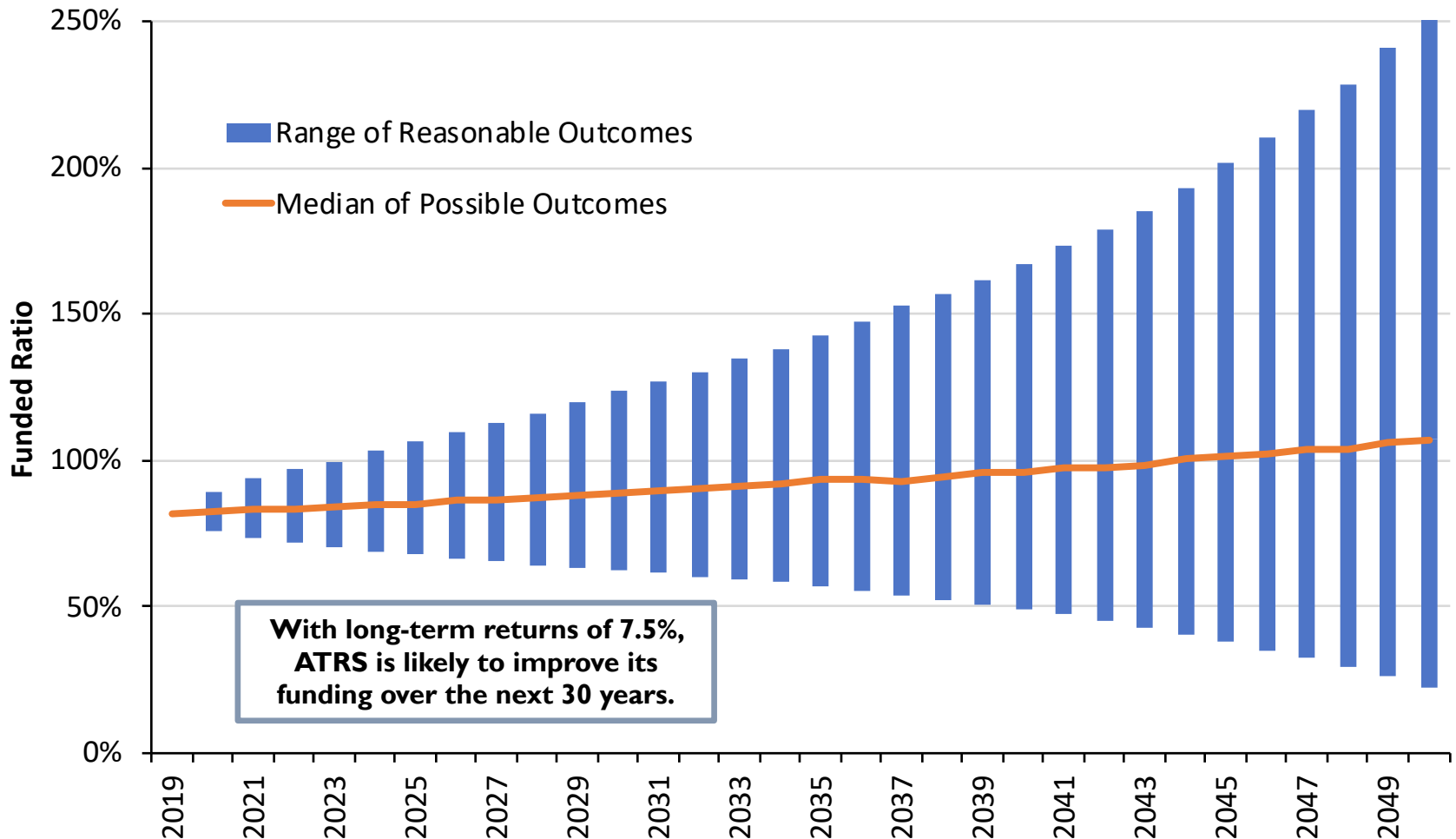
Source: Pension Integrity Project actuarial forecast of ATRS plan using the return and risk assumptions of the Monte Carlo analysis. Conservative returns are 7.28%, which are the result of combining the long-term capital market assumptions from four prominent financial firms



30-year Funded Ratio Forecast (Statutory Contribution Policy)

Funded Ratios Can Vary But Are Expected to Improve

Long-term Average Returns of 7.5%



**With long-term returns of 7.5%,
ATRS is likely to improve its
funding over the next 30 years.**

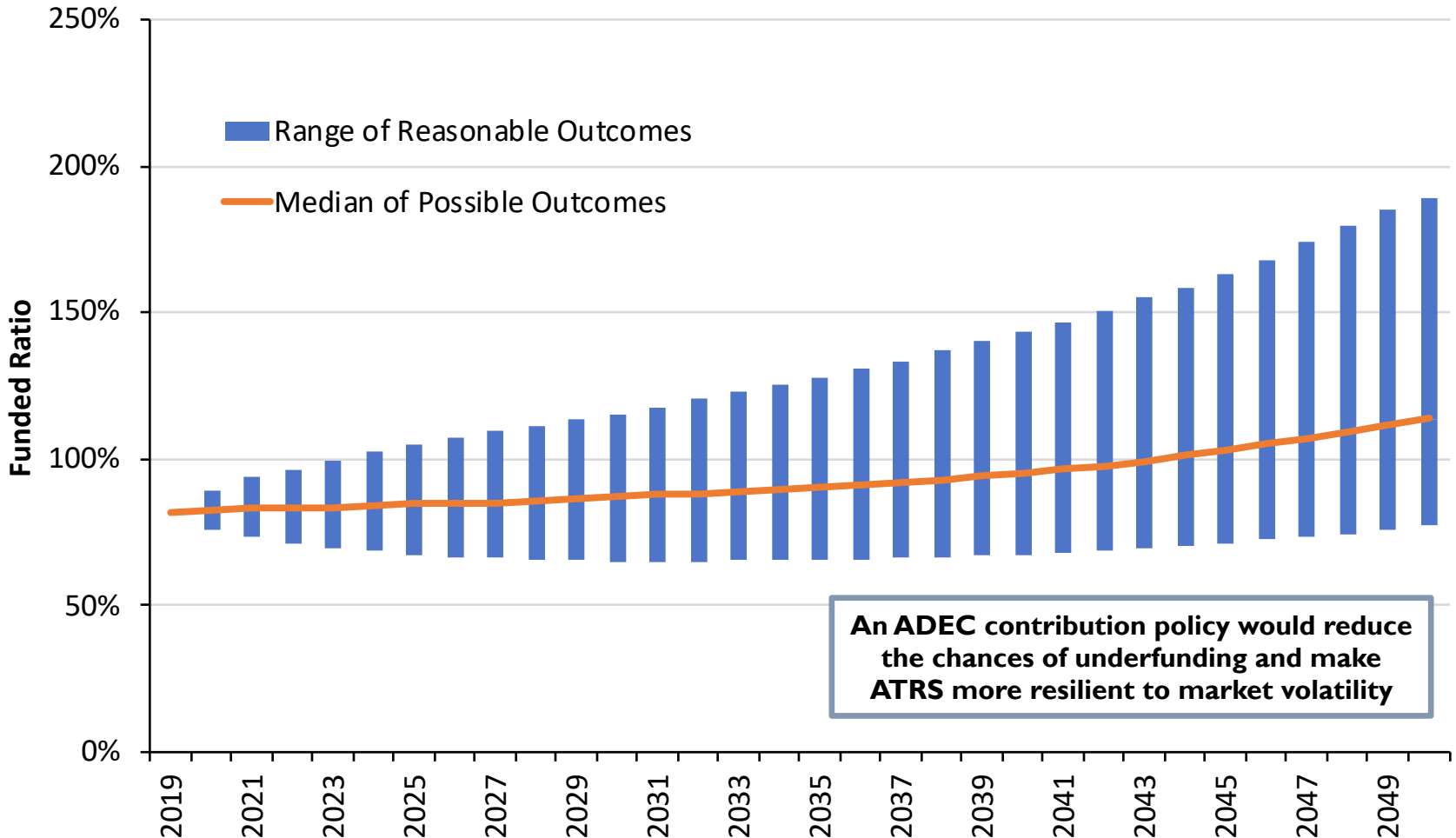
Source: Pension Integrity Project actuarial forecast of ATRS plan based on TRS return and risk assumptions. Range of Reasonable Outcomes represents the 50% of possible outcomes closest to the median.



30-year Funded Ratio Forecast (ADEC Contribution Policy)

Avoiding Underfunding Through Contribution Policy

Long-term Average Returns of 7.5%



An ADEC contribution policy would reduce the chances of underfunding and make ATRS more resilient to market volatility

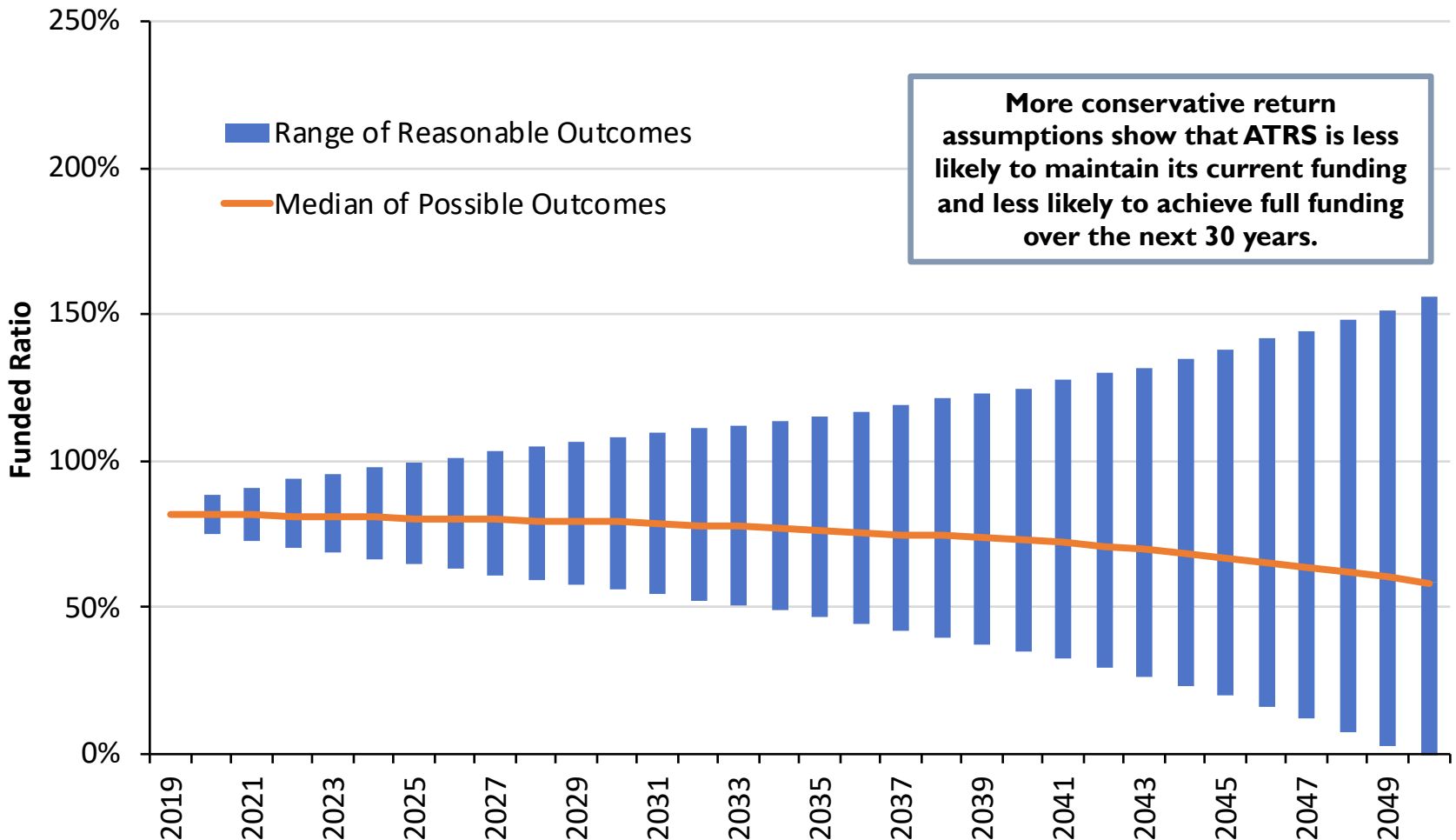
Source: Pension Integrity Project actuarial forecast of ATRS plan based on TRS return and risk assumptions. Range of Reasonable Outcomes represents the 50% of possible outcomes closest to the median.



30-year Funded Ratio Forecast (Statutory Contribution Policy)

ATRS Funding in a “New Normal” Future

More Conservative Long-term Average Returns

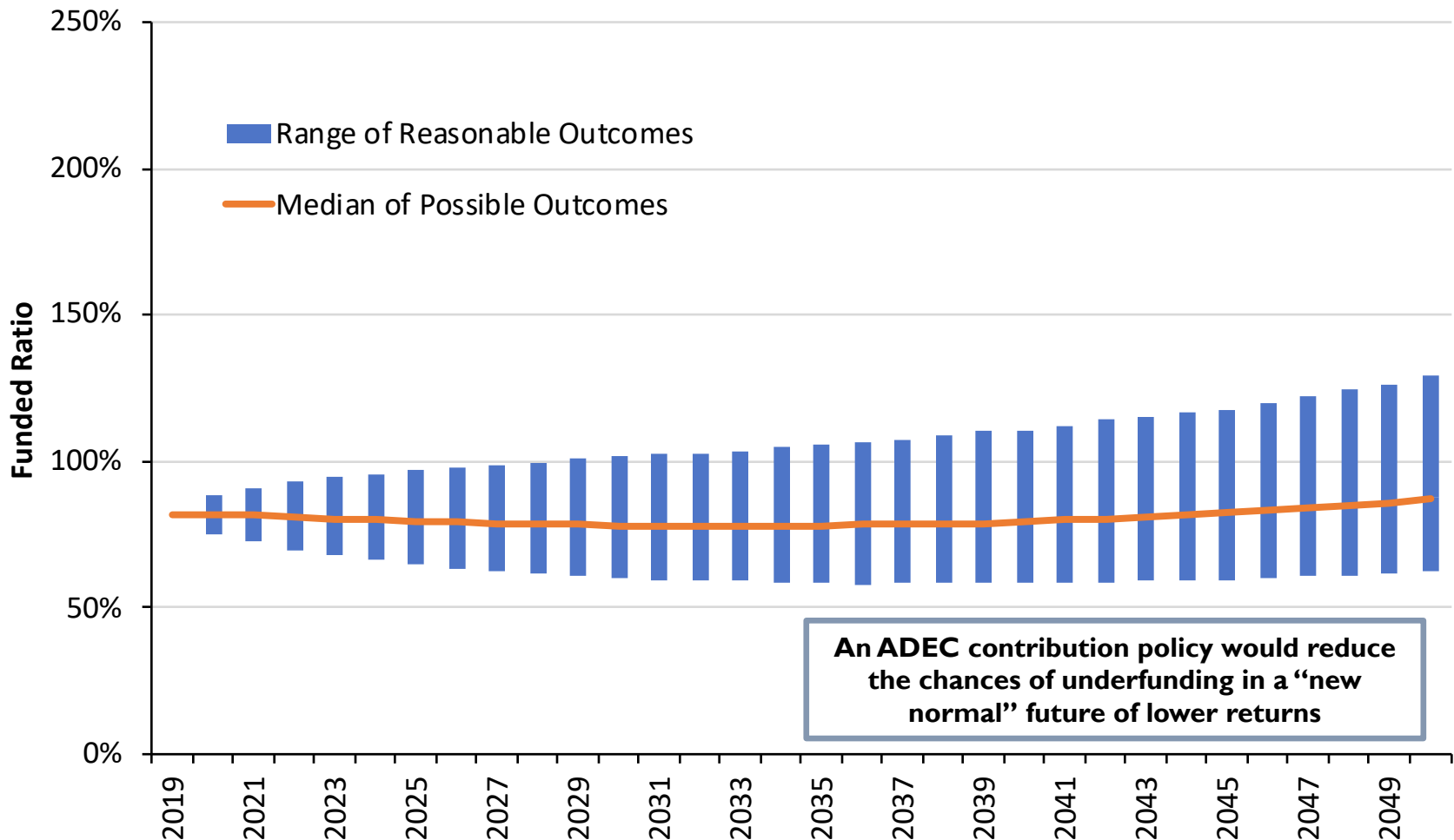


Source: Pension Integrity Project actuarial forecast of ATRS plan using the return and risk assumptions of the Monte Carlo analysis. Conservative returns are 7.28%, which are the result of combining the long-term capital market assumptions from four prominent financial firms

30-year Funded Ratio Forecast (ADEC Contribution Policy)

Guarding ATRS From Underfunding in a “New Normal” Future

More Conservative Long-term Average Returns



An ADEC contribution policy would reduce the chances of underfunding in a “new normal” future of lower returns

Source: Pension Integrity Project actuarial forecast of ATRS plan using the return and risk assumptions of the Monte Carlo analysis. Conservative returns are 7.28%, which are the result of combining the long-term capital market assumptions from four prominent financial firms

Sensitivity of Normal Cost

Alternative Assumed Rates of Return

(Amounts to be Paid in 2020-21 Contribution Fiscal Year, % of projected payroll)



	Gross Normal Cost	Employer Normal Cost	Employee Normal Cost (Average)
7.5% Assumed Return (FYE 2019 Baseline)	12.30%	6.26%	6.04%
6.5% Assumed Return	13.82%	7.78%	6.04%
5.5% Assumed Return	15.78%	9.74%	6.04%
4.5% Assumed Return	18.34%	12.30%	6.04%

Note: These alternative gross normal cost figures should be considered approximate guides to how much more normal cost should be under different discount rates. Any policy changes should be based on more precise normal cost forecasts using detailed plan data. Alternative normal cost rates based reported liability sensitivity from the FYE 2018 ATRS CAFR.

Source: Pension Integrity Project analysis based on ATRS actuarial valuation reports and CAFRs.



CHALLENGE 2: INSUFFICIENT EMPLOYER CONTRIBUTIONS

- Since 2011, ATRS has fallen behind their Actuarially Determined Contributions, which resulted in the need for much higher contributions today
- Cash flow challenges compound funding shortfalls in mature plans like ATRS

State Statutes Have Created a Structural Underfunding Problem for ATRS

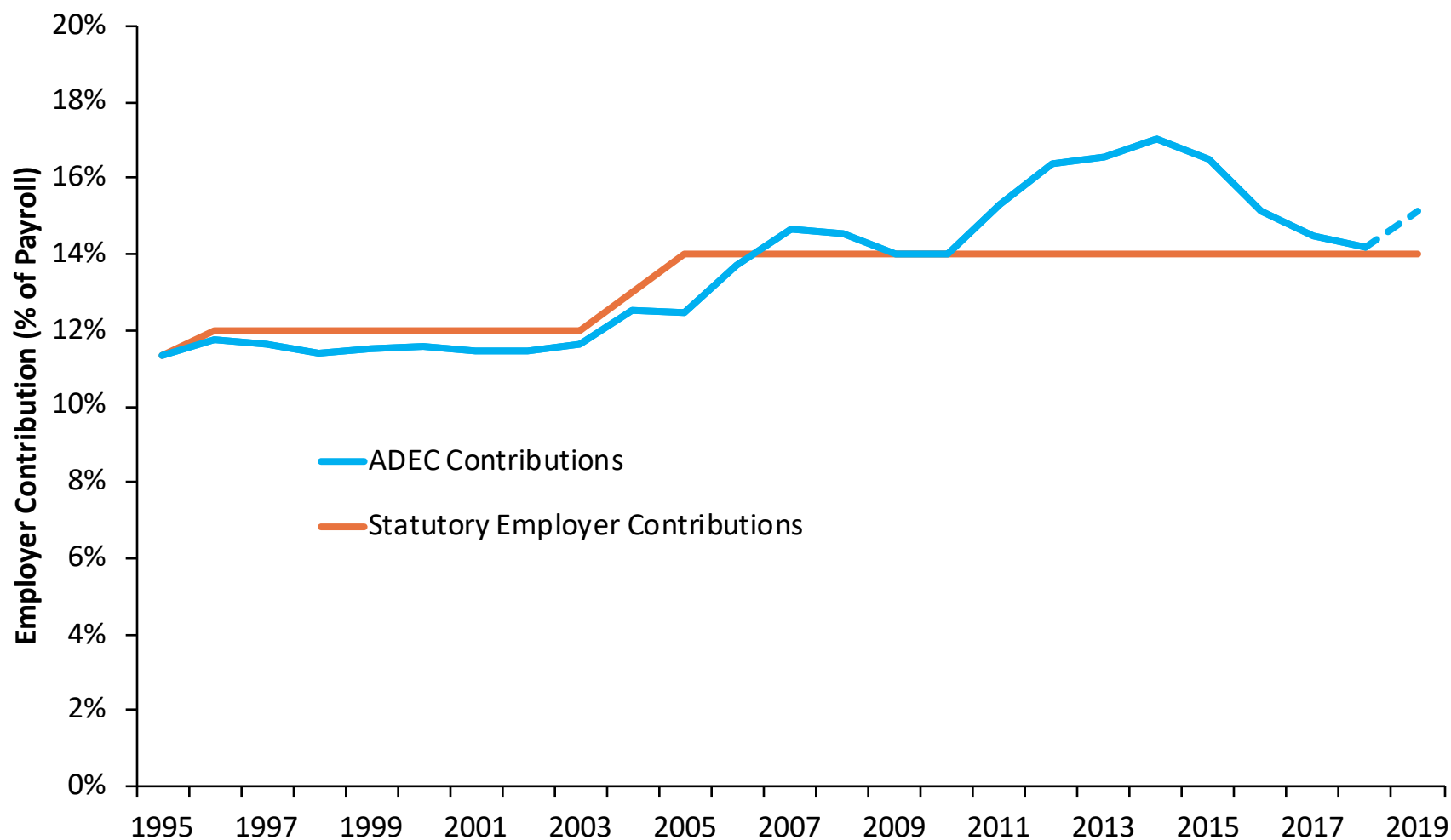


- Over the past five years, statutory employer contributions regularly fall short of the actuarially determined employer contribution (ADEC) rate.
- Employer contribution rates determined by legislative statute are not enough to keep up with the actual amount necessary to amortize the debt.
- **2019: Employer ADEC v. Statute**
 - *Statutory* Employer Contribution: 14% of payroll
 - *Actuarially Determined* Contribution: around 15.1%* of payroll

**2019 ADEC contribution rate is not yet reported and is approximated using historical rates. In general, ADEC rates are set based on the 30-year amortization period. The 2019 ADEC contribution rate was assumed to roughly equal 2016 ADEC rate. And as ATRS actuary notes: “[t]he result would look different [be higher] if the ADEC were calculated according to the Board’s target of 18 years.”*

Employer Contribution Trend, 1995-2019

ADEC v. Statutory Contribution Rates

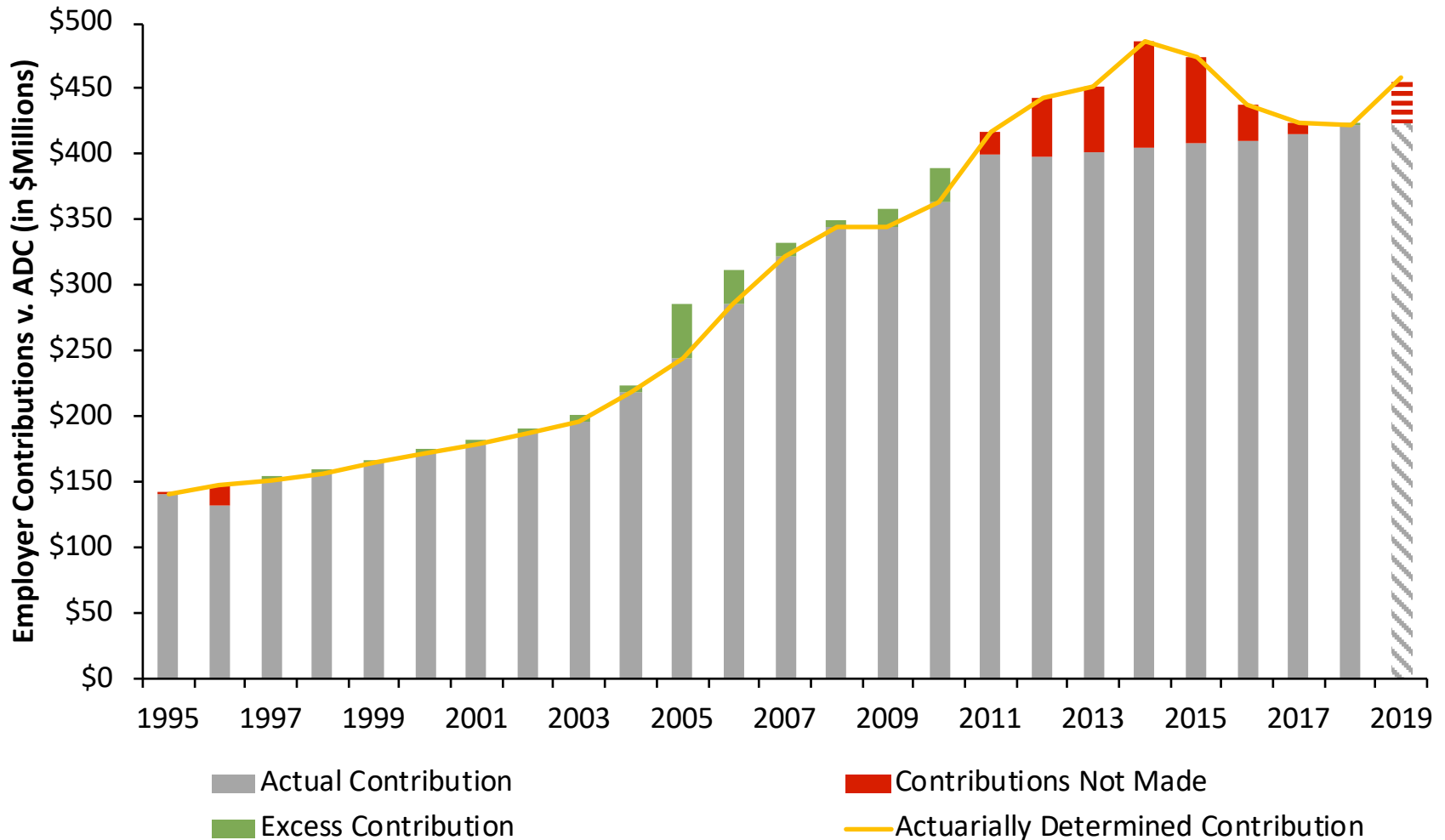


Source: Pension Integrity Project analysis of ATRS actuarial reports and CAFRs.
The 2019 ADEC contribution rate was assumed to roughly equal 2016 ADEC rate.



Actuarially Determined Employer Contribution History, 1995-2019

Actual v. Required Contributions



Source: Pension Integrity Project analysis of ATRS actuarial reports and CAFRs.
 The 2019 ADEC contribution rate was assumed to roughly equal 2016 ADEC rate.

Scenario Comparison of Employer Costs

Scenarios	Statutory Contributions			Actuarial Contributions		
	30-Year Employer Contributions	2050 Unfunded Market Liability	Total All-in Employer Costs	30-Year Employer Contributions	2050 Unfunded Market Liability	Total All-in Employer Costs
Pre-Crisis Baseline (Statutory)	\$14.4 B	-\$3.2 B	\$11.2 B	\$14.4 B	-\$3.2 B	\$11.2 B
2020-23 Crisis + Average 6%	\$14.4 B	\$19.7 B	\$34.1 B	\$24.7 B	-\$0.3 B	\$24.4 B
Two Crises + Average 6%	\$14.4 B	\$20.5 B	\$34.9 B	\$25.7 B	-\$1.2 B	\$24.5 B
2020-23 Crisis + Average 6% + 5-Year Cont. Freeze	\$14.1 B	\$20.4 B	\$34.5 B	\$25.8 B	-\$0.1 B	\$25.9 B
Two Crises + Average 6% + 5-Year Cont. Freeze	\$14.5 B	\$20.8 B	\$35.4 B	\$26.6 B	-\$0.7 B	\$25.9 B

Source: Pension Integrity Project actuarial forecast of ATRS funding. Values are rounded and adjusted for inflation.

The "All-in Cost" includes all employer contributions over the 30-year timeframe, and the ending unfunded liability accrued by the end of the forecast period.

Negative Amortization: Understanding the Current Funding Policy



- ATRS's statutory contribution rate means high variance in the years needed to amortize unfunded liabilities based on the capped employer contributions.
 - 2008: 21-year amortization period
 - 2017: 29-year amortization period
 - 2013: 70-year amortization period
- These long amortization periods are indicators that plan amortization payments are not sufficient to pay down the unfunded liability and interest it accrues. (i.e. *negative amortization*)
- According to ATRS reports, to avoid negative amortization in 2016 the system would have needed to use an **18-year amortization period**.
- This goes in line with the Society of Actuaries' recommending funding periods of 15 to 20 years. Shorter periods cut long-term costs.



CHALLENGE 3: PLAN MATURITY AND STRAIN ON CASH FLOW

- An aging membership & slow asset growth create cash flow challenges for ATRS

Cash Flow Demands in a Low-Yield Environment Undermine Asset Growth



Two important factors are rapidly driving up ATRS cash outflow demands:

- Benefit enhancements before the 2000s offered to ATRS members resulted in higher benefit payouts than would otherwise be required without these increases
- Changing demographics strain ATRS asset levels because as ATRS matures the number of retired employees outgrow active members. This is exacerbated by the aging population phenomenon

Large negative cash flows, although expected, may indicate:

- A need to adjust return assumption from long-term horizon to mid-term projection, to better align with the average timing of pension payouts
- A need for additional pension contributions
- Severely high actuarial risks caused by unrealistic actuarial assumptions
- Impractical reliance on investment returns to grow assets, meaning ATRS is more exposed to downside risks

Cash Flow Demands in a Low-Yield Environment Undermine Asset Growth



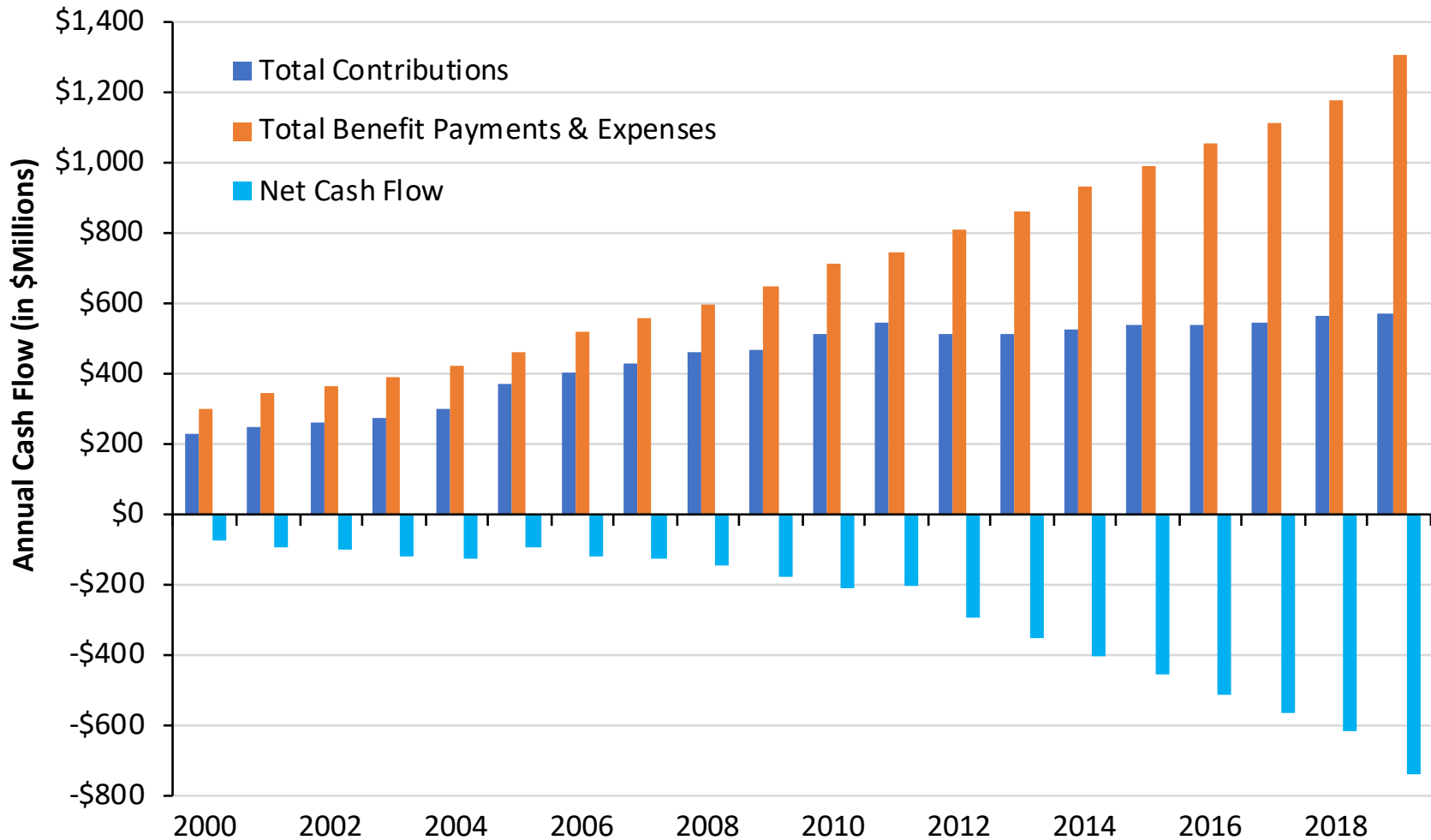
- Mature pension systems like ATRS often pay out more in benefits than they take in from employees, employers, and investments - negative cash flow is expected.
- In the “New Normal” low-yield environment, as expenses strain ATRS assets, timing is important.
- Unlike newly established plans, ATRS will need to pay out a significant amount of pension benefits over the next 15 years, meaning a large portion of its current assets will not be around (in years 16-30) to make up for the lower earnings anticipated.
- As of 2019, the average duration of ATRS actuarial liabilities was 13.8 years.

Quick Fact:

- ATRS paid out \$1.31 billion in benefits and refunds in 2019, while taking in only \$574 million in contributions

Net Cash Flow, 2000-2019

ATRS Expenses Outgrow Contributions

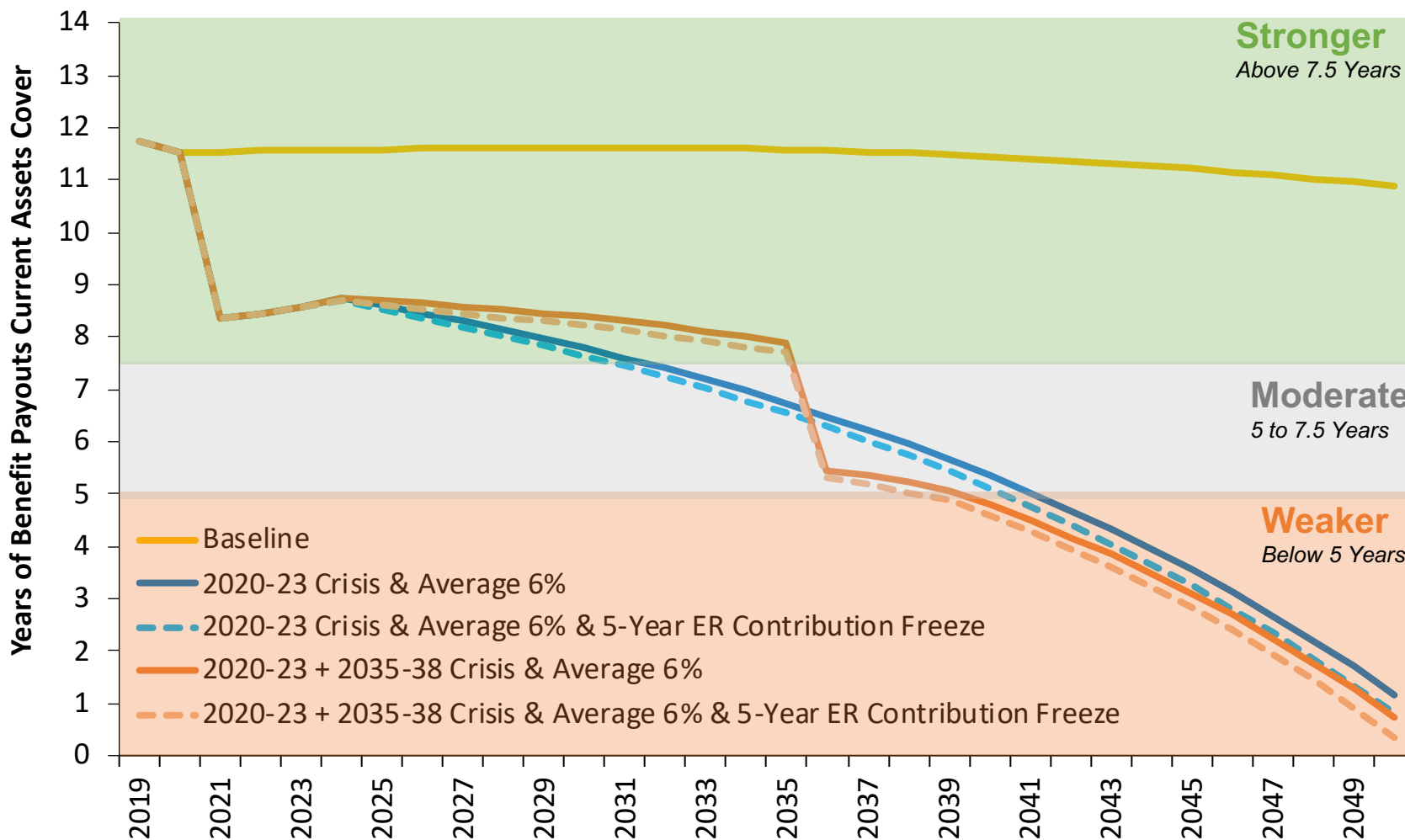


Source: Pension Integrity Project analysis of ATRS actuarial reports and CAFRs. Net Cash Flow equals the difference between total contributions (net of investment income) and total expenses.

ATRS Stress Testing: Cash Flow Projections

Crises Deplete ATRS' Ability to Pay Promised Benefits

Discount Rate: 7.5%, Assumed Return: 7.5%, Actual Return: Varying, Amo. Period: 30-Year, Closed



Source: Pension Integrity Project actuarial forecast of ATRS.

Moody's Investors Service, "State government – US: Most states have the financial flexibility and reserves to manage a recession," May 2019. "Scenarios assume that the state continues to pay 100% of the statutory contribution rates each year."



CHALLENGE 4: ACTUARIAL ASSUMPTIONS AND METHODS

- The combination of unmet actuarial assumptions and slow-paced changes to those assumptions is increasing the size of unfunded liabilities



Challenges from Aggressive Actuarial Assumptions

Actual Experience Different from Actuarial Assumptions

(-) Retirement Assumptions

- Teachers have been retiring earlier than expected, receiving retirement benefits over longer time periods, thereby increasing actuarial liabilities by \$237.2 million between 2000-2018.

(+) Death, Disability, and Withdrawal Rate Assumptions

- Although the total amount of accrued liabilities decreases whenever a member leaves employment before she starts qualifying for retirement benefits by foregoing the employer match, high overall turnover rates suggest that the state is facing challenges retaining and properly rewarding high-quality employees.



Challenges from Aggressive Actuarial Assumptions

Actual Experience Different from Actuarial Assumptions

(+) Overestimated Payroll Growth

- ATRS employers have not raised salaries as fast as expected, resulting in lower payrolls and thus lower earned pension benefits. This has meant a reduction in actuarial liabilities of \$1.15 billion from 2000 to 2018.

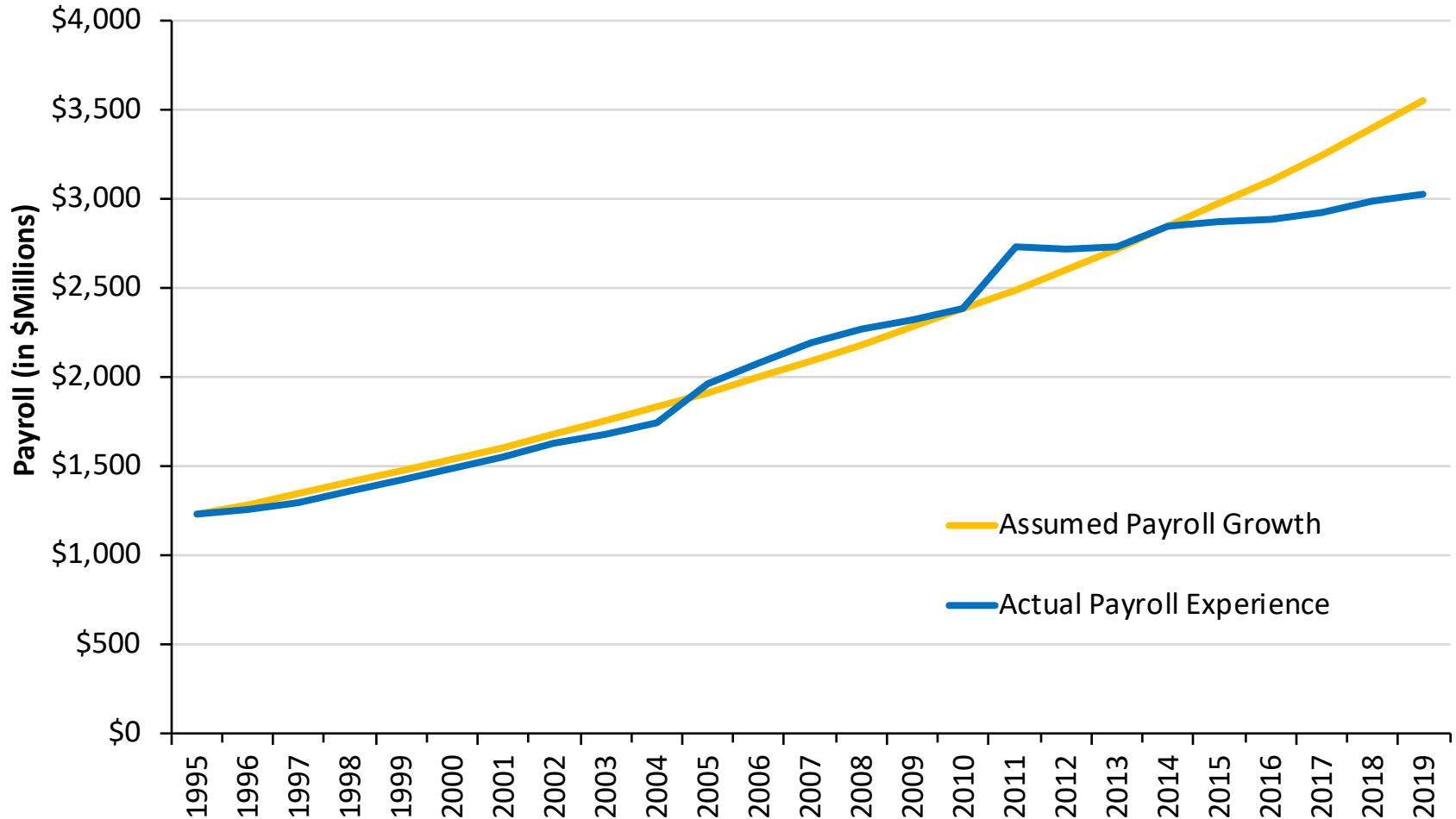
(-) Overestimated Payroll Growth

- However, overestimating payroll growth is creating a long-term problem for ATRS because of its combination with the level-percentage of payroll amortization method used by the plan.
- This method *backloads pension debt payments* by assuming that future payrolls will be larger than today (a reasonable assumption). But when payroll does not grow as fast as expected, employer contributions must rise as a percentage of payroll. This means the amortization method combined with the inaccurate assumption is delaying debt payments.



Challenges from Aggressive Actuarial Assumptions

Actual Change in Payroll v. Assumption

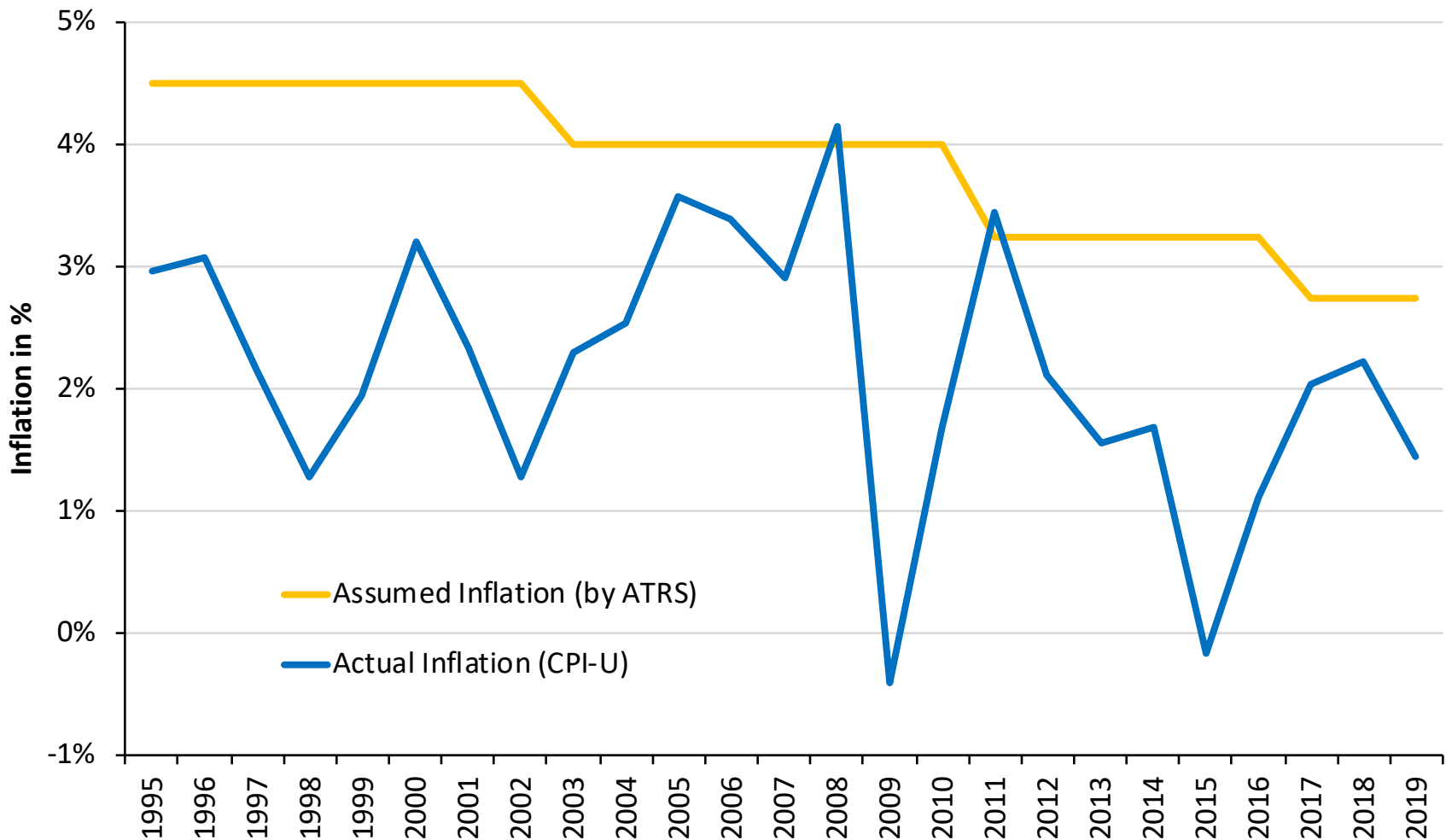


Source: Pension Integrity Project forecasting based on ATRS actuarial valuation reports and CAFRs.



Challenges from Aggressive Actuarial Assumptions

Actual Inflation v. Assumption





CHALLENGE 5: DISCOUNT RATE AND UNDERVALUING DEBT

- The discount rate undervalues the measured amount of existing pension obligations

ATRS 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 ATRS — 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 ATRS estimates what the plan will return on average in the long run and is used to calculate contributions needed each year to fund the plans.
 - The **Discount Rate (DR)**, on the other hand, is used to determine the net present value of all of the already promised pension benefits and supposed to reflect the risk of the plan sponsor not being able to pay the promised pensions.

ATRS Discount Rate Methodology is Undervaluing Liabilities



- 2. Setting a discount rate too high will lead to undervaluing the amount of pension benefits actually 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/discount the value of existing promised benefits, the result will likely be that the actuarially recognized amount of accrued liabilities is undervalued.
- 3. It is reasonable to conclude that there is almost no risk that Arkansas would pay out less than 100% of promised retirement income benefits to members and retirees.**
 - Promised benefits for vested members represent a legal contract.
- 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.

ATRS Pension Debt Sensitivity

FYE 2019 Net Pension Liability Under Varying Discount Rates

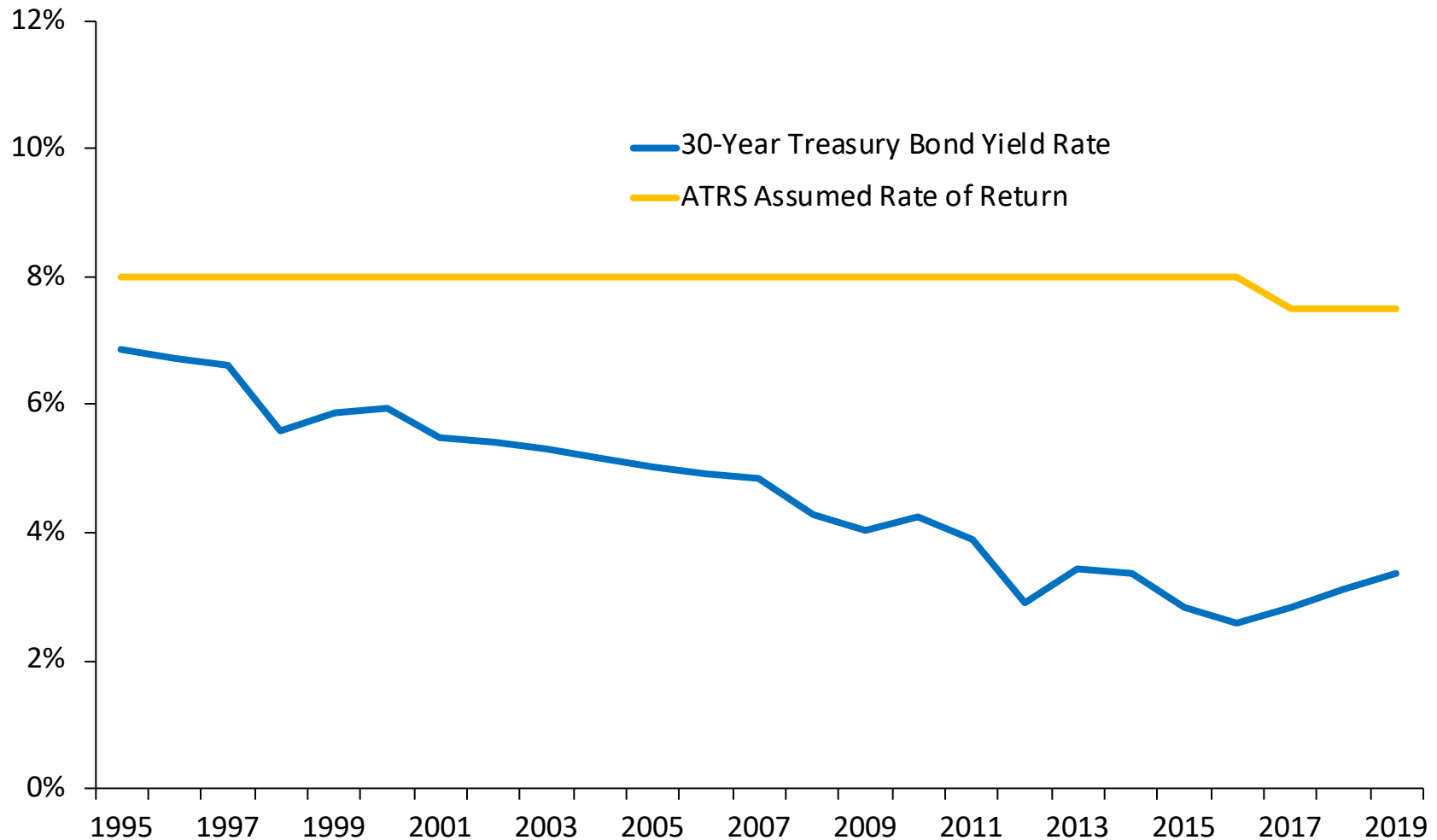


	Funded Ratio (Market Value)	Unfunded Liability (Market Value)	Actuarial Accrued Liability
7.5% Discount Rate	81.7%	\$4.0 billion	\$21.7 billion
6.5% Discount Rate	72.8%	\$6.6 billion	\$24.4 billion
5.5% Discount Rate	64.2%	\$9.9 billion	\$27.6 billion
4.5% Discount Rate	56.2%	\$13.8 billion	\$31.5 billion

Source: Pension Integrity Project analysis of ATRS GASB Statements.

Market values used are fiduciary net position and actuarial accrued liability is total pension liability. Figures are rounded.

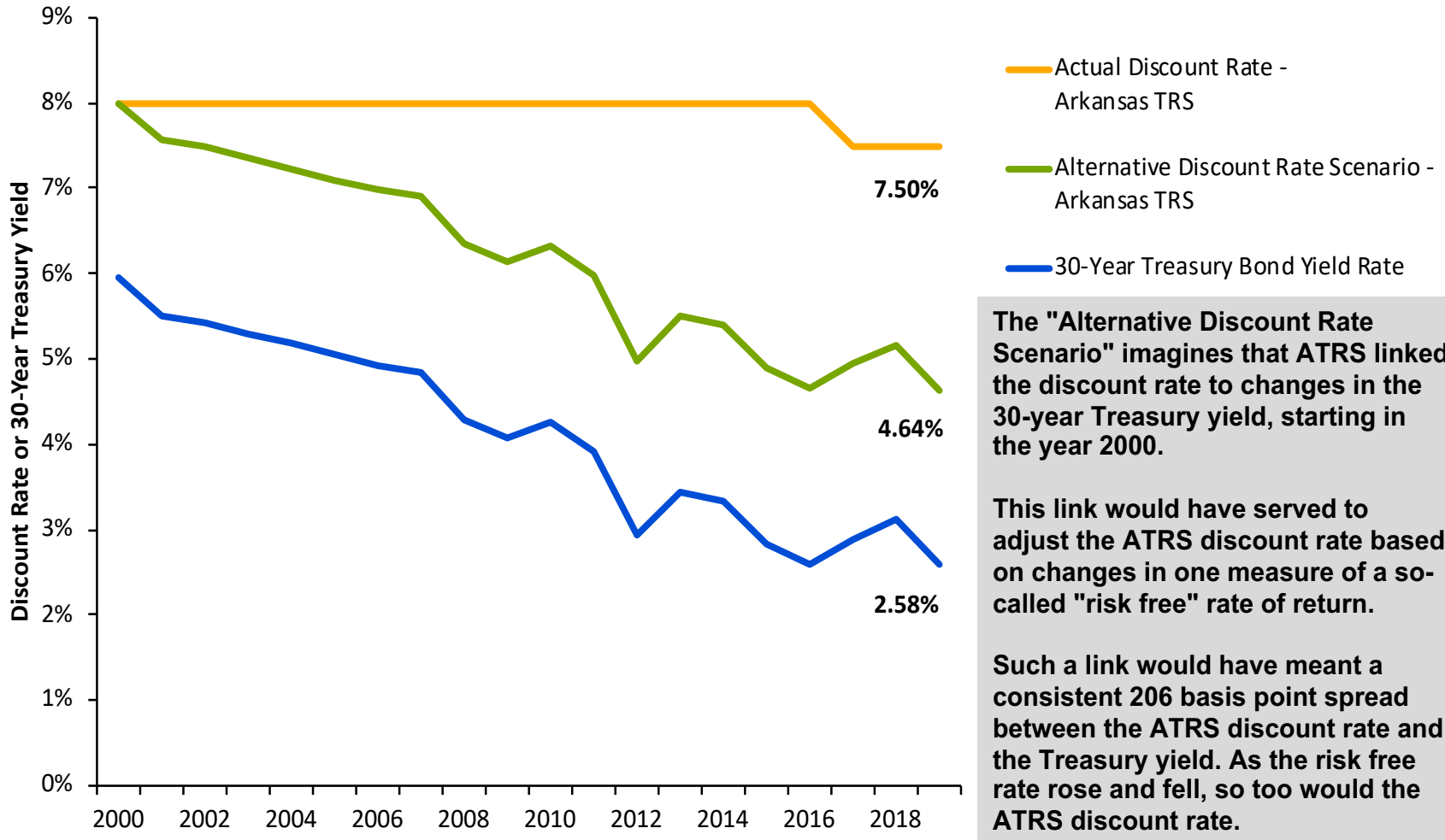
Change in the Risk-Free Rate Compared to ATRS Discount Rate (1995-2019)



Source: Federal Reserve average annual 30-Year Treasury constant maturity rate.



Comparing Change in Discount Rate to the Change in the Risk Free Rate, 2000-2019



Source: Federal Reserve average annual 30-year treasury constant maturity rate

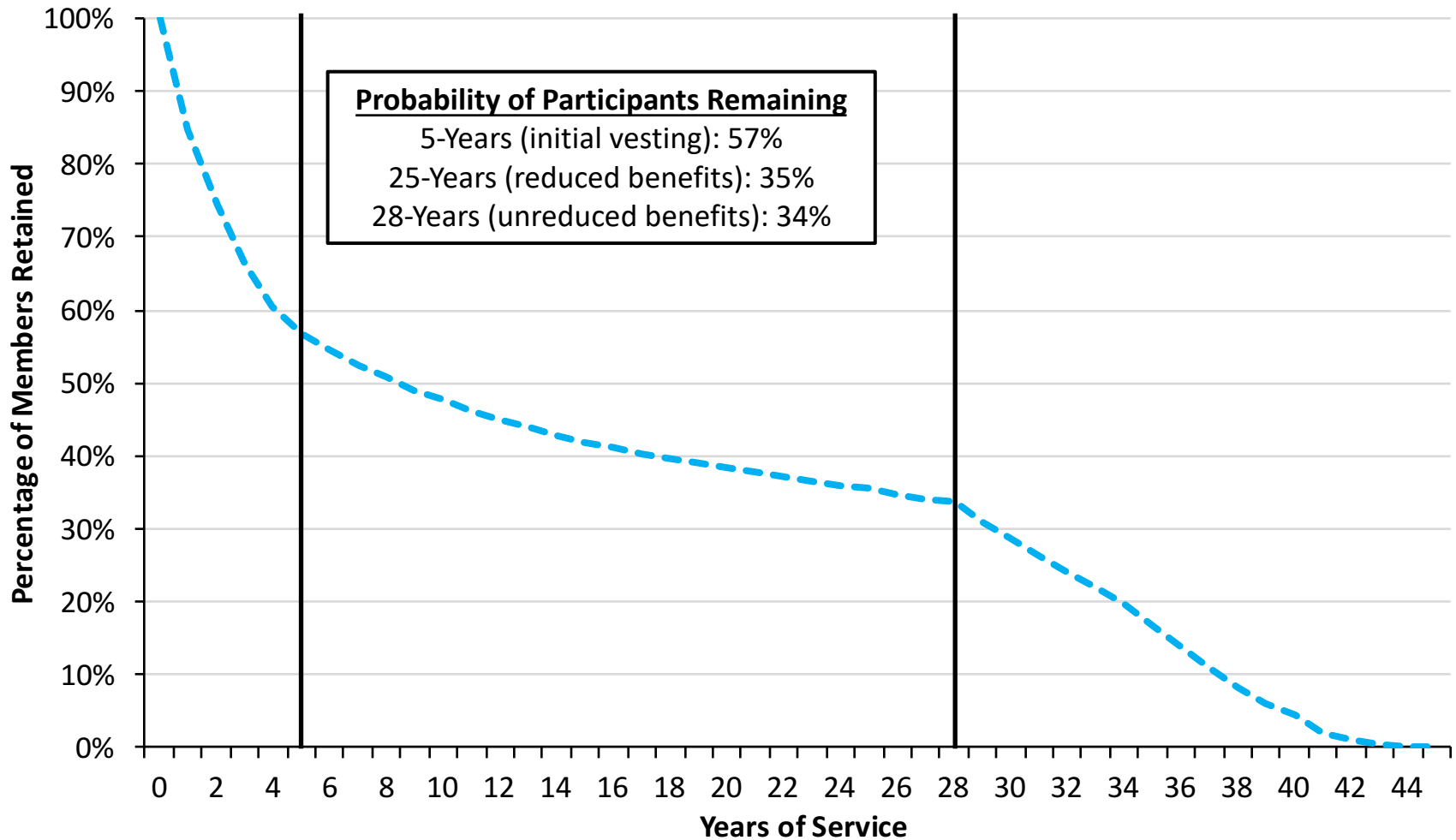


CHALLENGE 6: THE EXISTING BENEFIT DESIGN DOES NOT WORK FOR EVERYONE

- The turnover rate for members of ATRS suggests that the current retirement benefit design is not supporting goals for retention



Probability of Teachers Remaining in ATRS



Source: Pension Integrity Project analysis of ATRS actuarial reports and CAFRs.

Illustration is based on plan's 2016 assumptions and a hypothetical analysis of an average male teacher hired at the age of 25

Does Arkansas TRS Retirement Plan Work for All Employees?



- **43%** of new teachers leave before 5 years
 - Teachers need to work for 5 years before their benefits become vested.
 - Teachers who leave the plan before then must forfeit contributions their school or state made on their behalf.
 - Another 5% to 10% of new teachers who are still working after 5 years will leave before 10 years of service.
- **Just 37%** of all new teachers will reach the “break even” point
 - Per Bellwether Education Partners, teachers of the ATRS need to work **for 20 years** before the value of their accumulated pension benefits exceed the present value of their own contributions + interest. And only **37%** of new ATRS members are expected to break even.
- **35%** of all paid members hired next year will still be working after 25 years, long enough to qualify for a reduced benefits
 - Arkansas ensures that all teachers have access to Social Security benefits.



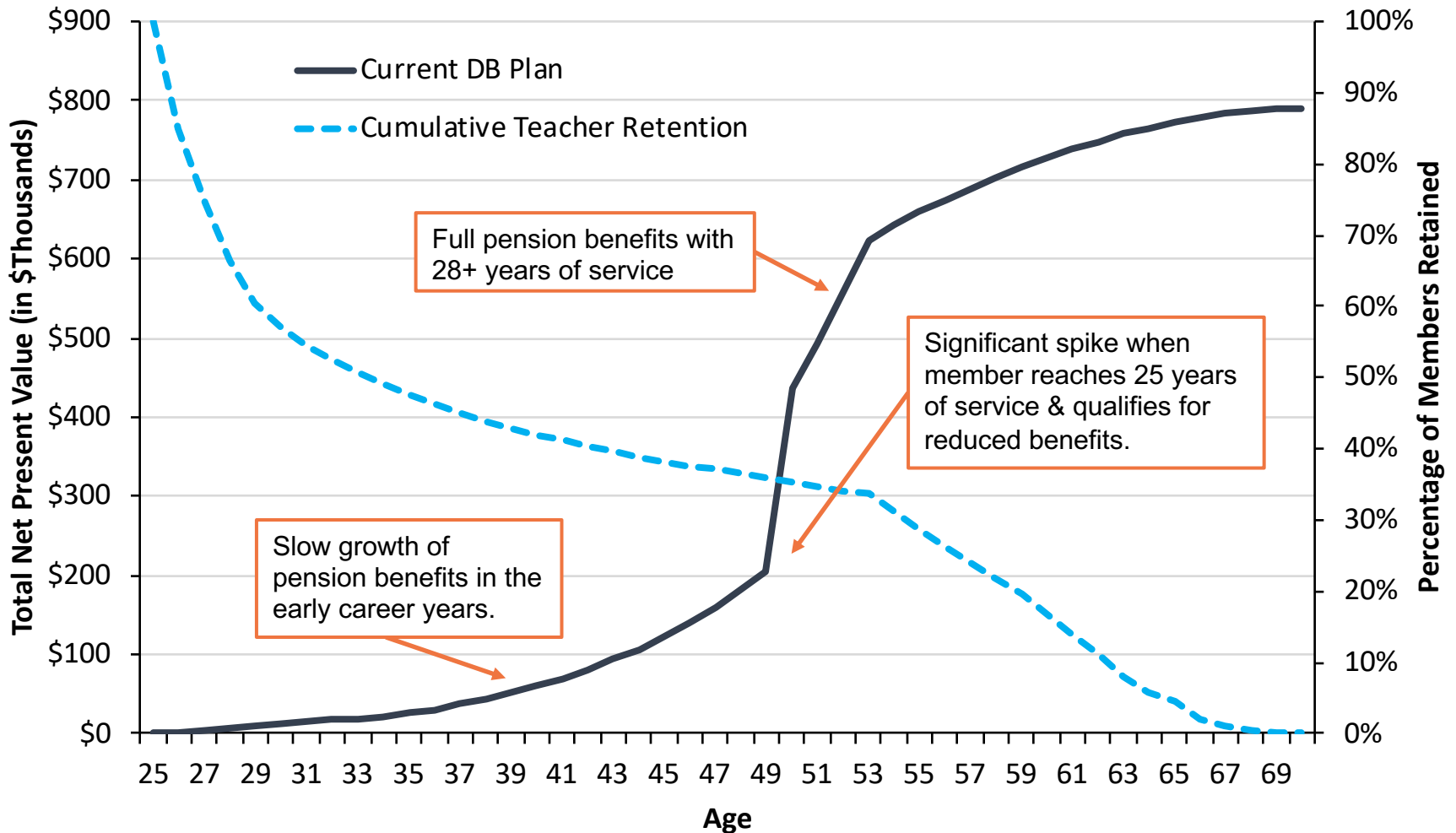
ATRS DB Benefit Overview

DB Plan Design for New Hires

- **Multiplier:** 2.15% contributory / 1.25% noncontributory
- **Final Average Salary:** Highest Consecutive 5-Years (From 2019)
- **Vesting:** 5 Years
- **Normal Retirement Eligibility:** Age 60 & 5 years of service
or Any Age & 28 years of service
- **Early Retirement Provision:** Any Age & 25 years of service
- **Average Employee Contribution:** 6.0%
- **Participation in Social Security:** Yes
- **Annual Benefit Summary (*Retirees as of 7/1/19*):**
 - Average Annual Benefit: \$23,558
 - Number of Retirees and Beneficiaries: 48,677



Most Arkansas Teachers See Limited Benefit Under the Current Backloaded Plan Structure



Source: Pension Integrity Project benefit modeling and analysis of Arkansas TRS Actuarial Valuations.

Illustration shows present value of cumulative contributions/pensions for a hypothetical average new teacher with Master's degree hired at the age of 25.



Recruiting and Retaining Teachers

■ Recruiting Teachers:

- There is little evidence that retirement plans — DB, DC, or other design — are a major factor in whether an individual wants to become a teacher or otherwise enter public service
- The most likely incentive to increase recruiting to the teacher work force is increased salary.

■ Retaining Teachers:

- If worker retention is a goal of the ATRS system, it is clearly not working. 43% of teachers leave within 5 years.
- After 20 to 25 years of service there is some retention effect, but the same incentives serve to push out teachers in a sharp drop off after 28 years of service.



FRAMEWORK FOR RESILIENT PENSION POLICY



Policy Objectives

Keeping Promises: Ensure the ability to pay 100% of the benefits earned and accrued by active workers and retirees

Retirement Security: Provide retirement security for all current and future employees

Predictability: Stabilize contribution rates for the long-term

Risk Reduction: Reduce pension system exposure to financial risk and market volatility

Affordability: Reduce long-term costs for employers/taxpayers and employees

Attractive Benefits: Ensure the ability to recruit 21st Century employees

Good Governance: Adopt best practices for board organization, investment management, and financial reporting



Pension Resiliency Strategies

Problems 1 & 4: Assumptions

- *Policy Area 1:* Reduce investment risk and align assumed return with a more realistic probability of success
- *Policy Area 4:* Review the process of setting and reviewing assumptions to ensure the overall governance is in line with best practices

Problems 2 & 3: Contribution Methods & Discount Rate

- *Policy Area 2:* Consider switching from paying statutorily determined contributions to paying actuarially determined contributions
- *Policy Area 3:* Consider changing discount rate method to better price the estimated value of promised benefits

Problem 5: Benefit Design

- *Policy Area 5.1:* Consider whether adjustments to the current system could reduce costs and risks, while still ensuring retirement security
- *Policy Area 5.2:* Consider whether a new benefit system design could work for more ATRS members and reduce future risks



Questions?

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